

Heritage inventories: promoting effectiveness as a vital tool for sustainable heritage management

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Abstract

Purpose – The purpose of this paper is to identify key elements of what makes an inventory program effective for cultural heritage conservation and management. It is hoped that it will spur discussion among heritage professionals about increasing the effectiveness of inventory programs.

Design/methodology/approach – This paper reflects on more than a decade of experience with the establishment of heritage surveys and inventories at national and citywide scales in the Middle East and North America, and through site-based heritage management projects. In addition, it reflects on engagement with international professionals involved with heritage inventories.

Findings – Heritage inventories are permanent, ongoing records that require long-term institutional resource commitments. To be effective for heritage management, inventory programs should be established with links to heritage legislation, built upon data standards, and maintain dedicated personnel, programs of activity, and systems on an ongoing basis. Inventories are fundamentally different than heritage surveys, or other data collection activities, which collect information within a specific timeframe.

Practical implications – The findings are based on engagement with real-world, practical applications. It is hoped that the recommendations included will be useful to professionals working in heritage institutions that are establishing inventory programs, or seeking to modernize, invigorate, or increase the effectiveness of their inventory programs.

Originality/value – This paper presents insights gained through engagement with a large number and variety of heritage inventory and survey programs and projects from across the world, reflecting on broad trends and patterns.

Keywords Cultural heritage, Information systems, Databases, Heritage management, Inventories, Data standards, Heritage conservation, Heritage surveys

Paper type General review

1. Introduction

A fundamental principle in the practice of cultural heritage management is that first knowing what heritage one has is necessary to managing it. A comprehensive understanding of the nature and extent of those heritage places is the first step in their conservation, and the more one knows, the more prepared one is to care for those places. This principle makes inventories an essential tool for cultural heritage management in all of its various aspects.

At the time that this paper is being written, the Islamic State of the Levant (ISIL) is waging a relentless campaign of intentional destruction and looting of the millennia-old cultural heritage in areas that it controls in Syria, Iraq, as well as Libya. ISIL has

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been employing explosives and bulldozers in its shocking offensive against the region's heritage, which began in 2014. The author participated in a summit in December 2015 in Washington, DC, focussed on the plight of cultural heritage in Syria, bringing together nearly 20 organizations who have been striving to document and protect heritage in Syria, as well as other countries in the Arab region[1]. One of the themes that occurred again and again during this summit was the essential need for comprehensive inventories of heritage places and cultural artifacts, including museum collections.

As demonstrated by these events, inventories are critical to heritage protection during armed conflicts. This is the case from both legal and practical standpoints. Inventories are a key feature of the second protocol to the Hague Convention of 1954 for the protection of cultural property in the event of armed conflict (UNESCO, 1999), which calls for the preparation of inventories as a peacetime safeguarding measure. Inventories and post-impact assessments have also contributed to the legal prosecution, and in some cases conviction, of individuals involved in intentional destruction of cultural heritage within conflicts, as occurred with the Balkan wars of the 1990s (Riedlmayer, 2002, 2007). It is possible that various organizations' documentation of ISIL's ongoing intentional destruction of cultural heritage in Syria and Iraq could be used as evidence in the future prosecution of those acts as crimes against humanity. From a practical standpoint, inventories are also essential to the protection of heritage with respect to both aerial bombing, through the compilation of so-called "no-strike lists," and on-the-ground operations (Stone, 2013). In addition, inventories are essential to systematically determining intervention priorities in response to damage caused through armed conflicts.

In April and May 2015 a series of severe earthquakes struck in Nepal and had devastating effects on the cultural heritage of that country, including in the capital of Kathmandu. In formulating a response to heritage being caught in the midst of this or any other type of disaster situation, including fires, floods, or tsunamis, one of the first needs is to consult an inventory of heritage places, which can be used as a basis for assessing the full extent of damaged and at risk heritage, and systematically determining intervention priorities. Inventories are equally essential in preparing for future disasters (Stovel, 1998).

When considering broad trends in the world today, a much more pervasive agent causing destruction of cultural heritage is rapid world population growth and increased urbanization. Combined with the imperative for constant economic growth, these various factors have resulted in an increasing pace of development for a broad range of purposes, including housing, infrastructure improvements such as roads and highways, agricultural production, natural resource extraction, and manufacturing. The increased consumption of fossil fuels to drive such widespread growth in human activity is producing worldwide climate change, an additional trend putting heritage at risk.

For organizations around the world tasked with safeguarding heritage places, inventories, and their connection to legal regimes for heritage protection are the most essential means at their disposal for mitigating such massive forces propelling change to the built environment. They also can provide a record of heritage destroyed by natural disasters or human activity. Inventories can allow for research and comparison of large numbers of heritage places to aid in their classification and comparison of significance, integrity, and condition. These assessments can be used as a basis for prioritizing management interventions, whether for protection, conservation, reuse, or presentation. In essence, inventories are intended to tell us what heritage places are significant, where they are located, and what condition they are in, which is critical

information for responding to a dynamic world. The recognition of important heritage places through publicly accessible inventories also promotes their broader understanding, appreciation, and public engagement with those places, which is often an important factor in heritage stewardship. Public accessibility can also encourage citizens to add knowledge to existing records and promote public input on heritage places not included in inventories. The information contained in accessible inventories also has the potential to provide great value in heritage-related research, and in guiding new investigations. From the perspective of sustainable development, heritage inventories employed deftly through modern information technologies have the potential to be the most essential tool for proactively responding to all of these phenomena with the aim of sustaining the continued existence of significant heritage places to be the patrimony, or inheritance, of future generations. Conversely, without effective inventories, and if information in them is not accessible to government agencies making key decisions about the built environment, then heritage is at risk from lack of information.

In addition to the Hague Convention, the importance and role of inventories is recognized in various international heritage charters, conventions, and recommendations, including the Athens Charter (Tyrwhitt, 1933), the UNESCO (1972a, b) World Heritage Convention, the UNESCO recommendation concerning the protection, at national level, of the cultural and natural heritage, the ICOMOS, International Committee on Archaeological Heritage Management (ICAHM) (1990) charter for the protection and management of the archaeological heritage, the ICOMOS (1996) principles for the recording of monuments, groups of buildings, and sites, the UNESCO (2001) convention on the protection of underwater cultural heritage, the UNESCO (2003) convention for the safeguarding of the intangible cultural heritage, the ICOMOS (2008, 2011) charter on cultural routes, and the Valletta principles for the safeguarding and management of historic cities, towns and urban areas. Inventories are further recognized in regional heritage norms, such as the Council of Europe's (1985, 1992) convention for the protection of the architectural heritage of Europe and European convention on the protection of the archaeological heritage, and national laws pertaining to heritage in many countries.

Despite frequent attention paid to inventories in international and regional heritage norms as well as national legislation, from this author's perspective there has been a lack of attention focussed on defining the key elements of effective heritage inventory programs. Therefore, this paper seeks to go beyond arguing for the value of inventories in the conservation of cultural heritage places. Instead, it aims to identify key activities and systems that need to be supported on an ongoing basis in order for inventories to be effective heritage management tools. This may be useful to professionals working in organizations that are either in the process of establishing a heritage inventory program, or that are looking to modernize, invigorate, or increase the effectiveness of their inventory program. This may also be of value to discussions about how inventory programs should be supported within the context of diminishing resources for heritage organizations. This paper is oriented toward professionals who are either directly or indirectly involved with inventories that are used specifically for the management of heritage places, including through protection, conservation, regulation, and valorization. In many cases such professionals work for government authorities; in others they work for nongovernmental organizations.

The recommendations that follow are based on more than a decade of experience dealing with the establishment of heritage inventories and surveys at national and

citywide scales in the Middle East and North America, and through involvement in site-based heritage conservation and management projects. They are also based on engagement with professionals from across the world who are involved in heritage inventories and related standards and information technologies, both through involvement in the Arches project (see Myers *et al.*, 2016) as well as participation in CIPA[2]. While it is not possible to address this subject comprehensively within the constraints of a single article, it is hoped that it will help to spur a discussion and engagement among heritage professionals who grapple with this critical topic.

2. Inventories and data collection activities: fundamental differences

When discussing practice relating to heritage inventories, it is useful to address differences between inventories and data collection activities, such as heritage surveys, the role of data collection with respect to inventories, and the limited value of data collection without investment in ongoing inventory programs.

2.1 Inventories

Inventories are ongoing records for identifying, as well as describing heritage places for a range of purposes, including heritage management and protection, and public appreciation. Inventories are typically produced at a variety of geographic scales, including international, national, regional, local (e.g. city), and site levels. In some cases, topical or thematic inventories are produced, such as of shipwrecks, rock art, or industrial heritage, whether through legal mandate or by professional or voluntary organizations with topical concerns.

Information within an inventory should evolve as more is learned about particular heritage places, as additional heritage places are identified, and as the status of those heritage places changes. The physical environment is in a continual state of change, whether due to human or natural forces. Human cultural traditions as well as conceptions of what is culturally significant also are in an ongoing state of flux. New information periodically emerges about the significance of heritage places. Heritage places are newly revealed from time-to-time, whether through active investigation or through coincidence, such as in the discovery of buried ruins under a demolished building or through a wildfire burning away vegetation covering an archaeological site.

For inventories to be effective tools for the range of purposes mentioned previously, the information contained within them must be kept up-to-date to reflect these various changes in the state of the world, and our interactions with and understanding of it. At a basic level, inventories should record the location and spatial extent of a heritage place and reflect whether it still exists, has been destroyed, or otherwise has been significantly altered or degraded.

2.2 Data collection activities

Information within inventories is kept current as well as improved through data collection activities, such as surveys, excavations, and analysis of remote sensing data, such as satellite imagery. Discrete data collection activities occur over a limited time duration. As with inventories, data collection activities can be undertaken at a variety of geographic scales, and with a thematic or topical focus. Sometimes they are oriented toward geographic areas that have never been formally investigated or toward heritage typologies that have never been recorded, and are thus geared toward heritage identification. Others are oriented toward getting a more current view of the state of heritage places, such as after a substantial amount of time has elapsed since a prior

survey, or in direct response to changes in the environment, whether due to natural or human causes. Resulting data represents a snapshot from a particular point in time. Therefore, over time many aspects of it will increasingly be considered outdated.

Data collection activities have the potential to create information that can be incorporated within inventories, both to fill in gaps and make information more current. To serve this purpose, organizations or individuals designing and implementing data collection efforts must coordinate their efforts with those responsible for inventories intended to receive new data. To enable the integration of collected data into a digital inventory, prior to the start of the data collection activity agreement should be reached between coordinating organizations so that data generated adheres to applicable data standards and uses a compatible data structure and data formats to ensure it is integratable with minimal effort. As is the case with inventories, long-term data preservation is an important consideration for data collection activities.

3. Key characteristics of effective inventories

For heritage inventories to be effective in the range of uses mentioned previously, the information within them should have the following characteristics[3]:

- *Accurate.* Making decisions affecting heritage places, such as issuing a permit to demolish a building or approving plans for the development of infrastructure, relies on accurate information. Errors in key inventory data, such as location or designation status, could have disastrous effects.
- *Comprehensive.* Inventories that cover defined geographic or administrative areas strive to identify, even with a basic level of information, all significant heritage places within those areas. This will help to achieve the aim of safeguarding all significant heritage places within that area. Gaps in the geographic coverage of an inventory can put significant heritage places at risk. In most jurisdictions, the pursuit of comprehensiveness is never fully achievable given that buried archaeological remnants are incrementally revealed over time.
- *Current.* As mentioned already, information in inventories should be up-to-date to ensure that decisions affecting heritage places are well informed.
- *Authoritative.* In some cases inventory systems should serve as the definitive system of record of a particular government jurisdiction or organization. This is the case, for example, when government officials or the public, including property owners or prospective property buyers, need to know the designation status of a particular heritage place as a factor in decision making.
- *Controlled accessibility.* In order for the overarching aims of a heritage inventory program to be realized, information within an inventory needs to be accessible to a range of authorized users, who very often have differing locations and various affiliations. Confidential or restricted information, such as detailed information on archaeological sites and places held sacred by indigenous groups, should only be made accessible to those who have been identified as authorized users and secured against access by those not authorized. Far too often, information may be less accessible than is desired due to limitations associated with the information technology of an inventory system, such as a system not being web based or having limited search or data export functionality. In other cases existing

inventory data are inaccessible due to limitations in data compatibility, such as when data are in a format that is no longer readable.

- *Secure.* Information within an inventory must be protected from accidental loss, erasure, corruption, or intentional damage.

4. Elements to promote inventory effectiveness

The following elements have been identified as critical components of programs to implement effective heritage inventories. These elements have been divided into two categories: elements to put in place when setting up an inventory system; and areas of activity and systems requiring ongoing investment.

4.1 *Elements to put in place when establishing inventories*

Two elements are essential when setting up an inventory to ensure that it is structured to be effective.

Links to legal regimes for heritage protection and valorization. Statutory heritage lists or registers are one of the primary tools of national, regional, and local legal regimes for the protection and valorization of heritage places. They typically identify those heritage places that have been determined worthy of legal protection, those heritage places for which changes are guided by regulation, and for which consideration is required under formal systems for planning or impact assessment. In some places lists or registers also identify heritage places whose owners qualify to receive financial incentives for the benefit of their heritage properties. Typically, laws or their associated regulations identify criteria and processes for the evaluation of heritage places to determine whether their level of cultural significance merits their inclusion on a statutory list.

Official national, regional, and local inventories typically contain a full information record about each heritage place designated on relevant statutory lists. In addition, such inventories typically contain information records on all other heritage places that are not formally designated. In essence, official inventory systems serve as the day-to-day, “go-to” information resource for applying heritage-related laws and policies. Non-statutory inventories, such as those compiled by heritage trusts or other non-profit organizations, may be created for other purposes but can also be valuable precursors for official heritage lists. Their usefulness in this respect can be greatly enhanced if they are designed to easily integrate information into statutory inventories.

Data standards. Data standards are a key element of any inventory system to ensure that information is created in a consistent and valid way over time, even through the contributions of a range of individuals who may have varying interests, expertise, and experience. Data standards are also essential to promoting the retrieval and integration of inventory information. The UK Historic Environment Data Standard provides the following simple definition: “A data standard is simply a list of what information should be recorded and how it should be recorded, to meet a particular objective” (English Heritage, 2012, p. 8). In defining what information should be recorded, at a basic level this should include a list of categories of information to be recorded and their attributes. For example, a person category of information, which may be associated with a heritage place, has attributes of a name as well as birth and death dates and locations. Defining how information should be recorded is likely more complex and specific. For example, for the date attributes associated with a person, the how part of

the data standard might specify that dates can be expressed in year, month, and day fields. It might also identify specific fields in an information system through which those attributes should be recorded. The how part of the standard may also specify which fields within an information system are mandatory and which are optional for completion, which information fields should have a single value and which may have multiple values recorded, which fields have dropdown values restricted by controlled vocabularies, and which have free text fields with a specified range of text characters, etc. Such data standards are typically defined in detail through written guidelines, including definitions of the meaning of each category of information and its related attributes.

Some organizations may find of interest work that has been undertaken to establish international standards for the inventory of heritage places. In the early 1990s two such standards were developed to identify those “core,” or essential, items of information that should form a part of any cultural heritage inventory: the Core Data Index to Historic Buildings and Monuments of the Architectural Heritage adopted by the Council of Europe in 1995 (Thornes and Bold, 1998a), and the International Core Data Standard for Archaeological Sites and Monuments adopted by the International Committee for Documentation (CIDOC) of the International Council of Museums (ICOM) and the Council of Europe in 1995 (Thornes and Bold, 1998b). In the late 2000s the CIDOC Archaeological Sites Working Group made the decision to revise the International Core Data Standard for Archaeological Sites and Monuments to bring it up-to-date given that it was developed before the introduction of mass computing, the internet, the development and widespread adoption of Geographic Information Systems. As they were so closely linked, the group decided to combine the two standards mentioned above. The CIDOC working group, through input from CIPA, is now preparing the international core data standard for archaeological and architectural heritage, which is intended for use in the creation of inventories for both built and archaeological heritage.

Another key component of a data standard is controlled vocabularies, which have been defined as “an information tool that contains standardized words and phrases to refer to ideas, physical characteristics, people, places, events, subject matter, and many other subjects” (Harpring, 2010, p. 1). Controlled vocabularies range in form and complexity from simple word lists to hierarchical, multi-lingual thesauri. Controlled vocabularies are a vital tool to help ensure that data creation is consistent and valid, and that both information creators and retrievers clearly understand when they are referring to a specific thing. The application of controlled vocabularies when creating inventory records can also be extremely powerful in the retrieval of inventory information within modern information systems. For any particular inventory, controlled vocabularies for all topics relevant to that inventory’s data standard should be created through agreement among subject-matter experts. Those controlled vocabularies should be closely managed over time, as the need for new or variant terms may emerge. In some cases, thought should be given to relating controlled vocabularies across multiple inventories, such as when a regional inventory needs to provide data to a national inventory, or when searching across information systems is desired.

Given that modern heritage inventories are in almost all cases digital, an additional essential type of standard relates to digital data. An organization managing a digital inventory should prescribe the data structure, formats, and other technical characteristics of data created or provided for that inventory. Particular details will

often depend on the digital information system, or systems, that the organization uses to manage inventory data. In some cases organizations may wish to prescribe that specific information systems or other digital applications are used to create data. This may minimize the effort required to incorporate data into a permanent inventory system, and minimize the risk of data incompatibility.

All data standards should be expected to be refined and otherwise improved over time based upon accumulated experience in their use. Some aspects of standards will require modification as information technologies evolve. Some heritage organizations that manage inventories maintain standing organizational entities devoted to the ongoing maintenance, improvement, and application of their data standards. Examples include Historic England's Data Standards Unit, the UK Forum on Information Standards in Heritage (FISH), and the Jordanian Department of Antiquities' MEGA-Jordan Scientific Committee.

4.2 Areas of activity and systems requiring ongoing investment

Given that a heritage inventory is an ongoing record that should be kept up-to-date, and given the other requirements of maintaining an effective inventory, it follows that an organization responsible for an inventory should maintain an ongoing commitment to invest in the following four additional types of supporting activities and systems:

Dedicated personnel and capacity building. Organizations responsible for heritage inventories should have a permanent program of dedicated staff able to work with the inventory, and an ongoing program for building the capacity of those personnel to carry out its work. Dedicated staff may include those responsible for data collection (e.g. heritage specialists involved in field survey), for maintenance and compliance with standards, and for management of data and IT systems. Capacity building activities may include orientation to the meaning and application of data standards, and training in field recording and in the assessment of heritage places. In some cases capacity building regarding techniques for public engagement may be beneficial. Very often IT-oriented capacity building is needed, such as in the use of applicable information systems, in digital data management, and perhaps in satellite image analysis.

Managing information systems and data. It is essential that an organization responsible for a digital inventory implements measures for the long-term management, accessibility, and safeguarding of inventory data. This should include systems for data security and data backups, and a policy regarding data accessibility. It should also provide for the maintenance and occasional replacement of information systems as information technologies evolve. One should anticipate that as transitions occur from one information system to another, data will need to be exported from old systems and imported into new systems. Additionally, attention should be paid to having data in formats that will allow for long-term readability. With this aim in mind, thought should be given to maintaining data in formats that are well established, which are software-platform independent (i.e. do not require a specific software program to open and interpret or understand), and can be read and processed by a variety of readily available, including non-proprietary, software tools.

Improving information and keeping it current. Information within inventories should also be improved over time, including filling in information gaps. As mentioned previously, information within an inventory needs to be kept up-to-date for the inventory to be an effective tool. Keeping information current requires ongoing activities to gather new information about the evolving situation. This element might

include active efforts to keep apprised of new development, integration of information on evaluations of heritage significance and new heritage listings, ongoing research including as new information sources becomes available, periodic field surveys, analysis of remotely sensed data, as well as ongoing mechanisms for public input.

Prioritizing critical information for heritage protection. For organizations responsible for safeguarding heritage places, it is critical that an inventory have accurate information on the location and extent, such as the legal boundary and buffer zone, of heritage places. When it is necessary to prioritize the expenditure of limited resources in safeguarding heritage places, it is also essential to have valid and up-to-date information on both their relative significance and condition (including apparent threats). It is recommended that emphasis be placed on maintaining the quality of information in these categories if heritage protection is a high priority.

5. Conclusion

For organizations to have official inventories be effective tools for safeguarding heritage places, they should be established with links to heritage legislation and built upon solid data standards, as well as maintain dedicated personnel, programs of activity, and systems on an ongoing basis. This requires a long-term institutional commitment to investing resources. The short-term investment in carrying out heritage surveys or establish a heritage inventory, no matter how well resourced and executed, will very soon become obsolete if these endeavors are not sustained over the long term.

Notes

1. "Protecting Our Shared Heritage in Syria: An International Summit to Promote Collaboration," sponsored by the US National Endowment for the Humanities, was held December 10-11, 2015. More information about the public portion of this summit is available at: www.asor.org/news/2015/12/neh-summit.html (accessed January 28, 2016).
2. The Arches Heritage Inventory and Management System is a modern software platform purpose-built for the creation and management of inventories to support effective heritage place management. Information on the Arches platform may be found at the project website (<http://archesproject.org/>), where along with participating in the community forum visitors can interact with an online demo, download the software code, access documentation, view the project roadmap, and receive project updates.
3. The characteristics noted could be both elaborated on and expanded. For a more elaborated discussion of this topic, as a starting point one could consult the ISO 9000 family of quality management systems standards (https://en.wikipedia.org/wiki/ISO_9000 (accessed December 28, 2015), or the online resources of the International Association for Information and Data Quality, available at: <http://iaidq.org/> (accessed December 28, 2015).

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