**label: 3**

**title:** Considerations for Building Inventories for Effective Heritage Management

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Given the information presented in the preceding chapters, what might heritage organizations consider in their particular cases when approaching the establishment, modernization, or invigoration of heritage inventories or increasing their effectiveness? In this chapter, a series of considerations is presented for an organization to use in examining what is needed in its particular case given its own circumstances.

The considerations that follow are based on a checklist created by the Getty Conservation Institute, which was informed by its research as well as collective experiences over a number of years dealing with heritage inventories in a variety of contexts and stages of development. Many of these considerations relate to the potential types of infrastructure, resources, and activities to support inventories described in **chapter 2**.

The considerations are presented with the most fundamental first followed by others that build upon them. (Note that not all considerations will be relevant to every heritage organization.) A **Resources sidebar** provides descriptions and directions to further guidance, related standards, or relevant examples of inventory practice.

## Legal and Organizational Considerations

The following are considerations relating to the [legal and policy framework](#_Does_a_Legal), [potential inventory consolidation](#_How_Many_Inventories), the [inventory’s purposes](#_What_Are_the), and related [roles and responsibilities](#_Who_Will_Hold).

### Does a Legal and Policy Framework for the Inventory Need to Be Established or Enhanced?

For an official heritage inventory of an administrative jurisdiction, a first consideration is to determine whether a legal and policy framework for the inventory needs to be established or enhanced. The following are specific points to consider examining in this regard:

* Does the existing legal and policy framework of your administrative jurisdiction explicitly authorize and support the jurisdiction’s heritage inventory or inventories? If not, then consider exploring ways to provide for that formal authorization and support, perhaps through amending the legal and policy framework.
* If the inventory is already formally linked to the related legal and policy framework, are there ways the framework could be enhanced to strengthen the inventory’s effectiveness as a tool for heritage management? Has the historical development of the legal and policy framework led to the creation of multiple topical heritage inventories (e.g., archaeological, architectural and urban, intangible) that would function more effectively if they were consolidated? (This question is dealt with in further detail in the [next section](#_Determine_hHow_Many).)

An in-depth analysis may help determine how a legal and policy framework might be enhanced to better support a heritage inventory or inventories. It may also be worthwhile to look at examples of how other legal and policy frameworks support inventories for reference. See **Legal and Policy Framework** and **Inventory Consolidation and Integration** in the sidebar for examples.

### How Many Inventories Are Needed for a Specific Jurisdiction?

When a heritage organization has the opportunity to establish or modernize an inventory program, a first-order consideration may be to determine how many inventories would be optimal for the jurisdiction. If multiple inventories and related inventory databases already exist, a related question is whether any of them should be consolidated. This question may be primarily relevant for national-level inventories, and occasionally for regional-level ones.

Administrative jurisdictions sometimes have legal frameworks in which multiple official heritage inventories, lists, or registers are specified. In many such cases, different statutes from different points in time relate to different heritage types, and they have sometimes resulted in the creation of different government agencies responsible for those specific heritage types. For instance, some countries have specific laws relating to archaeological heritage, with corresponding agencies and inventories devoted only to that heritage. The same may be true for individual lists or inventories for other heritage types, such as maritime heritage or historic battlefields. This approach to heritage management typically arose in a bygone era when heritage administration and practice were distinctly divided among specializations.

In some jurisdictions this is also the case for indigenous heritage, in which the separation from other heritage types has been purposeful, to uphold confidentiality of information to respect concerns among indigenous communities. More recently, separate inventories of intangible heritage are emerging in some jurisdictions, as intangible heritage is often deemed to be distinctly different from more traditionally defined tangible heritage. Such separation of heritage types into distinct inventories has often resulted in separate databases with differing data standards and structures.

As is well known, such separations in law, in administration and practice, and in data sets typically lead to numerous practical challenges and shortcomings. Having differing inventories separated by distinct databases often prevents searching across data sets. This may be compounded by different specialists using different, frequently incompatible terminology, even when referring to the same heritage item (e.g., architectural historians and archaeologists labeling the same type of building differently). Having different data structures and vocabularies for each inventory will also prove to be barriers should the inventories need to be unified in the future.

As mentioned in the **introduction**, in recent years the heritage field has experienced a trend toward a more holistic approach to management, in which the variety of heritage typologies are integrated within a unified system. A more holistic approach is now broadly deemed to be more efficient, effective, and sensitive. Following this trend, some heritage agencies have taken proactive measures to rationalize their separate inventories into fewer ones, or even a single inventory database, and to unify their controlled vocabularies. Some have even integrated their field survey teams to include a range of specialties, such as both archaeology and architectural history. See **Inventory Consolidation and Integration** in the sidebar for examples of how two jurisdictions are handling these issues.

### What Are the Primary and Secondary Purposes of the Inventory?

Another first-order consideration is what purposes an inventory will serve, at the primary and secondary levels, and perhaps beneath that. Very often, inventories of public agencies first serve the function of heritage protection and management and land-use planning, as well as informing the public (which is typically a requirement for any public agency). Then, secondarily, they serve research needs. Confirming these priorities will help guide the selection of types of information that need to be contained in an information system, culled from legacy data, collected in the field, and so on.

Problems can arise when trying to make an inventory database equally serve everyone’s wishes. Experience has shown that inventory databases function better when they are designed to do a limited number of tasks simply. Public agencies also typically have limited resources, and therefore need to prioritize the areas of focus of their infrastructure and activities.

### Who Will Hold What Roles and Responsibilities for the Inventory?

Another key consideration for an inventory program is who will hold related roles and responsibilities, and particularly who will serve in primary roles. In some cases, roles and responsibilities may be spread across multiple organizations. Roles and responsibilities may first be determined at an organizational level (i.e., which organization or organizations have what responsibilities), then at a suborganizational level, and finally at an individual personnel member level. In some cases, roles and responsibilities may be specified within the relevant legal and policy framework.[[1]](#endnote-1)  Spreading roles and responsibilities across an organization or multiple organizations will require mechanisms for coordination.

## Users, Languages, and Access

The following are considerations relating to [inventory users](#_Who_Will_the), the [official language or languages of the inventory](#_Should_the_Inventory), and [categories of information access](#_What_Categories_of).

### Who Will the Inventory Users Be?

An additional consideration is what categories of users will be using the inventory. Determining user types will flow logically from defining the purposes the inventory serves. Different types of users will have varying motivations, interests, and technical capabilities and will seek different levels of information detail. Identifying user categories and needs can in turn provide a basis for defining different categories of inventory information system access, as well as system user privileges with respect to adding, editing, deleting, and exporting information (see [What Categories of Inventory Information Access Are Needed?](#_Define_What_Categories)).

Clearly, primary users will include those who are responsible for managing and maintaining the inventory and adding, updating, and editing information within it. A small number of individuals will need exclusive privileges to administer the database and its other users; in IT parlance these would be considered superusers.

Another user group of primary importance is other heritage professionals from the government agency or agencies mandated with heritage management in the jurisdiction served by the inventory. This group might include planners, architects, archaeologists, historians, and asset managers.

Typically, other types of nongovernmental heritage professionals also require inventory access, such as heritage consultants, professional researchers, and NGO staff. Other types of nonheritage specialists may need inventory access for professional purposes, for example, other government planners and environmental, planning, or design consultants. Other typical inventory users include community groups, educators and students, property owners and developers, amateur researchers, and casual users.

### Should the Inventory Have More than One Official Language?

If an inventory is for a multilingual jurisdiction, its official operating language (or languages) is an important consideration – one that is sometimes specified by law. This determination will affect things such as the text of the user interface of an inventory database, the languages of database drop-down values or vocabularies, the language permitted for free-text data entry into the database, and the language used for related written guidance and other informational materials and in inventory-related public meetings. Some jurisdictions will need multilingual inventory databases as well as related materials and activities. Knowing the intended inventory users will inform the determination of inventory languages. Having a multilingual inventory may at some point necessitate efforts to translate terms and texts between languages.[[2]](#endnote-2)

Web-based tools and standards also exist for collaborative creation and management of translations of the user interface and potentially data input components of information systems and apps, documentation, and websites. This process is known in information technology practice as *internationalization and localization* ({{Souphavanh and Karoonboonyanan 2005}}).

### What Categories of Inventory Information Access Are Needed?

Another essential consideration when establishing an inventory is to determine what users should have access to which information. In some cases, most information will be made accessible to all users, including the general public. Very often, however, access to specific types of information will be restricted by law, such as detailed or location information on archaeological sites and places held sacred by indigenous groups. Typically, certain information must be held confidential, such as personal information about property owners or information system user credentials. Access to some data may also be limited by copyright and privacy restrictions. See **Information Accessibility** in the sidebar for more on this topic.

The inventory program may also need to create an information access policy. As mentioned previously, such a policy can help ensure that information access is both provided and controlled in accordance with the relevant laws for a jurisdiction, such as those covering freedom of information, information privacy, copyright laws, and the restriction of confidential information relating to archaeological sites and sacred places.

Once an information access policy has been created, the inventory DBA can create different user groups for specific categories of users, and assign to each user group appropriate privileges to access, create, edit, delete, and export or download data. For example, data editors will likely need access to provisional data edits to determine whether data standards are met before that information is approved and made accessible to the bulk of users.

## Inventory Information

The following are considerations related to inventory information record types, as well as [controlled vocabularies](#_Are_Controlled_Vocabularies).

### What Record Types Need to Be Included in the Inventory?

Another important consideration is what types of information records an inventory should contain (see **fig. 2.2a**). This decision may be informed in part by the types of heritage to be recorded in the inventory (e.g., buildings, landscapes, archaeological sites, districts or areas, maritime heritage, intangible heritage). Inventories also often contain records for activities such as surveys, excavations, and conservation interventions; persons and organizations such as architects, historical figures, and heritage organizations; and information sources such as images, reports, historical maps and documents, audio or video recordings, as well as archives or other repositories. Other record types may be needed depending on the particular requirements of an inventory program.

### What Are the Scope and Details of Information for Each Inventory Record Type?

Following from identifying the heritage resource types and other record types to be included in the inventory, a next-order consideration is what set of information each inventory record type should contain (see **fig. 2.2b**). The specific data fields for each type of database record will need to be defined, as well as the data type of each field (e.g., free text, numeric, address, geospatial location, controlled vocabulary). When considering incorporating inventory data within an information system, many additional related details will need to be determined, depending on the characteristics of the information system. See **Data Standards** in the sidebar for more on this topic.

### Are Controlled Vocabularies Needed for the Inventory?

As discussed in the **Controlled Vocabularies** sidebar in chapter 2, if some data fields within an inventory database are to have drop-down values, an important related task is to define specific vocabularies for each field, as appropriate for a given jurisdiction. This effort may entail defining, for example, valid cultural periods, architectural styles, site or building types, categories of heritage designation, and so forth. Certain vocabularies function best when organized in hierarchies, such as the Neolithic period being a subtype of the Prehistoric period, or mineral extraction sites and furnaces being subtypes of industrial sites.

The task of defining controlled vocabularies may require the involvement of a group of professionals with expertise in the range of topics covered, as well as familiarity with knowledge organization practices. An organization may also wish to identify specific staff that will have ongoing responsibility for the management of controlled vocabularies, and perhaps also a standing reference group to consult as questions or issues arise. See **Controlled Vocabularies** in the sidebar for several resources on this topic.

**[[Insert Resources sidebar here – or anywhere it fits; placement does not matter]]**

## Sources, Guidance, and Activities

The following are considerations regarding [sources of legacy data](#_What_Legacy_Data), ongoing [management of inventory information](#_How_Will_Inventory), and [external engagement](#_How_Will_the).

### What Legacy Data Sets Should be Incorporated in the Inventory?

A key step when establishing or enhancing a heritage inventory is to identify any relevant sets of legacy data to potentially incorporate. Legacy data might collectively help form an initial data set for an inventory or may otherwise add valuable information. Such legacy data might exist within your own agency or with other government agencies, academic institutions, or NGOs, or with individual researchers, libraries, or archives.

Once relevant data sets are identified, they may be assessed for potential inclusion within the inventory. Factors to examine include whether information is outdated and no longer of value, as well as accuracy and precision (perhaps geographic locations were recorded before the advent of modern geospatial technologies). The format of legacy data is also an important consideration, particularly whether data is still readable (sometimes data in proprietary formats is not), and whether the investment required to convert legacy information to a usable format is feasible and justified.

After valuable legacy data sets have been identified, steps may be taken to secure copies from organizations or individuals who hold them. This may require securing usage rights and ensuring necessary credits will be included, such as the name of the person or entity that holds the rights to each image.

A later step with legacy data is to prepare the data to be imported into a target heritage database. If legacy data resides in other databases, it will need to be transferred through a multi-step ETL (extract-transform-load) process. Preparing legacy data for import inevitably involves an extensive investment of time in data cleanup (e.g., addressing errors or inconsistencies), formatting, and mapping data fields from the legacy database to the target database structure. Once that legacy data is cleaned and mapped to a target database, the import process is typically an iterative one, with data errors or inconsistencies being revealed with each import attempt. Further legacy data corrections are needed after each step, until an import succeeds without errors.

### How Will Inventory Information Be Managed Over Time?

For your inventory program, what measures should be implemented to create, collect, update, add to, and improve information over time? Improving the inventory record is a continuous process that is usually best achieved through a variety of means. As discussed in chapter 2, in the section **Information Collection, Creation, and Editing**, common related activities include:

* Compiling legacy data or existing information
* Office- and collection-based research
* Remote sensing
* Conducting surveys
* Forming partnerships with other organizations
* Soliciting public participation and input
* Cultural mapping
* Getting input from other heritage-related processes

Consider which of those activities are needed and feasible in the case of your inventory.

An important part of improving inventory information is determining a regular schedule for proactively assessing its status to identify gaps and particular areas in need of updating. When relevant, thematic frameworks and thematic studies or historic context statements can aid in this process (see the **Overview** **sidebar** on this topicin chapter 2 for more on these tools). Through this sort of assessment, a heritage organization might recognize the need to carry out new surveys or other data collection activities or determine topical areas in need of new research to help address inventory gaps. Once needs for new data collection or research are identified, steps can be taken to determine when and how they should be undertaken.

Finally, as mentioned previously, it is important that heritage organizations strive for accuracy of inventory information to provide a sound basis for heritage management decisions. Therefore, it is recommended that heritage inventory programs put in place measures for data validation through information quality assurance (QA) and quality control (QC). The U.S. Geological Survey defines the two concepts as follows: “QA refers to defect prevention, whereas QC refers to defect detection. Generally, QA is applied before and during data acquisition, whereas QC is applied after data are in hand” ({{USGS n.d.}}).

QA/QC may include activities such as data editors regularly checking the quality of additions and edits to data and flagging issues needing correction, possibly including checking mapped locations for accuracy and precision. Another quality control example is DBAs running automated validation tests to evaluate data with respect to the established rules or standards and then flagging issues for correction.

### How Will the Inventory Program Address External Engagement, Community Outreach, and Public Participation?

As discussed in chapter 2, for inventory programs of public heritage agencies, engagement with external organizations and stakeholders, including the general public, is a key and ongoing activity (see **External Engagement, Community Outreach, and Public Participation**). This is often also the case in certain ways for heritage NGOs. Those working within an inventory program may wish to determine the nature of those engagements, some of which may be determined by the legal or administrative context within which they are operating. The following are related considerations:

* For public agency inventory programs, is there a need to exchange information with other public agencies? Do you need to share information with others, obtain it from them, provide them related heritage advice, or interpret inventory information for them?
* If data needs to be readily integrated with the information systems of other organizations, what measures should be put in place on all sides to ensure data interoperability?
* Would the inventory benefit from having an advisory committee that includes representatives from stakeholder groups or the general public?
* How can stakeholder groups, as well as the general public, best participate in identifying heritage resources they deem significant and provide other relevant information? In some cases, this decision may be enhanced through proactive outreach to stakeholder groups to encourage their participation (see **Stakeholder Inclusion** in the sidebar). Consider the following approaches:
  + Carrying out oral history interviews with targeted stakeholders or members of the public
  + Engaging in cultural mapping to capture the public’s views on the identification of heritage resources, particularly for their social significance
  + Creating online means for the public or stakeholders to submit information
  + Enlisting and training stakeholder groups or volunteers in crowdsourcing activities

To help ensure the quality of information provided, you may also wish to consider limiting publicly submitted or crowdsourced information to a subset of data within inventory records (perhaps by eliciting descriptive and factual information but not assessments of significance), as well as putting in place measures to validate publicly submitted or crowdsourced information, such as follow-up research.

* If a heritage inventory utilizes an accompanying thematic framework, thematic studies, or historic context statements, how can stakeholders be engaged to provide input on formulating or enhancing those tools?
* How can the inventory program best respond to queries, remarks, or criticisms regarding inventory information and provide heritage advice relating to the inventory?

Heritage organizations also often carry out activities to promote awareness and understanding of how to utilize their inventories. The following are related considerations:

* Who are target audiences for promoting awareness and understanding of the utility of the inventory? (This communication may include demonstrating the mechanics of using the inventory information system if it is publicly accessible.) Such audiences might include public agencies, heritage advocacy groups, historical and genealogical societies, community groups, museums, private heritage firms or consultants, schools and universities, property investors and realtors, tourism promotion organizations, film location scouts, and the general public.
* What means should be employed to promote awareness, understanding and use of the inventory? Options might include in-person or virtual presentations to target audiences; tutorial videos; social media, websites, or other informational materials; published articles; and outreach to news media. Some inventory programs take advantage of certain events to encourage the public to explore information on related types of heritage within the inventory, such as calling attention to information on heritage associated with World War I on November 11, the date of the formal end of hostilities in that conflict (commemorated as Veterans Day in the U.S. and Remembrance Day in the U.K., Commonwealth Nations, and Europe).

## Information Technology

The following are considerations relating to inventory-related information technologies.

### What Database Technology Will Best Fit the Inventory?

One of the most important decisions to be made for a heritage inventory program is choosing the type of database technology to manage and publish inventory information. Investments in inventory information systems can be substantial, whether you procure software off the shelf or develop a new system. Once chosen and implemented, an inventory system is typically in place for a number of years and requires ongoing software upgrades and maintenance. It should also be anticipated that an inventory database will eventually need to be replaced by a newer technology once it becomes obsolete, which will require exporting and migrating data.

Although a full review of criteria for software selection is beyond the scope of this book, the following are a few essential considerations based on the author’s experience, including interactions with IT specialists:

* What are your organization’s requirements and use cases for its inventory database?
* Should the information technology be web-based? This may be an obvious requirement for organizations implementing new inventory databases. It may be a more pressing question for organizations wishing to provide online access to an existing offline database.
* How can it be ensured that inventory information is readable into the future, given that system data will inevitably need to be migrated to new software when the chosen system reaches its end of life? Will the technology store and export data only in proprietary formats? Reading data in proprietary formats typically requires particular proprietary software, whereas nonproprietary data formats are readable by a range of software.
* What are the pros and cons of selecting open-source software versus proprietary software? Some organizations are most comfortable with well-known proprietary software, despite its contractual service obligations. Open-source software offers advantages such as no licensing fees, customizable software code allowing for innovations by implementers, lack of vendor lock-in, and (typically) storing data in nonproprietary formats.
* Does the software meet your security requirements or standards?
* Should the information technology be purpose-built for cultural heritage information or would more generic software suffice?
* How user friendly should the software be? How much training will be required to effectively use it?
* Who do you expect to provide IT support for the software selected? Possibilities include IT support within the same organization, from an affiliated organization, or by a commercial IT service provider.
* What is the projected total cost of ownership (TCO)[[3]](#endnote-3) of the options being considered? How does this compare with the organization’s available resources?

**Chapter 4** discusses one particular open-source information technology that has been purpose built for heritage inventories and surveys based on the requirements of heritage organizations around the world.

### Should the Inventory Information System Link or Integrate with Other Information Systems?

Consider whether it would be desirable to have your inventory information system link to and/or dynamically integrate with external information systems or digital assets. For example, in some cases it may be useful to have an inventory system dynamically integrate with a building permit system that tracks demolition permits, a land-use planning system, or a planning casework system that is used for impact assessments with respect to development proposals. In other cases, it may be useful to have heritage resource records within an inventory system contain hyperlinks to external online bibliographic sources.

If the desirability of such linkages or integrations is established, a next step would be to determine the feasibility of their implementation, which can depend upon a range of factors, including whether different systems share common data standards, the data formats used, and whether they can connect through an API (application programming interface). IT specialists are best positioned to advise on the feasibility of integrating or linking systems.

## Guidance Materials

This section discusses the types of guidance materials that might be needed to educate a range of participants and users about the processes and tools used in an inventory program.

### Are New or Revised Guidance Materials Needed?

It is recommended that an inventory program have a set of guidance materials for key activities and infrastructure. Such guidance is particularly helpful to new staff members, interns, and volunteers, and to those learning how to use an inventory database. Does your inventory program need to create new guidance materials or enhance an existing set? The following are some of the topics that such guidance might address.

* **Field recording and assessment of heritage resources**, including how to compile inventory forms, photography, and field recording of geographic locations (see **chapter 10** for further discussion of these topics)
* **Guidance on use of digital applications** on mobile devices (tablet computers or phones) to create digital data in the field
* **Use of the inventory database** **for internal users** – those from the heritage organization managing the inventory – including how to use system features accessible only to those users, such as how to enter and edit information records and how to export data
* **Access by external or public users**, which might focus on searching for and visualizing inventory data, and potentially downloading data

Guidance for IT typically refers to relevant data standards, including [controlled vocabularies](#_Determine_whether_to), as discussed in earlier in this chapter. Guidance can take the form of written and illustrated documents or webpages, which might include screenshots from the inventory database and mobile apps, and potentially also video tutorials.

Depending on the [number of official languages](#_Should_the_Inventory) of the inventory, guidance might need to be prepared in multiple languages. It is recommended that attention be given to keeping guidance up to date as changes occur, for example, when the database software is replaced, field recording technologies are updated, methods are improved, or if organizational roles and responsibilities change. See **Guidance Materials** in the sidebar for useful examples.

## Ongoing Support, Evaluation, and Improvement

The following are considerations regarding long-term [inventory program support](#_How_Will_Inventory-Related), [evaluation](#_What_Measures_Are), and [improvement](#_How_Might_the).

### How Will Inventory-Related Infrastructure, Activities, and Staffing Be Supported over the Long Term?

Given that inventory information needs to be improved and updated on an ongoing basis, one of the most important considerations is to determine how inventory-related infrastructure, activities, and staffing will be supported over time. Potential types of support utilized by public agencies and NGOs include:

* Annual agency funding
* Pooling of resources across multiple institutions through consortia or partnerships, including cooperation among institutions in the public, academic, and private sectors (including NGOs and philanthropies)
* Tourism-related taxes
* Grants providing targeted support for limited duration
* User fees for more robust access to inventory information systems
* Service fees for time spent by inventory staff on responding to research requests

See **Fiscal Support** in the sidebar for examples of the latter two approaches.

### What Measures Are Needed to Monitor and Evaluate How Well-Defined Inventory Outcomes Are Being Achieved?

It is recommended that heritage organizations consider establishing systems to monitor and periodically evaluate aspects of their inventory program. By defining specific outcomes and related indicators over defined time periods, organizations can assess the extent to which defined outcomes are achieved. Topical areas for assessment might include currency and comprehensiveness of inventory information, compliance with data standards, data security, levels of access and external engagement, delivery of services, and assessing the appropriateness of infrastructure, resources, and management.

Heritage organizations might additionally consider evaluating their inventories with respect to the key qualities required for effective heritage management outlined in **chapter 1**. These efforts can ultimately help identify areas in need of improvement, attention, and/or further investment. For example, inventory information currency can be assessed to help identify specific areas in need of updates through new data collection activities, such as surveys. See **Monitoring and Evaluation** in the sidebar for examples of auditing systems.

### How Might the Interactions of Multiple Inventories across a Heritage Sector Be Improved?

In many heritage sectors multiple heritage inventories need to interact with one another, which tends to involve a number of complexities and other challenges. For example, information from regional or local inventories may need to be integrated into or shared with a corresponding national inventory, or information from local inventories may need to be integrated into or shared with a state or provincial inventory. This integration can be further complicated by additional heritage organizations responsible for collecting inventory-level information within a given sector, such as public works or transportation agencies or managers of heritage sites or areas.

Related challenges may include duplication of data but also possible inconsistencies in corresponding information, potential lack of clarity among data consumers as to which information is authoritative, duplication of effort and resources expended, difficulties in exchanging data when desired, and limitations in being able to search across data sets.

Sometimes gaps in information coverage occur due to the complex range of heritage organizations collecting information within a given sector. In such cases, it is recommended that the stakeholders involved periodically consider how to improve interactions among inventories across the sector, such as by further rationalizing roles and responsibilities; bolstering the development and application of shared information standards; determining ways to reduce duplication in information held and resources expended; creating a community of practice among professionals working with heritage inventories across the sector; and considering potential information technology solutions to improve information sharing, access, and searchability. Such improvements might be achieved through pooling the resources of multiple organizations.

For varied examples of means to improve inventory interactions across a heritage sector, refer to **Inventory Consolidation and Integration**, **Inventory Communities of Practice**, and **Fiscal Support** in the sidebar.

1. . See, for example, the statutorily defined roles and responsibilities in Wales with respect to Welsh historic environment records ({{Cadw 2017a}}). [↑](#endnote-ref-1)
2. . Use of online automated translation services, such as Google Translate, is growing. Note that caution should be exercised in assessing the accuracy of such automated translations. [↑](#endnote-ref-2)
3. . The management consulting company Gartner defines total cost of ownership (TCO) as “a comprehensive assessment of information technology (IT) or other costs across enterprise boundaries over time. For IT, TCO includes hardware and software acquisition, management and support, communications, end-user expenses and the opportunity cost of downtime, training and other productivity losses” ({{Gartner n.d}}). [↑](#endnote-ref-3)