

Background and Research

What Is A Space Assessment?

A space assessment determines the physical space that is 1) currently occupied by a collection, and 2) needed by a collection to ensure that accepted standards of care and preservation are met. An assessment of storage space can include both the fixtures the collection is stored on, as well as the larger storage space, the room or building.

A space assessment measures the space that items need, not the items themselves. This is important to remember, because all collections need “buffer” space: the empty space that surrounds an item that ensures it is not touching another or the walls of the fixture. Buffer space ensures that there is enough space for any required foam padding, mounts, or trays. This includes any mounts that might be constructed in the future. Empty space around each item also ensures that staff can safely remove them from the shelf; ideally, this is achievable without having to remove other items first. By analyzing space an assessment ensures that sufficient space will be planned to appropriately house each item.

A space assessment is a tool used to understand and plan for collections. **It is not about achieving exact precision; eyeballing and estimations are inherently a part of even the most exacting assessment.** Assessors must mentally balance their knowledge of the space and gathered measurements to arrive at a useful result. There is no equation that will arrive at the perfect solution for collections storage. Space assessments are about achieving an efficient use of space that simultaneously preserves the items. While a space assessment will help achieve this, it does not tell you exactly how and where each item should be stored.

Space assessments are not a “one size fits all” project, and can be designed with more or less detail to match the needs and available resources of collections and institutions. The defining feature of any space assessment is that the end result creates an improved understanding of the physical space your collection needs.

A Quantifying Tool

A space assessment is most useful as a quantifying tool. This kind of assessment produces specific data rather than generalized statements or conclusions. While there are multiple ways to execute an assessment that will produce useful results, **at the end you will have a number that expresses information about the space needs of your collection.** This can be expressed in

different ways depending on the design of your assessment, such as cubic or square feet needed, the spatial volume or footprint, or a growth percentage. A quantitative assessment allows an institution to more accurately and precisely plan collections spaces and identify different areas of inefficiency and overcrowding. Quantitative results are versatile: the numbers may be broken down in different ways to project space needs for both new and old fixtures, and can be adapted for multiple space plans.

Collections professionals do not make large decisions about the collections in a vacuum and very often need the support of board, trustees, or a museum administrator to receive the resources required to implement large changes like those that may be recommended by the results of a space assessment. A quantitative result is more useful when using an assessment to advocate for resources or justify decisions. For example, if you are presenting the results of your assessment to your board to advocate for the needs of the collections, using quantitative assessment results allows you to more accurately convey the exact needs of the collection, and are easier to explain to non-museum stakeholders. A number expressing space needs has more inherent meaning than a qualitative statement such as “We need more shelves,” or “The collections need much more room.” A quantified result from your assessment can be justified and understood through the process of the assessment and analysis, which gives it more credence and use in collections planning.

Part of a Toolkit

Space assessments are often executed as part of a larger toolkit of assessments to determine the health of museum collections. These assessments use multiple metrics to create a holistic picture of the state of the collections. Metrics are the areas of collection health that can be assessed per a determined standard including space, curation, housing, accessibility, and preservation. Multi-metric assessments examine multiple areas of collection health simultaneously to identify and quantify collection health by creating rankings for each health metric that can be easily compared to one another. This identifies levels of need and creates a more holistic picture of the state of the collection. This type of assessment is best applied when the collections are in an unknown state, or are known to need attention in several areas.

A multi-metric health assessment helps pinpoint needs and allocate resources, enabling staff to prioritize responses to certain areas of the collection. The more metrics you include in a health assessment, the more specific an understanding of the current state of the collections can be developed. For example, you can examine space, preservation, and cataloging to determine if there is a correlation between the current state of object preservation and a perceived overcrowding

issue, while also determining how intellectually accessible the items are. However, the trade-off is time and depth of the assessment. Assessing and interpreting seven metrics takes more time than three. Often this type of assessment is done by visual survey and estimations. For institutions looking for specific data on a single metric, they may wish to instead do a more tailored and in-depth assessment of that area of preservation alone.

The Profiling Unit

The profiling unit is the discrete unit that is being measured in the assessment. It can be expressed as the level of the assessment; this can be item-level, shelf-level, cabinet level, or type groups (pottery, moccasins, textiles, etc.).¹ Another way to describe this is the repeating, scalable unit being directly measured and assessed for space. Each of these will require a slightly different model and documentation method. They also have very disparate time needs: an item-level assessment will take the longest because it addresses each item in the collection individually. Using a fixture, such as a cabinet, as a profiling unit will speed up the execution stage because you only have to assess the cabinet instead of each individual item. For example, in a fixture-level assessment, each storage fixture receives an assessment of expansion required to appropriately house those items. This requires accurate visual balancing of overcrowded and underused space in the same fixture. A whole room can also be used as a profiling unit, using a similar method.

Item-level assessments may take the longest, but they also provide the most detailed picture of the collection. They record dimensions for every item, which can help you plan the appropriate size of fixture for the collection. This model gives a higher resolution to your data; instead of knowing a cabinet needs 50% more space overall, you have data for individual items that can be organized in different ways to maximize efficiency or influence preservation. The detailed data produced from this model can be easily used to plan for new types of fixtures; the same data can be analyzed in terms of multiple dimensions of shelf, shelving unit or other storage fixture. Measuring item-by-item can also be an effective way to ensure your data is organized correctly.

Item level-assessments take longer on the front-end, but when the space is being planned using the results, there is no guesswork; planners will know exactly where to put each fixture, and each shelf or rack or drawer on that fixture, because the necessary heights have been calculated. Because of this, there will be less handling of the items to try out different configurations of shelves or racks. This type of assessment is useful when you are working with limited space and have little

¹ Terminology adapted from Moser, W., K. Reed, and C. Bright, "Collection profiling—The process." In: *Third Conference on Partnership Opportunities for Federally-Associated Collections*, 13–17 November; Austin, Texas.

room for error; you don't want to end an assessment with expensive fixtures that don't fit into the space, or worse, a layout that won't accommodate all the items

The item profiling unit is not always the right choice, however. Going item-by-item for hundreds of thousands of items is often impractical, and there is no need to spend the extra time if you are purchasing a few new fixtures of the same type you already use. If the sole purpose of the assessment is to determine how much space a collection will need in a new building, a larger profiling unit can get you there.

Those embarking on a space assessment will need to put thought into selecting the appropriate profiling unit. This decision will be based on the time you have available, the size and type of collection being assessed, and what you plan to do with the data produced. Be aware of how you can most effectively use your time.

What Do We Gain From Space Assessments?

Collections planning or moves can be done without detailed assessments, but that results in having to move the items multiple times while you try out multiple configurations to make the items fit into your fixtures; knowing you have enough space and knowing how the items fit into that space are two different things. **The benefits of assessing what is needed before you move the items is confidence in your space plan and less handling once the move begins.** You will not need to estimate where to place your shelves in the fixtures, so you will not need to remove and rehouse items multiple times.

Space assessments are vital to understanding the space needs of your collection, both as it currently exists and for future growth. The results of an assessment can quantify overcrowding, inefficient use of space, or a combination of both. While collections staff may be able to identify a concern without one, doing a space assessment is how we understand and measure the problem. For example, a collections manager may be aware that a collection is highly overcrowded; a space assessment will reveal where space is being used inefficiently in the collection; reorganization and some extra shelves might dramatically help the situation, rather than requiring multiple new fixtures that may not fit in the available storage space. Space assessments provide the most accurate and data-driven picture of space needs and can be used to find a tailored solution or provide options for improving collections storage.

How Do We Use The Results?

Advocacy and Support

Space assessments are powerful tools for explaining to others the needs of the collection. The results can be included in grant applications to support the needs for funds, or can be

presented to non-museum professionals to explain the current state of the collections. Assessments are useful in this way because they bring a quantified result that can be explained if questioned, and demonstrate that the proposed space needs are a justifiable reality and not a loose estimation. The results act as a communication tool, succinctly explainable to those who didn't perform the assessment themselves. Doing a space assessment shows due diligence to accurately defining the space problem, which is important when asking for money to make storage changes.

Planning

Having a clear understanding of available space, needed space, and a plan for growth, is a necessary part of collections planning. Projects like collections moves, new storage spaces, or new fixtures require an accurate understanding of the spatial needs of the collection. With the information from a space assessment, professionals can make informed decisions about the needs of the collection during planning. Collections professionals can target the most over-congested cabinets or sections for care, can predict the expanded footprint of a rehoused collection, or indicate how many new fixtures or shelves will be required if the collection is stored appropriately.

Space assessment can also be used to plan for anticipated growth of the collection. We cannot plan growth space in our storage rooms without knowing first what we have, how much space it needs, and where and how much room there is for new items. Knowing the current footprint of the collection means that more specific plans for growth can be made, such as 5% overall per year, and informs an understanding of what "on average" looks like (for example, how many items "on average" fit onto a shelf? What's the most common textile width?). Balancing anticipated growth with available space allows staff to justify both accepting and turning away items offered to the institution.

Preservation

Space assessments are tool for collections preservation. Having the necessary amount of space, the efficient use of space, and the appropriate fixtures for a given collection is essential to ongoing preservation. Overcrowded storage has ongoing ramifications for the preservation of collections: it can increase the handling of objects as many items need to be moved before another can be removed from a fixture, it increases impact damage from surrounding items, and causes items to be stored too close to the edge of shelves. If ceramics are bumping together, or a basket collection is nested on top of each other, a space assessment will allow staff to plan for improved storage that will better preserve and protect these items.

Understanding best practices and standards for preservation and storage of different material types is similarly part of using space assessments to improve preservation; the storage needs of ceramics are different from that of textiles. Different item types will need different amounts of buffer space, different considerations for mounts, different fixtures, and different considerations of space use: how will pot sherds be stored versus clothing? A space assessment can be used to plan for improved preservation, but is reliant on being planned with an understanding of preservation standards.

Collections professionals also have to understand and assess how the use of space contributes to preservation. If a space has 15-foot ceilings, you still may not want to include 12 foot shelves for ceramics; coming down a ladder with a highly fragile and heavy piece of pottery is not advisable. However, this may be vertical space that could house lighter-weight baskets or hats in mixed collections storage.

Planning may call for a compromise between what is recommended for preservation and what a space can accommodate. If a museum is planning to purchase new fixtures, a collections manager will need to know not only how many cabinets they need to appropriately house the collection, but how many they can safely fit into their space, and how to maximize the efficiency of storage. For example, mobile high-density storage units (compactors) can increase storage area on a given footprint, but they are heavy and cannot be retrofitted everywhere. Collections managers have to use their own knowledge and consider options like vertical expansion.

Sources for Learning and Understanding Space Assessments

Literature

Space assessments are an important, technical skill, and as such should be covered by the resources for museum students and professionals. My review of frequented sources, while indicating that such assessments are useful and necessary, provided little guidance on clear steps to performing a space assessment. This may be a frustration for new professionals who have not done an assessment, and are looking for help implementing one for their institution.

The American Alliance of Museums [AAM], and the National Park Service [NPS] both offer ample resources, however these are directed toward space planning and not a nuts-and-bolts guide for a space assessment. The NPS *Conserv O Gram* series and the [NPS Handbook, Chapter 7: Museum Collections Storage](#) are useful places to start when considering your institution's space, with discussions on storage preservation and planning storage layout. *Conserv O Gram* 4/11,

Determining Museum Storage Space Requirements, offers tips to determine the current footprint of storage equipment, but does not consider how to assess overcrowded fixtures. AAM resources address the need for assessment and its place in collections management, language which is useful when advocating for a space assessment, but resources including the [AAM Guide to Collections Planning](#) and the [AAM Standards and Best Practices](#) have little direction on conducting assessments themselves.

There is a more robust literature on assessments in natural history media. These resources skew toward multi-metric assessments of collections such as entomology and zoology, and while these offer some insight into space as a metric, because of the nature of the multi-metric assessment they do not offer the depth needed to design a full space assessment. Perhaps the most direct and useful guide I found is an article from Hollis et al which outlines how to design your own assessment that assigns and grades health metrics across your collection. This resource provides useful how-to steps during planning and analysis, but is tailored for larger profiling units, and uses standardized health rankings to compare results across multiple metrics.

Collections Professionals

After reading these sources I was still left with many questions about how to actually plan for and begin a space assessment. To fill these gaps, I reached out to established museum professionals who had executed successful space assessments, to both gain their insight into conducting space assessments on cultural collections and to find out where they learned how to perform these assessments. These professionals exposed me to different approaches to executing successful space assessments, informed by their own experiences with assessments in different scales for different needs.

Those interviewed include:

Melissa Bechhoefer, Collections Manager of Anthropology, Denver Museum of Nature and Science: her assessment was supported by a professional architecture firm, and was done in advance of a new storage building custom built for the collections.

Melissa de Bie, Director of Collections Management & Registration at HistoryColorado: performed an assessment prior to moving all items from an out of town warehouse into a new space.

Laura Elliff Cruz, Collections Manager, Denver Art Museum: used a space assessment to determine the cubic footprint of the entire collection so off-site space could be procured during a construction project.

Christina Cain, Collections Manager, University of Colorado Museum of Natural History: has guided space assessments for multiple sections of the collection for storage improvement planning, including textile, basketry, and ceramics. At a previous institution, she led the assessment to determine storage layout and space usage in a new building.

Julia Clifton, Archaeology Curator, and Kieffer Nialls, Collections Manager, Museum of Indian Arts and Culture: involved with a project to move the museum's ceramics collection from one building to another. A full conservation assessment and project was implemented prior to the move.

Tips and recommendations from these collections professionals for designing and executing a successful space assessment include:

- **Learning space assessments:** most professionals learn to do assessment either through their own trial and error or from another museum professional. This is a gap in resources, because there are few concrete sources for those beginning their first assessment to turn to.² This also means that many professionals are implementing similar but unique models based on who they learned from, or how they self-taught.
 - **Example:** de Bie and Bechhoefer both learned to perform assessment from the same professional planning new buildings for their respective institutions. However, both have tailored the process they learned to suit the needs of later assessments they performed on their own.³
- **Tailor your assessment to the scale of the project at hand:** select a profiling unit that balances the needed results and what is practical to achieve. If you are assessing the entire collection for a new building all at once, even going cabinet by cabinet is likely impractical; the solution may be to assess the collections' space by item type.⁴ Make decisions based on the size of the overall project; balance the time needed to get the numbers you need to make an assessment work.⁵

² Laura Elliff Cruz (Denver Art Museum Collections Manager), interviewed by Andrea Blaser, Denver, CO, October 2017.

³ Melissa de Bie (HistoryColorado Director of Collections Management and Registration), interviewed by Andrea Blaser, Denver, CO, October 2017.

Melissa Bechhoefer (Denver Museum of Nature and Science Anthropology Collections Manager), interviewed by Andrea Blaser, Denver, CO, September 2017.

⁴ Bechhoefer, interviewed by Blaser, September 2017.

⁵ Ibid

- **Example:** The assessment at HistoryColorado was tailored to moving the oversized collections onto pallets and into a warehouse space, so the pallet itself became the profiling unit to streamline planning.⁶
- **Example:** If you are able to rely multiple students over a long period of time to assess the space needs of the collection, it is feasible to be able to assess the entire collection at the item-level. ⁷
- **Be consistent:** this applies not just to how you are measuring space, but also to documentation and decision making. Having consistent data is essential to being able to do calculations and analysis with the results, even if that means simplifying in some areas.⁸
 - **Example:** your space may have two types of cabinets with very similar dimensions. Even though these technically have a different footprint, it may be a more effective use of your time to assume in your calculations that they are the same, rather than trying to calculate the data acknowledging a .25ft² difference.
- **Don't be afraid to pad the measurements:** part of attaining a usable, accurate result is padding your assessment to a certain degree. This means making informed decisions with your numbers along the way to ensure enough space.⁹ Overestimation is preferred to underestimation; extra space will always be filled but ending with too little is a failed assessment.¹⁰ Along the way, something will be mis-measured or forgotten; this is simply part of the human element of a space assessment. Plan for this reality.
 - **Example:** In her assessment, Elliff Cruz learned that the best way to ensure there was enough space in her new warehouse was to add two square feet to each unit they assessed.¹¹
- **Space assessments are inherently subjective:** no space assessment measures every item or even every unit exactly; “eyeballing,” extrapolation, “guesstimating,” are part of the process.¹² The more you do, the better and more accurate an assessor gets. Even at the analysis stage there is no equation that will perfectly process the numbers for you: it is still

⁶ de Bie, interviewed by Blaser, October 2017.

⁷ Christina Cain (University of Colorado Museum of Natural History Anthropology Collections Manager), interviewed by Andrea Blaser, Boulder, CO, October 2017.

⁸ de Bie, interviewed by Blaser, October 2017.

⁹ Bechhoefer, interviewed by Blaser, September 2017.

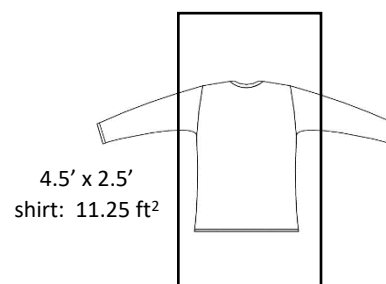
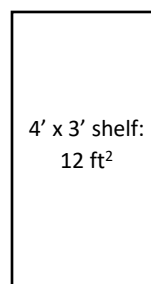
¹⁰ Cain, interviewed by Blaser, October 2017.

¹¹ Elliff Cruz, interviewed by Blaser, October 2017.

¹² Bechhoefer, interviewed by Blaser, September 2017.

about mentally balancing the collected numbers and your own understanding of the needs and reality of the collections.¹³

- **Example:** You cannot lay out every item from a shelf to determine exactly how much expansion space is needed for each shelf. However, you can do it once to understand what 50% overcrowding looks like, or how many items of a certain size will realistically fit onto a standard shelf. Use this knowledge to inform the rest of your analysis.
- **Space assessments provide data, not answers:** the human decision-making element is the “management” aspect of the collections manager’s role in an assessment. An assessment is a tool to help the collections professional understand the collections’ needs and make decisions using the rest of their knowledge.¹⁴ Utilizing your knowledge during analysis and interpretation of the results is a crucial part of an assessment.
 - **Example:** while looking at the raw data from a space assessment might indicate that many small items can be used to “fill in” gaps around larger items, a collections manager knows to balance this effective use of space with the preservation of small items, which can be easily damaged when stored with oversized items that make them harder to see.
- **Dimensions are important:** while shelves may technically have the needed area for a given number of items, these items still may not fit. Think about the geometry of your items, and how they can be laid out in reality.
 - **Example:** At the Denver Museum of Nature and Science the decision was made to lay clothing flat with arms spread out to avoid creasing the textiles. The shelves purchased could not accommodate the width of many items in this configuration, despite the overall area being greater than that of the clothing.¹⁵



¹³ Cain, interviewed by Blaser, October 2017.

¹⁴ Elliff Cruz, interviewed by Blaser, October 2017.

¹⁵ Bechhoefer, interviewed by Blaser, September 2017.

- **Working with professional planners:** professional planners are experienced in understanding three-dimensional spaces and planning the needed expansion of collections storage. However, they also rely on collections professionals' understanding of the needs of collections items, and the expansion that different item types require for preservation. While a professional architect's voice may carry a great deal of weight, they will need guidance from those who know the collections best.¹⁶
 - Example: at CUMNH, a professional space planning group planned for expansion of each collection based on dimensions provided by the collections managers, but assumed everything in Anthropology would go in the same type of fixture. It took a collections professional's understanding of collections storage to note the different needs of items that had to be considered.¹⁷
- **Have a plan before you start:** you cannot overestimate the importance of having a plan in place before beginning, both for the assessment itself and the application of the assessment. Diving in before you have defined goals and fully planned can easily result in waste time and resources if you need to backtrack, and may result in a useless assessment.
 - Example: A space assessment for the new building for the MIAC collections was already underway when curators decided to complete a conservation project before moving; the gathered numbers had to be scrapped and the process begun again.¹⁸
- **Be flexible:** no matter how much planning you do, there will be unexpected questions that emerge. While consistency is important, it is equally important to incorporate new information that emerges during the assessment, and adapt to it. The most important thing should be that the resulting information is accurate and useful.
 - Example: During the conservation assessment at MIAC, indigenous potters were brought in the consult on reconstructions; in some situations, their recommendation was to not reconstruct the vessel, meaning those working on the space assessment had to plan for expanded storage space for mounted sherds.¹⁹
- **Ask for help:** space assessments are not always straightforward. There are things you may not think to plan for, unexpected issues that may arise. Turning to your network for advice and support is one of the best ways to plan for a space assessment.

¹⁶ de Bie, interviewed by Blaser, October 2017.

¹⁷ Cain, interviewed by Blaser, October 2017.

¹⁸ Julia Clifton and Kieffer Nialls (Museum of Indian Arts and Culture), interviewed

¹⁹ Ibid

- Example: Elliff Cruz turned to de Bie for support and assistance during her space assessment, knowing that HistoryColorado had also just executed a complete collections move. Because she reached out, she was able to buy surplus supplies from the other institution for her own project, as well as recommendations on assessing pallet spaces.²⁰

Everyone interviewed performed a space assessment using their own procedure and methodologies, although there was much in common between them. Their advice and input is highly relevant to a general understanding of the process of executing a successful assessment, no matter which model and profiling unit you choose to use. While the methodology presented in Section III is tailored specifically to item-level assessments, the models and procedures executed by these professionals offered valuable insight to its development.

²⁰ Elliff Cruz, interviewed by Blaser, October 2017.