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Appraisal Guidance for the Preservation of Research Data

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Purpose of the Guidance

Appraisal and selection are key activities necessary for the responsible stewardship of research data. Not all data has long-term research value, and the increasing volume of data produced and published to meet short- and mid-term needs creates a burden on both the repositories storing and maintaining access to the resources and the researchers searching for quality data. Repository appraisal decisions, often made at the time of deposit by curators working with research data creators to optimize data for sharing and reuse, need to better address the long-term sustainability of the [FAIR](#) data practices they support.¹

In addition to the questionable long-term value of some datasets, it is the unfortunate reality that much of the data produced today may not remain accessible and reusable as originally deposited. Changing trends around reuse may require that file formats, repository metadata, and dataset documentation be updated or revised to meet the needs of a repository's designated community. Good appraisal practices are therefore an invaluable component of the curation process as they can guide future preservation activities and retention decisions. Ideally, they inform a researcher's approach to information sharing, but critically, they drive repository acquisition decisions and the ongoing allocation of resources to maintain access to data for as long as necessary. Formal appraisal and selection processes ensure that repositories are transparent and realistic in their decision-making about what data to accept, how the data is best shared, and for how long the data needs to be preserved.

This guide is designed to be used alongside a repository's existing acquisition, collection development, preservation, and deaccessioning policies and other high-level institutional strategy documents to help curators work with researchers and preservation specialists to evaluate research data for long-term preservation. For more information on policy development, check out the [Policy Tools and Guidance](#) provided by the Digital Curation Centre or DataShare's [Policy-making for Research Data in Repositories: A Guide](#).²

¹ Mark D. Wilkinson, Michel Dumontier, IJsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, Niklas Blomberg et al. "The FAIR Guiding Principles for Scientific Data Management and Stewardship," *Scientific Data* 3, no. 1 (2016): 1-9, accessed on January 28, 2022, <https://doi.org/10.1038/sdata.2016.18>.

² "Policy Tools and Guidance," *Digital Curation Centre*, accessed on January 28, 2022, <https://www.dcc.ac.uk/guidance/policy/policy-tools-and-guidance>; Ann Green, Stuart Macdonald, and Robin Rice, *Policy-making for Research Data in Repositories: A Guide*, v. 1.2 (Edinburgh: DISC-UK DataShare and EDINA and University Data Library, University of Edinburgh, May 2009), <https://www.coar-repositories.org/files/guide.pdf>.





1. Definitions

Appraisal for preservation is the process of determining whether a dataset has sufficient long-term archival value to merit the work of monitoring, managing, storing, and sustaining access to that data, as well as related systems and workflows, persistently over time.

Reappraisal is when a new appraisal evaluation is conducted at a later date to assess a dataset for continued archival value.

Selection is the process of determining which files in a dataset should be retained after long-term archival value has been established.

Preservation describes the “series of managed activities necessary to ensure continued access to digital materials for as long as necessary.”³

2. Appraisal Stakeholders

Data creators can contribute to the appraisal process by considering what will be required for others to understand and reproduce their research. They should ensure that their files are well-organized and described or contextualized in order to support the work of data curators, who often make appraisal decisions on behalf of stewarding repositories and institutions. Data creators may also approach repositories with timeframes for retention in mind and preservation intentions, based on funder requirements and their expert knowledge of the field of research, which should be documented in any repository appraisal decisions.

Data curators work with data creators to make appraisal and selection decisions based on the quality of the data at hand and the context of the research the data supports. They may collaborate with the data creators to improve a dataset’s potential for sustained reuse, which may include adding more detailed description and contextualization of the data for the broader research community. If a curator is reviewing the dataset at the point of deposit into a repository, they also must take into account that repository’s priorities, collection policies, and standards, as well as the resources that might be required to ensure persistent access into the future.

³ “Glossary - Digital Preservation,” Digital Preservation Coalition, accessed on January 28, 2022, <https://www.dpconline.org/handbook/glossary#D>.





Preservationists⁴ work with repositories to store and maintain access to data for as long as necessary. Their activities involve creating preservation metadata, migrating files as original formats become problematic or obsolete, replicating data across storage locations, and checking the integrity of that data over time.

Researchers and community stakeholders are the ones accessing and reusing the data, and can inform curators and preservationists of the changing needs and contexts for the data over time.

3. Appraisal and Selection Concepts and Practice

Appraisal has a long history of discussion and practice in the field of archives. In conducting appraisal, archivists acknowledge that their role is not neutral and their decisions will have implications for future researchers and the preservation of recorded memory. At the same time, they also recognize that it is impossible and irresponsible to keep everything. Resources are needed to ensure access to reliable, well-contextualized, and well-organized information over time, and storage costs, preservation costs, and the environmental impact of digital storage all need to be sustainable.

An archivist may consider collecting materials based on: the relevance to a geographic area or a particular community; the desire for a balanced and equitable representation of events, ideas, and peoples; or the research interests of their institution, among other things. Critically, they must consider their own ability to provide equitable and sustainable access to all archival stakeholders. Materials in the archive cannot be limited to an elite few with access to the funds and technology to “unlock” the records. Appraisal and reappraisal have emerged as increasingly valuable tools for evaluating and prioritizing endangered digital file formats in order to provide ongoing access. For more on appraising and selecting digital materials, see [Approaching Appraisal](#) by Nathan Tallman and Lauren Work.⁵

Guidance for the appraisal and selection of research data is also fairly well-established within the research data management community, where it focuses on ensuring data is shared in a FAIR (findable, accessible, interoperable, and reusable) and equitable manner. Depositors are advised to make personal appraisal decisions early in the research data lifecycle, when creating or revising a data management plan (DMP) at the start of a research project, or when they begin cleaning up their data to share with others. They may work with curators at any point during this

⁴ Not all repositories will have a dedicated preservation specialist on hand, so some or all of these responsibilities may fall to other staff in some circumstances. The absence of preservation support personnel puts further pressure on the curator to be mindful of the repository’s capacity for preservation in making appraisal and reappraisal decisions.

⁵ Nathan Tallman and Lauren Work, “308.1 Approaching Appraisal: Framing Criteria for Selecting Digital Content for Preservation,” OSF, June 20, 2019, <https://doi.org/10.17605/OSF.IO/8Y6DC>.





process, but often curatorial appraisal first happens when data is submitted to a repository. The level and quality of curation provided by that repository will depend on each repository's resources, policies, and priorities, but curation may include activities such as: verifying compliance with the repository's terms of use, ensuring the quality of data files and the documentation and metadata that provide contextual information, identifying ethical considerations, documenting appropriate rights for access, reuse, and preservation, and ensuring the use of non-proprietary file formats where possible. Frameworks for these activities include the Digital Research Alliance of Canada's [CURATION checklist](#), the Data Curation Network's [CURATED steps](#), and the Digital Curation Centre's [Lifecycle Model](#).⁶

Despite considerable overlap in the appraisal criteria used by both archivists and data curators, a key difference between the two fields is that *archival appraisal reflects and reinforces a commitment to the long-term stewardship of any materials in the collections*. It guides and supports high-level acquisition decisions while also providing a mechanism to assess the continued value of a resource in the face of new challenges around technical obsolescence, shifting institutional priorities, and the changing needs of stakeholder communities. Archival appraisal practices require a continuing investment of time and effort, as well as ongoing advocacy for archival stakeholders long after a resource is first acquired.

Where research data are concerned, appraisal practices often prioritize the immediate reusability of the data and the impact of data sharing – sometimes at the expense of long-term preservability.⁷ There is also little indication that reappraisal in support of preservation management currently exists as a formalized practice in many data repositories.⁸ Clear processes for conducting appraisal and reappraisal are requirements for repositories to achieve trustworthy status through [CoreTrustSeal](#) certification and certification via *Audit and Certification of Trustworthy Digital Repositories (ISO 16363)*, but these are not yet widely achieved certifications, nor are these frameworks explicit about how to conduct reappraisal.⁹ The limited

⁶ Alexandra Cooper, Michael Steeleworthy, Ève Paquette-Bigras, Erin Clary, Erin MacPherson, Louise Gillis, Lee Wilson and Jason Brodeur, "Dataverse Curation Guide," Zenodo, October 19, 2021, <https://doi.org/10.5281/zenodo.5579820>; "The DCN Curation Workflow: The CURATED Steps," Data Curation Network, accessed on January 26, 2022, <https://datacurationnetwork.org/outputs/workflows/>; "The DCC Curation Lifecycle Model," Digital Curation Centre, accessed on January 26, 2022, <https://www.dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf>.

⁷ This is especially true in circumstances where there are no appropriate preservation format recommendations available at the time of ingest into a repository and the next-best option may hinder reuse due to loss of context or essential functional components from file transformations. Within the wider preservation community, defining what constitutes acceptable loss in order to ensure ongoing accessibility is a constant concern.

⁸ Where reappraisal does appear in curation guidance, it seems only to be triggered by problems arising from the data in storage, such as failed validation procedures, or it is simply indicated as a possibility, if needed, without specific information as to when it should be carried out. See, for example, "The DCC Curation Lifecycle Model."

⁹ The *CoreTrustSeal Extended Guidance 2020-2022* advises in Requirement 8, "Appraisal" only that reappraisal may be triggered by changes to repository selection criteria. See CoreTrustSeal Standards and Certification Board, "CoreTrustSeal Trustworthy Data Repositories Requirements: Extended Guidance 2020–2022," Zenodo, accessed on January 28, 2022, <https://doi.org/10.5281/zenodo.3632533>; International Organization for Standardization, *Space*





focus on appraisal as an acquisition/deaccession tool presents a potentially significant opportunity for loss, as future preservationists tasked with the ongoing management of aging data formats scramble to understand how best to communicate old data to new audiences.

- What was important about the format in which the data was originally shared, and is that still valuable to current stakeholders?
- What would be considered ‘acceptable loss’ if files must be transformed to be usable?
- How has the field of research evolved?
- Has the repository’s designated community narrowed or expanded, and have the needs of that community changed?

When data curation also supports long-term preservation, appraisal and reappraisal practices must be reconsidered as critical to maintaining the value of the data preserved.

4. The Appraisal Process

What gets appraised?

A researcher’s personal appraisal process is often tailored to the specific need to communicate their research findings, which means that appraisal and selection can happen at a very granular level. Ideally, this appraisal process is informed by the goals laid out in the researcher’s data management plan and, if applicable, the conditions of any approvals obtained from their Research Ethics Board. Files may be removed, or new files created, to limit or refine the data points that are ultimately shared.

For repositories, appraisal happens at the dataset level. Each deposit should be reviewed and appraised as a whole for its compliance with repository collection or other deposit policies. Selection, on the other hand, can happen at the file level. Curators may flag problem files and suggest the removal or replacement of problematic content or specific file formats, or seek additional contextual information. Ultimately, decisions to accept a dataset into a repository’s care are always made based on the dataset as a whole, and not on its individual parts.

Who appraises?

Data creators participate in appraisal by making decisions about what data to share. They may work with curators during this process, or they may undertake this work on their own.

Repository curators are ultimately responsible for appraising a dataset for publication and for assessing its ongoing suitability to the repository, in collaboration with data creators, discipline specialists, preservationists, or other stakeholders as needed. These stakeholders are invaluable sources of knowledge about the cost of generating the data, the uniqueness of the data, the significance of the file formats, and can provide insight into the value of the data within the original field of research.

data and information transfer systems — Audit and certification of trustworthy digital repositories, ISO 16363:2012 (Geneva, Switzerland: ISO, last reviewed 2017), <https://www.iso.org/standard/56510.html>.





When does appraisal and selection happen?

Data can be appraised at any point in the research process, but typically appraisal and selection happen when researchers enter the dissemination phase of the research lifecycle and repositories evaluate data deposits for acceptance and publication.

Reappraisal is the responsibility of the managing repository. A date for conducting reappraisal may be scheduled during the initial appraisal review, if there is uncertainty around the long-term value of the data or preservation concerns raised about the file formats shared, or it may happen at specific intervals determined by repository policies (for instance, 10 years after deposit for all materials). Reappraisal may happen many times over the life of a dataset.

How does appraisal happen?

Depositors first consider what information and data files they want to share, and if they are legally and ethically allowed to share it. If needed, they may seek additional permissions, or modify or eliminate some data from their deposit to comply with those obligations. They may choose to share raw, analyzed, or processed data, or a combination of all three, depending on how useful each of those data outputs may be in helping others to understand and reproduce their work.

Curators evaluate the content and context of the dataset to determine whether the data is indeed understandable and usable by someone other than the data depositor. In the process, curators also consider whether the deposit aligns with the repository's collection policies, as well as the potential long-term value of storing and sharing the dataset for future use. Is the data presented in a way that is appropriate and useful for other research contexts?

While a depositor's selection process can be unique to each researcher, a curator's appraisal of a dataset needs to be transparent and accountable. A formal set of criteria helps to ensure that appraisal is not subject to individual biases. Appraisal checklists and other guidance documents can also ensure that curatorial decisions are recorded, so reappraisal does not happen in the future without access to the information available at the time of deposit.

5. Evaluation Criteria

The chart below identifies several high-level questions that can be used to help identify immediate and ongoing preservation needs, and their implications for the stewarding repository, during appraisal and reappraisal.¹⁰

¹⁰ The authors wish to acknowledge that these criteria were compiled from existing appraisal guidance documents, such as Tallman and Work's "Approaching Appraisal" (2019) and Whyte and Wilson's "How to Appraise & Select Research Data for Curation" (2010), with the intent of clarifying the specific preservation implications in their use. Please see the "Sources and Citations" at the end of the guidance for more resources on appraisal.





Criteria	Key questions	Preservation implication
Preservation intent	<p>Does the dataset owner intend or require the materials to be preserved? Is there an obligation on the part of a funder or other stakeholder that needs to be met?</p> <p>What aspects of the materials does the depositor consider important to preserve?</p>	<p>Researchers may approach your repository with different needs, and it is important to understand those requirements in order to advise the researcher of the preservability of their work. Researchers may also be able to advise which features of a dataset they consider important to preserve, which may include the informational content as well as its appearance, interactivity, or some other aspect. A researcher's preservation intention should be documented and considered during the initial appraisal, as well as at any subsequent reappraisals.</p> <p><i>Tip: If the research concerns Indigenous peoples or lands, ensure the data creator has obtained permission to both share <i>and</i> preserve the dataset, especially if preservation activities may require transforming or augmenting the data in some way. It may be advisable to reach out to those stakeholders for consultation in determining whether your repository can proceed with the depositor's preservation intent.</i></p>
Relevance to mission	<p>Do the materials meet your institution or repository's acquisition mandate, collection policy, domain speciality, or other priorities?</p>	<p>Memory institutions and repositories that intend to keep research data for the long-term require a mission and mandate to both acquire and preserve these collections. This mission may be further defined via policies, such as: collections policies, submission guidelines, terms of use, and preservation policies. Lacking such a mission or mandate means that the institution may not be prepared to sustain the financial resources required for long-term preservation and appraisal may not be conducted in good faith.</p> <p><i>Tip: If a potential deposit does not align with your collection policy, can you refer the depositor to a more suitable repository for their data?</i></p>
Value	<p>Do the data provide valuable evidence of research activity, and</p>	<p>Future value is incredibly difficult to predict, which is why archivists also consider the present landscape in their decision-making. How valuable</p>





	demonstrate potential ongoing social, scientific or historical value?	<p>are these data in communicating current knowledge and perspectives? Are there external metrics (citations, grants, awards, access statistics) or disciplinary norms (retention periods) that can support determinations of value? Be particularly mindful of data that assists in representing research about or by under-documented or marginalized peoples, or which documents any shifts in a field of practice.</p> <p><i>Tip: Consider who is likely to use this data, why, and in what format it would be useful. Does the deposit satisfy these needs? Consider reappraising a few years later if you are unsure - community interest and short-term use may help answer this question.</i></p>
Uniqueness	<p>Are the data unique or are they published or available elsewhere? Does the dataset accompany a copy of the code or scientific model that could reproduce it?</p>	<p>If the data are not unique and have been acquired and preserved by another repository, it should be a straightforward decision not to preserve them. Redundancy isn't always a bad thing however – sometimes archives keep copies of things that also exist in other archives to facilitate ease of access. Similarly, if the data was produced by a model, the environmental impact of regenerating that data may outweigh the cost of preserving the data.</p> <p><i>Tip: If the dataset serves your user community and it is important for other reasons identified in this chart, you may wish to preserve it despite duplication. Consider reappraising in 5-10 years if that is the case.</i></p>
Cost / Economic case	<p>Are there adequate resources to support:</p> <ul style="list-style-type: none"> • Staff time to validate and/or improve descriptive and administrative metadata, data contextualization and/or quality where required? • Resources for supporting preservation 	<p>Hard costs, like equipment and storage, are likely to decrease in the future, but the same is not true for human resources. Long-term preservation implies a level of care different from simply holding onto the data. How much effort will it take to keep this dataset useful in the future? Is your institution or repository prepared for the ongoing human, technological, and environmental costs required to preserve the data?</p> <p><i>Tip: Institutional policies for curation and preservation are essential to guide this decision-making. It is difficult to justify the allocation of resources for file validation and migration to new</i></p>





	<p>interventions, such as format conversion or software emulation?</p> <ul style="list-style-type: none"> Storage and maintenance costs over time? 	<p>formats if you have not articulated your preservation commitment.</p>
<p>Rights and restrictions / Potential for redistribution</p>	<p>Can the data be made accessible to the repository's designated community or are there restrictions that would prevent access?</p> <p>Does the data contain any sensitive or personal information that would preclude making it publicly accessible?</p>	<p>Accessibility is one of the most important questions in the curation of research data, and it matters for long-term preservation as well. Without the ability to enable access to the data at some point, the effort required for preservation is not justifiable.</p> <p><i>Tip:</i> Data that enters a repository are there to be shared. Have adequate permissions (including participant consent and ethics approvals) been obtained? Do these approvals specifically address long-term preservation? Is there any legal or ethical reason why you would not want your repository to continue to provide access to these data in the future?</p>
<p>Preservability of content and context / Full documentation</p>	<p>Is there adequate documentation for the context of the data's creation? Are the data in formats that support preservation and access?</p>	<p>Datasets that are not well documented now will be even less useful to future researchers as methodologies and practices in the field of research change. If a researcher has poorly documented their work or used proprietary file formats that cannot easily be converted to open file formats, it might not be a question of whether or not you <i>want</i> to preserve the dataset – you simply might not be able to.</p> <p><i>Tip:</i> Each new file format received presents a new challenge to long-term accessibility. Is the time, cost, and effort required to develop a process for making access copies of the files in this dataset justifiable? (The DCN Data Curation Primers can be useful tools for guiding the extraction of data from proprietary into accessible file formats. Where Primers are not available for a given format, a more formal preservation assessment may need to be undertaken. An example of an in-depth concept model for format assessments is available from The Danish National Archives.)</p>





		<p>Tip: Publishing a list of preferred formats implies a commitment to the sustainability of those formats, while it also signals to depositors that other formats may not receive the same level of support. If you do not have a published list of preferred formats, the Library of Congress Sustainability of Digital Formats chart and the recommendations by the Canadian National Heritage Digitization Strategy are good resources to track the effects of time and technological change on file format preservability. Consider reappraising non-preferred file formats every 5-10 years to determine their ongoing usability or look for a third party with the expertise to manage those formats better.</p>
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6. Appraisal Outcomes

Appraisal for research data begins when data creators consider which data, file formats, and documentation should be deposited and shared in a repository, and typically ends when the repository agrees or declines to steward the dataset on behalf of the data creator. If the selected repository has a commitment to long-term preservation, however, the appraisal process serves a valuable function beyond the point of acceptance. Many reappraisal decisions may be made over the life of a dataset, and in each instance curators and preservationists must consider whether they can or should continue to manage the data, in what form, and for how much longer. Each iteration of a repository's appraisal process will produce recommendations that can be carried out and documented to support the next appraisal decision, which may include:

At initial appraisal:

- Requesting a researcher provide more documentation to describe the dataset
- Discussing with the researcher the perceived long-term value of the dataset and their preservation intent
- Converting proprietary files to an open data format for both access and preservation
- Documenting curation decisions in metadata that will be preserved with the dataset
- Flagging datasets that are a priority for short-term reappraisal
- Identifying specific files that could be removed from a dataset due to licensing restrictions, sensitive content, or other selection considerations





At reappraisal:

- Further consultation with stakeholders from the repository's designated community
- The transformation of files to new access formats
- Addition of any administrative or preservation metadata needed to manage the dataset
- Addition or revision of user documentation to explain file format changes and/or software needed to access the files
- Transfer of data custodianship to other stakeholders, which may include repatriation of data to acknowledged owners or transfer to another repository with the expertise to manage the data formats
- Deaccession and removal of data no longer considered to have long-term value



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