

**Directorate for Biological Sciences**  
**UPDATED Information about the Data Management Plan Required for all Proposals**  
**September 2020**

**BACKGROUND**

NSF considers the Data Management Plan (DMP) to be an integral part of all full proposals (<http://www.nsf.gov/bfa/dias/policy/dmp.jsp>)<sup>1</sup> that will be “considered under Intellectual Merit or Broader Impacts or both, as appropriate for the scientific community of relevance” (NSF Proposal and Award Policies and Procedures Guide, Chapter II.C.2.j<sup>2</sup>). BIO recognizes that different research communities may have their own data management practices and standards; that these norms will change over time; and, that lifecycles of usefulness will vary for different data types. As such, it is essential for scientific communities to guide needed standards development and to shape expectations for sharing or archiving. While we anticipate variation in DMPs across research communities, each DMP should be appropriate for the data being generated and reflect the best practices and standards in the area of research being proposed.

**REQUIREMENTS**

All proposals must include a supplementary document of no more than two pages labeled “Data Management Plan.” Any specific instructions and exceptions to the two-page limit will be found in specific Program Solicitations.

- The DMP is NOT part of the 15-page Project Description.
- Even if no data will be produced (e.g., a workshop proposal), a DMP should be submitted that states: “No data are expected to be produced from this project.” Note, however, that projects that provide infrastructure or services in support of research that generates data should discuss whatever guidance or support they may provide to those users to help them meet their data sharing obligations
- Proposals that do not include a Data Management Plan will be returned without review.

DMP plans are evaluated as part of merit review and are monitored by program officers during the period of the award. Reviewers will be asked to consider the guidance in this document, the NSF PAPPG, the relevant solicitation, and any community specific standards when evaluating data management plans, and to defer to the highest standard expected by the appropriate community of practice. For collaborative proposals or proposals involving sub-awards, the lead PI is responsible for the DMP for the entire project. The lead PI is also responsible for reporting in the Annual and Final Reports on the data management, preservation and access for the whole project.

**CONTENT of the DMPs**

Data Management Plans should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results<sup>3</sup>. NSF is aware of the need to provide flexibility in the assessment of Data Management Plans. DMPs submitted to BIO programs should describe how PI(s) will

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<sup>1</sup> For the full policy implementation, see the NSF Proposal and Award Policies and Procedure Guide (PAPPG) II.C.2.j

<sup>2</sup> See NSF PAPPG ([https://www.nsf.gov/pubs/policydocs/pappg20\\_1/pappg\\_2.jsp#dmp](https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_2.jsp#dmp))

<sup>3</sup> See NSF PAPPG XI.D.4 ([https://www.nsf.gov/pubs/policydocs/pappg20\\_1/pappg\\_11.jsp#XID4](https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_11.jsp#XID4))

manage data (digital and analog) and physical materials (samples and collections) gathered or generated during the time of the award. This should include description of data handling processes to protect the data (e.g. to ensure quality or security), as well as procedures and standards used to document the provenance and quality of the data (metadata). The DMP should identify plans for dissemination and access after the period of the award in a manner consistent with FAIR data principles of Findability, Accessibility, Interoperability, and Reusability<sup>4</sup>. Where they exist, PIs are expected to make use of recognized, accessible, community-accepted repositories that conform to appropriate national and international standards for such facilities. DMPs that rely on self-publication on personal or lab websites in lieu of available public repositories may be considered unsatisfactory.

DMPs must include detail sufficient for evaluation of the plan (and past performance if any) during merit review. To facilitate the merit review process and post-award management, and as appropriate, please organize the DMP as follows:

#### Description of Data Used and/or Generated

1. Describe the types of data, physical samples or collections, software, curriculum materials, and other materials to be produced in the course of the project. (For collaborative proposals, the DMP must cover all the various data types being collected by each collaborator.)
2. Describe the standards to be used for all the data types anticipated, including data or file format and metadata. [Note: Where existing standards are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies.]

#### Accountability

3. Describe the roles and responsibilities of all parties with respect to the management of the data (including contingency plans for the departure of key personnel from the project).

#### Data Sharing

4. Describe the dissemination methods will be used to make the data and metadata available to others during the period of the award and any modifications or additional technical information regarding data access after the grant ends.
5. Describe the PI's policies for data sharing, public access and re-use, including re-distribution by others and the production of derivatives.

#### Protection of Data: Security and Integrity

6. Where appropriate, include provisions for protection of privacy, confidentiality, security, intellectual property rights and other rights.

#### Data Preservation

7. Where relevant, describe plans for archiving data, samples, and other research products, and for on-going access to these products through their lifecycle of usefulness to research and education. Consider which data (or research products) will be deposited for long-term access and where. (What physical and/or cyber resources and facilities [including third party resources] will be used to store and preserve the data after the grant ends?)

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<sup>4</sup> <https://www.nature.com/articles/sdata201618>

## COSTS ASSOCIATED WITH DATA MANAGEMENT

Some repositories may require up-front charges for curation of data, samples, code, specimens, etc. Costs for these services are allowable expenses similar to open access publication. If they apply, these should be documented and budgeted appropriately.<sup>5</sup>

## POST-AWARD MANAGEMENT

As noted above, after an award is made, implementation of the DMP will be monitored through the annual and final report process by BIO Program Directors and Committees of Visitors. Annual project reports required for all NSF multi-year awards must include information about progress made in data management and sharing of research products (e.g., identifier or accession numbers for data sets, citations of relevant publications, conference proceedings, and other types of data sharing and dissemination).

Final project reports required for all NSF awards should describe the implementation of the DMP including any changes from the original DMP and contain the following information:

- the data produced during the award period, and which data that will be retained after the award expires;
- how the data is to be disseminated and made available for sharing;
- the standards that will be used to make the data available to others, including data format and any metadata;
- where the data generated by the project has been deposited/is being stored for long-term public access; and
- unique, resolvable and persistent identifiers (such as Digital Object Identifiers [DOIs]; Uniform Resource Locators (URLs), or similar) for each publicly released product referenced in the report.

## FUTURE PROPOSALS

DMP implementation will also be considered during evaluation of subsequent proposals. Data management must be reported in subsequent proposals by the PI and Co-PIs under “Results of prior NSF support,” which must include “evidence of research products and their availability, including, but not limited to: data, publications, samples, physical collections, software, and models, as described in any Data Management Plan.”<sup>6</sup> When appropriate, this section must include evidence of deposition of samples, data, code, or other products in recognized, accessible, community-accepted repositories by listing such repositories and, if practical, metadata. All products that are specifically mentioned in the Results from Prior NSF Support section must be referenced in the References Cited section with unique, resolvable and persistent identifiers (such as Digital Object Identifiers [DOIs]; Uniform Resource Locators (URLs), or similar). Failure to document release of data or other products as per the DMP of a previous award may preclude action on any future proposal.

## DATA MANAGEMENT RESOURCES

There are many sites that provide specific guidance on data management practices. The following list will be updated from time to time and is not intended to endorse these particular resources. These provide an entry point for assistance:

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<sup>5</sup> See NSF DCL “Effective Practices for Data” (<https://www.nsf.gov/pubs/2019/nsf19069/nsf19069.jsp>)

<sup>6</sup>See NSF PAPPG II.C.2.d.iii ([https://www.nsf.gov/pubs/policydocs/pappg20\\_1/pappg\\_2.jsp#IIC2diii](https://www.nsf.gov/pubs/policydocs/pappg20_1/pappg_2.jsp#IIC2diii))

- Journals and data repositories may have specific formatting and metadata requirements for data publishing or archival deposit.
- Professional and scholarly societies may provide guidance for the community. For example, the Ecological Society of America provides a list of resources and tools for data sharing: <http://www.esa.org/esa/science/data-sharing/resources-and-tools/>
- Non-governmental organizations are now offering resources and training; see, for example:
  - DataOne - <https://www.dataone.org/best-practices>
  - Data Carpentry - <http://datacarpentry.org/>
  - Software Carpentry - <http://software-carpentry.org/>
- The US Geological Survey, while intended for USGS researchers, has a wealth of training and best practices materials: <http://www.usgs.gov/datamanagement/index.php>
- Repository registry (and search) service: <http://www.re3data.org/>
- Finally, many university libraries now provide resource guides on data management planning and best practices; some provide direct support for DMP development.