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## **DRAFT - Data Management Plan (DMP) Preparation Guidance and Template**

**Note: The Data Management Plan (DMP) Preparation Guidance and Template is intended to help in producing DMPs that are actionable through the life of the grant. However, while following the Data Management Plan (DMP) Preparation Guidance and Template is recommended, it does not guarantee funding.**

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- **Purpose:**
  - The DMP Preparation Guidance and Template document is used to assist NCAR/UCAR Community Programs (UCP) proposals in describing the plans for managing and sharing data and products from research/project in order to meet DMP requirements set forth by UCAR/NCAR's top funding/award agencies (i.e. NSF, NASA, and NOAA).
- **Overview:**
  - The DMP Preparation Guidance and Template document is structured based on the DMP requirements provided by the National Science Foundation's Grant Proposal Guide Chapter II.C.2.j with additional emphasis on the requirements and guidance provided by the Geosciences Directorate - Atmospheric and Geospace Sciences Division (AGS) and the Computer & Information Sciences & Engineering (CISE) Directorate.

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- A total of nine sections are included in the DMP Preparation Guidance and Template document, and the title for each section of the DMP template is listed as follows:
  - Section 1: Products of the Research (Type of Data Produced)
  - Section 2: Data Format
  - Section 3: Metadata
  - Section 4: Access to Data and Data Sharing Practices and Policies
  - Section 5: Policies for Re-Use, Re-Distribution, and Production of Derivatives
  - Section 6: Archiving of Data (Data Storage and Preservation of Access)
  - Section 7: Cost of Implementing the DMP
  - Section 8: Roles and Responsibilities
  - Section 9: Additional Comments
- Each section has a description and a set of guiding questions.
- NOTE: While it is typically not part of data management plans, DASH recommends that proposal teams also review any applicable Federal Information Security Modernization Act (FISMA) requirements when preparing for data management plans.
  - The [UCAR Information Technology Strategic Security Plan](#) outlines the comprehensive risk management approach to cybersecurity and privacy. UCAR seeks to achieve baseline compliance with the FISMA in order to better protect the confidentiality, integrity, and availability of information and information systems. UCAR has adopted the National Institute of Standards and Technology (NIST) defined guidelines and mandates that are aligned with the International Organization for Standardization (ISO) and industry best practices.
  - For questions or more information, the Cybersecurity Risk and Compliance ([CRC](#)) team is a dedicated resource for FISMA compliance support. Please contact CRC at [IT-Compliance@ucar.edu](mailto:IT-Compliance@ucar.edu).
- **Instructions:**
  - For each section of the DMP template, first read the description of the section; then, using the guiding questions, formulate the response to each section. If applicable, additional notes will also be made available for the specific section.
  - In some cases, the DMP may contain a statement such as “a data management plan is not relevant to the proposed activities;” such statements should be explained.
  - For NSF:
    - DMP is a maximum two-page document.
    - This document should be labeled as “Data Management Plan” and **must be** included as part of the supplementary documents to a NSF proposal. NSF will not evaluate any proposal that is lacking a DMP.

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- The final DMP should have the following components:
  - Document Title
  - DMP section titles
  - Response(s) to each sections.
- Please make sure the DMP conforms to any additional format requirements that are mandated by the funding agency/proposal.
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- **Selected Resources:**
  - NSF's Grant Proposal Guide (GPG) Chapter II.C.2.j ([http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg\\_2.jsp](http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg_2.jsp)) provides the overall description of the content that should be included in a DMP.
    - Individual solicitations may have additional data management plan requirements. If guidance specific to the program is not available, the requirements established in the NSF GPG apply.
    - Data management requirements and plans that are provided by specific Directorate, Office, Division, Program, or other NSF unit can be found under the following link: <https://www.nsf.gov/bfa/dias/policy/dmp.jsp>
  - DMPs are “living documents” such that any changes or modifications to the plans should be documented, and the content of the DMPs should be updated accordingly.
    - Notably, annual project reports require all NSF multi-year awards to include information about progress made in data management and sharing of research data/products.
  - A DMP allows the investigators/grantees to demonstrate in a clear, effective, and transparent manner their implementations of the expectations from Chapter VI.D.4.
  - Per NSF's Award and Administration Guide (AAG) on *Dissemination and Sharing of Research Results*, under the Intellectual Property section of the “Other Post Award Requirements”, or AAG Chapter VI.D.4, NSF provided five different areas regarding its expectations of their investigators who are grantees or are receiving grants.
    - AAG Chapter VI.D.4 can be viewed using the following link: [http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/aag\\_6.jsp#VID4](http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/aag_6.jsp#VID4)
  - Related information regarding managing and sharing research data/products can be found under the NSF's “Data Management & Sharing Frequently Asked Questions (FAQs)” page: <https://www.nsf.gov/bfa/dias/policy/dmpfaqs.jsp>

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## **Data Management Plan Preparation Guidance**

### **1. Products of the Research (Type of Data Produced)**

- **Description:** Describe the types of data and products that will be generated in the research, such as physical samples, space and/or time-dependent information on chemical and physical processes, images, spectra, final or intermediate numerical results, theoretical formalisms, computational strategies, software, and curriculum materials.
  - Other examples of types of data/products include, but are not limited to:
    - New observational data
    - New results from model(s)
    - Data/products generated from previous observations or models
    - Texts/Reports/Spreadsheets
    - Audio/video files
    - Surveys
    - Interactive resources
    - Services
    - Workflows
- **Questions to Consider:**
  - What, where, and when will the data/products from this research/project be produced?
    - What data/product types will you be creating or capturing (e.g. experimental measures, observational or qualitative, model simulation, processed etc.)?
  - How will you capture or create the data/products?
  - How will the data/products be processed?
  - What quality assurance and quality control measures will you employ?
  - If you will be using existing data/products, please identify them and explain how and where you obtain the existing data/products.
  - What is the relationship between the data/products you are creating/collecting and the existing data/products?
- **Additional Notes:**
  - Data that underlie the findings reported in a journal article or conference paper should be deposited in accordance with the policies of the publication and the procedures laid out in the DMP that was included in the proposal, which led to the award that the research is based upon.
  - All data resulting from the research funded by the award, whether or not the data support a publication, should be deposited at the appropriate repository as explained in the DMP.

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- Rarely does NSF expect that retention of all data that are streamed from an instrument or created in the course of an experiment or survey will be required. See your specific directorate or solicitation for details.

## 2. Data Format (Data Organization and File Format)

- **Description:** Describe the format in which the data or products are/will be stored (e.g. hardcopy logs and/or instrument outputs, ASCII, XML files, HDF5, CDF, NASA ICARTT, etc).
- **Questions to Consider:**
  - Which file formats/types/structures will you use for your data/products, and why?
  - What is the organizing structure that will be used, including the naming convention for the data files and the final products?
  - Approximately how many files will there be or what will the total file size for your data/products?
  - When existing, standardized file formats/types are absent or deemed inadequate, please document the rationale(s) and provide any proposed solutions or remedies.

## 3. Metadata

- **Description:** Describe the format and standard in which the data/products will be described/documented.
- **Questions to Consider:**
  - What form of description/documentation, or metadata, will be used to describe the data/products produced (i.e. what details will someone else need in order to be able to understand, interpret, and use the data/products)?
    - If you are using metadata standard(s) (e.g. ISO19115, Dublin Core, EML, etc.), which metadata standard(s) are you using and why have you chosen it(them)?
  - What is the essential information needed to understand, interpret, and use the data/products from this research/project?
    - Metadata may include descriptions of research details such as: experiments, apparatuses, computational codes, etc.
  - What contextual details are needed to make the data/products you create or collect meaningful?
  - How will you create or capture these metadata?
  - When existing standards are absent or deemed inadequate, please document the rationale(s) and provide any proposed solutions or remedies.

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○ **Additional Notes:**

- Metadata associated with the data should conform to community standards and the requirements of the host repository. NSF does not currently specify a single metadata standard. However, any acceptable minimum set of metadata elements would include the names of all authors, date of publication or release, and Universal Resource Locator (URL) or other persistent identifier, as required by Biographical Sketches in proposals (Section 3.2.3 and Grant Proposal Guide, Chapter II C.2.f.i (c) - [http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg\\_2.jsp](http://www.nsf.gov/pubs/policydocs/pappguide/nsf16001/gpg_2.jsp)).

**4. Access to Data and Data Sharing Practices and Policies**

○ **Description:**

- Describe your plans for providing public access to data, including websites maintained by your research group and contributions to public archives/repositories. If maintenance of a web site is the direct responsibility of your group, provide information about the period of time the website is expected to be maintained.
- Also describe your practice or policies regarding the release of data – for example whether data are available before or after formal publication and the approximate duration of time that the data will be kept private.
- Describe your policies (where applicable) for protection of proprietary data, privacy and confidentiality, intellectual property, or other rights or requirements.

○ **Questions to Consider:**

- What are your plans for providing access to your data/products, including those used in publications?
- What is the process for gaining access to the data/products?
  - Is there cost associated with gaining access?
  - What resources (e.g. software, equipment) are needed to access or use the data/products?
- How, where, and when will the data/products be made available to others, including without the need for direct requests? (Include resources needed to make the data available: equipment, systems, expertise, etc.)
  - If digital data/products will be made available to others, including without the need for direct requests, what file format(s) will be used?
  - If different communities, such as other researchers and the Public will be provided with different access methods and file format(s), please provide the rationale(s) and describe the methods/formats separately.

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- If different data/products will become available on different schedules, please provide explanations for this decision.
- If there is an embargo period for sharing the data/products, please provide detailed explanations.
- How long will the data/products be kept available and accessible beyond the life of the project?
- Are there legal and ethical issues related to the data/products? If so, how will these be resolved?
  - If the data is of a sensitive nature (e.g. human subject concerns, potential patentability, species/ecological endangerment concerns, such that public access is inappropriate), what have you done to comply with your obligations in your Institutional Review Board (IRB) Protocol? Also, please address here the means by which granular control and access will be achieved (e.g. formal consent agreements; anonymizing data; restricted access, only available within a secure network).
- Who will hold the intellectual property rights to the data/products and how might this affect data/products access?
- How long will the original data/product collector/creator/principal investigator retain the right to use the data/product before opening it up to wider use?
- **Additional Notes:**
  - Practices governing use of embargos and delayed data release vary widely across the research communities supported by NSF and should be discussed as part of the DMP. For large-scale projects that are supported primarily to generate data for community use, the timing of release will be part of the award terms and conditions and clearly stated in the public award abstracts. NSF recognizes that some classes of data, particularly those that relate to human subjects, education, personally identifiable information, national security, or proprietary interests, may be subject to restrictions. Such restrictions must be described in the DMP and changes addressed in annual and final reports.
  - Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) proposals and any other proposal may allow for exceptions for proprietary or otherwise restricted data, including but not limited to personally identifiable information, business confidential information, security, among other concerns outlined in section 4.a. of the Office of Science and Technology Policy (OSTP) memo. Any such data management issues as well as conditions that might affect, delay, or limit data sharing should be discussed in the DMP. Coordination with the Cognizant Program Officer prior to submitting the proposal is also advised.

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## 5. Policies for Re-Use, Re-Distribution, and Production of Derivatives

- **Description:** Describe your policies regarding the use of data provided via general access or sharing. If you plan to provide data on a website, will the site contain disclaimers, or conditions regarding the use of the data in other publications or products? If the data or products are copyrighted, how will this be noted on the website?
- **Questions to Consider:**
  - How can the policies outlined in the previous section be applied to the re-use and re-distribution of your data/products?
  - Who is likely to be interested in the data/products?
  - What and who are the intended or foreseeable uses of the data/products?
  - Who will be allowed to use your data/products?
  - For those who are allowed to use your data/products:
    - How will they be allowed to use your data/products?
    - Will they be allowed to disseminate your data/products?
  - If you are planning on applying permission granting processes or placing restrictions on access, use or dissemination of the data/products, you must explain in this section how you will codify and communicate these processes or restrictions.

## 6. Archiving of Data (Data Storage and Preservation of Access)

- **Description:** Describe whether and how data will be archived and how preservation of access will be handled. For example, will hardcopy logs, instrument outputs, and physical samples be stored in a location where there are safeguards against fire or water damage? Is there a plan to transfer digitized information to new storage media or devices as technological standards or practices change? Will there be an easily accessible index that documents where all archived data are stored and how they can be accessed? If the data will be archived by a third party, please refer to their preservation plans (if available).
- **Questions to Consider:**
  - How long do you expect the data/products to be available after the funding for the research/project has ended?
  - What is your long-term strategy for maintaining, archiving, curating, and preserving the data/products that the research/project will create?
  - Which archive/repository have you identified as a place to deposit the data/products?
  - What procedures does your intended long-term data/products storage facility have in place for preservation and backup?
  - How long will/should the data/products be kept beyond the life of the project?

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- What data/products will be preserved for the long-term? On what basis will data/products be selected for long-term preservation?
- What transformations/migrations will be necessary to prepare the data/products for preservation and future sharing?
- What documentation, or metadata, will be submitted alongside the data/products or created on deposit/transformation in order to make the data/products reusable?
- What related information will be deposited?
- **Additional Notes:**
  - There are several technical strategies for achieving long-term preservation including redundancy, dark archives, secure data centers, and so on. In general, good practice calls for duplicating the collection at a geographically distinct location and for regular monitoring and format migration, given the rapidness of media degrading and formats becoming obsolescence.

## 7. Cost of Implementing the DMP

- **Description:** If implementing the DMP will incur additional costs to the project this fact should be mentioned in the appropriate section of the plan (for example the cost of setting up and maintaining a web site). Details of the costs must be included in the budget justification in the budget section of the proposal.
- **Questions to Consider:**
  - Who will be responsible for funding the management of your data?
  - What are the key cost components (e.g. database building/maintenance, personnel training, archives/repositories fees, etc.)?

## 8. Roles and Responsibilities

- **Description:** Explain how the responsibilities regarding the management of your data will be delegated. This should include time allocations, project management of technical aspects, training requirements, and contributions of non-project staff/individuals should be named where possible. Remember that those responsible for long-term decisions about your data will likely be the custodians of the repository/archive you choose to store your data. While the costs associated with your research (and the results of your research) must be specified in the Budget Justification portion of the proposal, you may want to reiterate who will be responsible for funding the management of your data. Consider the following:
- **Questions to Consider:**

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- Outline the staff/organizational roles and responsibilities for implementing this data management plan.
- Who will be responsible for data management and for monitoring the data management plan?
- How will adherence to this data management plan be checked or demonstrated?
- What process is in place for transferring responsibility for the data, including when key personnel departures from the project?
- Who will have responsibility over time for decisions about the data once the original personnel are no longer available?

## 9. Additional Comments

- **Description:** Describe here any additional program-specific data management requirements. If none exist you may leave this section blank.
- **Areas to Consider:**
  - Identifiers: NSF encourages investigators to employ persistent identifiers for all research products (where these exist) and citation practices common to the discipline.
    - **Questions to Consider:**
      - Are there identifiers (ex: DOIs, PURLs, ARKs) that are associated with the data/products of the research/project?
      - If yes, what are they?
  - Previous published data: Describe your prior experience in publishing research data. If you have previously published research data, list the citations here (including the website or persistent identifier).

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## Data Management Plan

[Enter a Title for the DMP]

[Enter the Name of the Funding/Award Agency]

[Enter the Proposal Solicitation Number]

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### Products of the Research (Type of Data Produced)

[Insert your response here]

### Data Format (Data Organization and File Format)

[Insert your response here]

### Metadata

[Insert your response here]

### Access to Data and Data Sharing Practices and Policies

[Insert your response here]

### Policies for Re-Use, Re-Distribution, and Production of Derivatives

[Insert your response here]

### Archiving of Data (Data Storage and Preservation of Access)

[Insert your response here]

### Cost of Implementing the DMP

[Insert your response here]

### Roles and Responsibilities

[Insert your response here]

### Additional Comments

[Insert your response here]

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