



NSF

ARCTIC
Data
Center

<https://arcticdata.io>



@arcticdatactr

NSF Award #1546024



DataONE

Writing Good Data Management Plans

Kathryn Meyer

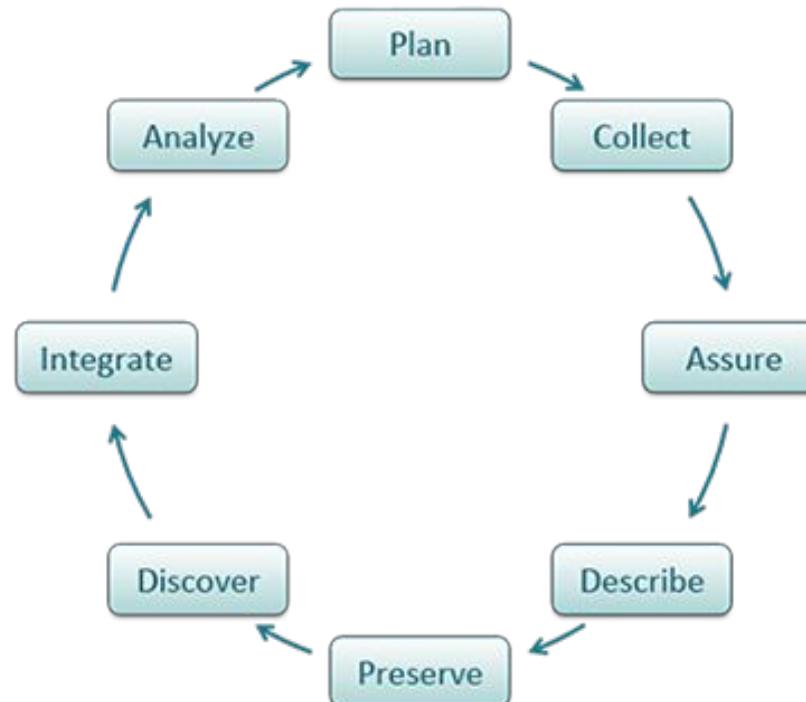


0000-0003-0200-0787

Arctic Data Center Data Science Training
January 14-18, 2019



The Data Life Cycle





The Data Life Cycle





Why Plan?



Efficiency



Why Plan?



Efficiency



Engagement



Why Plan?



Efficiency



Engagement



Stay Organized



Why Plan?



Efficiency



Engagement



Stay Organized



Funder Requirement



Why Plan?



Efficiency



Engagement



Stay Organized



Funder Requirement



Share data



What's in a Data Management Plan?

- Study design
- Data (including format)
- Metadata
- Policies for access, sharing & reuse
- Long-term storage & data management
- Budget



Writing a Data Management Plan (DMP)

1. Engage your team





Writing a Data Management Plan (DMP)



1. Engage your team
2. Plan from the start



Writing a Data Management Plan (DMP)



1. Engage your team
2. Plan from the start
3. **Follow good advice**
 - Arctic Data Center
 - Institutional Libraries
 - DataONE



Writing a Data Management Plan (DMP)



1. Engage your team
2. Plan from the start
3. Follow good advice
 - Arctic Data Center
 - Institutional Libraries
 - DataONE
4. Use good tools
 - DMPTool
 - DMPOnline



Writing a Data Management Plan (DMP)



1. Engage your team
2. Plan from the start
3. Follow good advice
 - Arctic Data Center
 - Institutional Libraries
 - DataONE
4. Use good tools
 - DMPTool
 - DMPOnline
5. Review and Revise



10 Simple Rules for Writing a Good DMP

PLOS COMPUTATIONAL BIOLOGY

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Publish

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advanced search

OPEN ACCESS

PERSPECTIVE

Ten Simple Rules for Creating a Good Data Management Plan

William K. Michener

Published: October 22, 2015 • <https://doi.org/10.1371/journal.pcbi.1004525>

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Citation

29,398
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Introduction

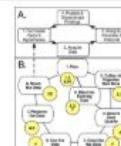
Rule 1: Determine the Research Sponsor Requirements

Rule 2: Identify the Data to Be Collected

Rule 3: Define How the Data Will Be Organized

Rule 4: Explain How the

Figures



Check for updates

Included in the Following Collections

Ten Simple Rules
Open Data



10 Simple Rules for Writing a Good DMP

1. Determine the research sponsor requirements
2. Identify the data to be collected
3. Define how the data will be organized
4. Explain how the data will be documented
5. Describe how quality data will be assured
6. Present a sound storage & preservation strategy
7. Define the project's data policies
8. Describe how the data will be disseminated
9. Assign roles & responsibilities
10. Prepare a realistic budget



Determine the research sponsor requirements



GORDON AND BETTY
MOORE
FOUNDATION

 **USGS**
science for a changing world



Identify the data to be collected: types; sources; volume; and data and file formats



Image credits: World Meteorological Organization on Flickr



Define how the data will be organized

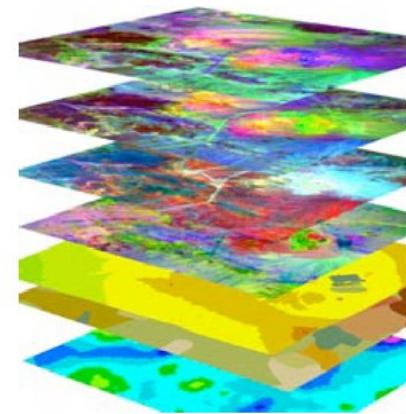


FileMaker



Arc
ESRI GIS

ORACLE

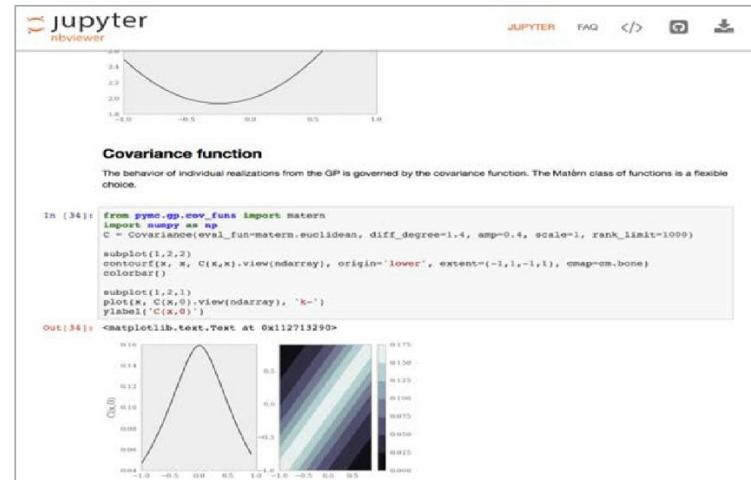




Explain how the data will be documented

- Dublin Core, ISO 19115, EML
 - Morpho, metavist, readme.txt
 - Electronic notebooks

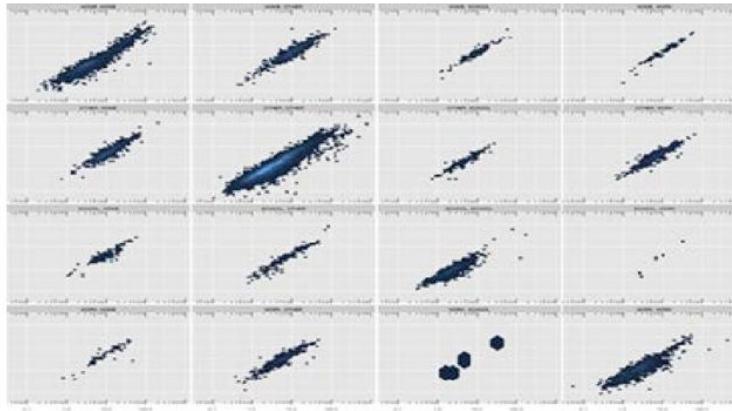
Data & Metadata (EML)





Describe how data quality will be assured

- Training activities, instrument calibration & verification tests, double-blind data entry, statistical and visualization approaches to error detection





Present a sound data storage & preservation strategy

- How long will the data be accessible?
- How will data be stored & protected during the project?
- How will data be preserved & made available for future use?



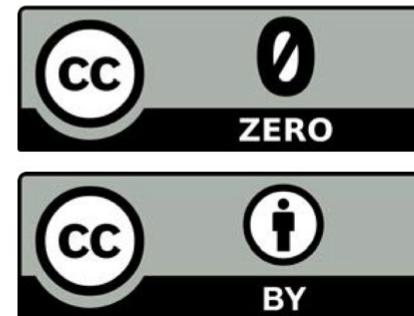
re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES

GitHub



Define the project's data policies

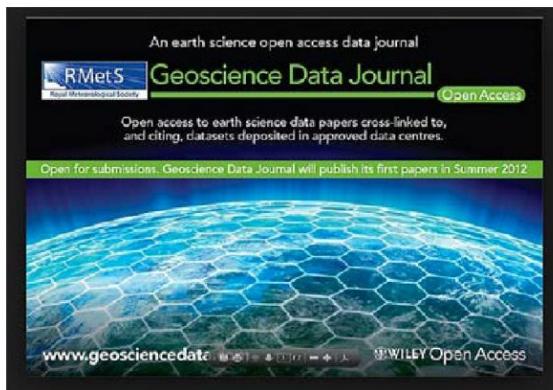
- Licensing and data sharing arrangements
- Human subject and other sensitive data





Describe how the data will be disseminated

- Active, robust and preferred approaches
 - Publishing data in open repository or archive
 - Submitting the data as appendices or supplements to journal articles
 - Publishing the data, metadata, and relevant code as a “data paper”



GitHub



Assign roles and responsibilities

- Roles may include
 - Data collection, data entry, QA/QC, metadata creation and management, backup data preparation and submission to an archive, system administration





Prepare a realistic budget

- Review your plan and make sure that there are lines in the budget to support the people that manage the data as well as pay for the requisite hardware & software





Find Research Funder Requirements

- NSF
 - NSF 14-1, Grantee Standards, Section j
(https://www.nsf.gov/pubs/policydocs/pappguide/nsf14001/gpg_2.jsp#IIC2j)
- NSF GEO
 - Directorate for Geosciences - Data Policies
(<https://www.nsf.gov/geo/geo-data-policies/>)
- NSF Polar Programs
 - NSF 16-055 Dear Colleague Letter
(<https://www.nsf.gov/pubs/2016/nsf16055/nsf16055.jsp>)
- Check your funder for specific requirements



NSF Division of Polar Programs

- NSF requires submission to the Arctic Data Center within 2 years
 - AON program requires submission within 6 months
- Need to document your data well enough for reuse
- There are exceptions for sensitive data
 - Social sciences, endangered species



NSF DMP Requirements: 5 Sections

- Products of research
 - *Types of data, samples, physical collections, software, curriculum materials, other materials produced during project*



NSF DMP Requirements: 5 Sections

- Products of research
 - *Types of data, samples, physical collections, software, curriculum materials, other materials produced during project*
- Data formats and standards
 - *Standards to be used for data and metadata format and content (for initial data collection, as well as subsequent storage and processing)*



NSF DMP Requirements: 5 Sections

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- Policies for access and sharing
 - *Provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements*
- Policies and provisions for re-use
 - *Including re-distribution and the production of derivatives*



NSF DMP Requirements: 5 Sections

- Products of research
 - *Types of data, samples, physical collections, software, curriculum materials, other materials produced during project*
- Data formats and standards
 - *Standards to be used for data and metadata format and content (for initial data collection, as well as subsequent storage and processing)*
- Policies for access and sharing
 - *Provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements*
- Policies and provisions for re-use
 - *Including re-distribution and the production of derivatives*
- Archiving of data
 - *Plans for archiving data, samples, research products and for preservation of access*



DMP Tools & Resources Online



DMPTool

<https://dmptool.org/>



<https://dmponline.dcc.ac.uk/>



Welcome

Create data management plans that meet institutional and funder requirements.

[Get started](#)

DMPTool by the Numbers



29,887
Users



26,353
Plans



234
Participating institutions

Top 5 templates

Digital Curation Centre

NSF-SBE: Social, Behavioral, Economic Sciences

NIH-GDS: Genomic Data Sharing

NIH-GEN: Generic

NEH-ODH: Office of Digital Humanities

[More](#)



Hands-On: Create a DMP

- ❖ Login or create a DMPTool account
(<https://dmptool.org/>)

- ❖ Draft your own Data Management Plan



Welcome
Create data management plans that meet institutional and funder requirements.

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Digital Curation Centre

NSF-SBE: Social, Behavioral, Economic Sciences

NIH-GDS: Genomic Data Sharing

NIH-GEN: Generic

NEH-ODH: Office of Digital Humanities



Build your Data Management Plan

Sign in options

Option 1: If your institution is affiliated with DMPTool.

Your institution

- or -

Option 2: If your institution is not affiliated with DMPTool.

Email address

- or -

Option 3: If not affiliated and you need an account.

Create account with email address



Build your Data Management Plan

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Option 1: If your institution is affiliated with DMPTool.

Your institution

- or -

Option 2: If your institution is not affiliated with DMPTool.

Email address

- or -

Option 3: If not affiliated and you need an account.

Create account with email address



Look up your institution here



university of



American University of Beirut (AUB)

City University of New York (CUNY)

Missouri University of Science and Technology (MST)

National University of Singapore (NUS)

University of Alabama

University of Alabama at Birmingham (UAB)

University of Arizona

University of California, Berkeley (UCB)

University of California, Davis (UCD)

University of California, Irvine (UCI)

University of California, Los Angeles (UCLA)

University of California, Merced (UCM)

University of California, Office of the President (UCOP)

University of California, Riverside (UCR)

University of California, San Diego (UCSD)

University of California, San Francisco (UCSF)

University of California, Santa Barbara (UCSB)

University of California, Santa Cruz (UCSC)

University of Campinas (UNICAMP)

University of Central Florida (UCF)

University of Chicago

Look up your institution here

Finland



Natural Resources Institute Finland (LUKE)

University of Helsinki, Finland

Institution not in the list? Create an account with any email address

Your institution

- or -

Option 2: If your institution is not affiliated with DMPTool.

Email address

- or -

Option 3: If not affiliated and you need an account.

Create account with email address





Build your Data Management Plan

Sign in options

Option 1: If your institution is affiliated with DMPTool.

Your institution

- or -

Option 2: If your institution is not affiliated with DMPTool.

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Option 3: If not affiliated and you need an account.

Create account with email address





Sign in Create account X

* First name

* Last name

* Email

* Password

Show password

* I accept the terms and conditions

Create account

Create account with email address



My dashboard Create plan

✓ Notice: Welcome! You have signed up successfully.

My dashboard

Create plan

Welcome

You are now ready to create your first data management plan.
Click the 'Create plan' button to begin.

There are no records associated

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Build your Data Management Plan

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Build your Data Management Plan

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Create a new plan

Before you get started, we need some information about your research project to set you up with the best DMP template for your needs.

What research project are you planning?

 Mock project for testing, practice, or educational purposes

Select the primary research organization

 Begin typing to see a filtered list

- or - My research organisation is not on the list or no research organisation is associated with this plan

Select the primary funding organization

 Begin typing to see a filtered list

- or - No funder associated with this plan

[Create plan](#) [Cancel](#)[About](#) [Terms of use & Privacy](#) [Privacy statement](#) [Accessibility](#) [GitHub](#) [Contact us](#)

[My dashboard](#) [Create plan](#)

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If applying for funding, state the project title exactly as in the proposal.
(Work, project, testing, practice, or educational purposes)

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[Create plan](#)[Cancel](#)

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Select the primary funding organization



- or - No funder associated with this plan

Which template would you like to use?

We found multiple templates corresponding to your funder.

[Create plan](#)[Cancel](#)



Project details Plan overview Write plan Share Download

* Project title

Arctic Data Center DMP Demo

mock project for testing, practice, or educational purposes

Funder

National Science Foundation (NSF)

Grant number

Project abstract

B I

Principal Investigator

Name

Kathryn Meyer

ORCID ID

Email

meyer@nceas.ucsb.edu

Data contact person

Same as Principal Investigator

Submit

Cancel

Plan guidance configuration

To help you write your plan, DMPTool can show you guidance from a variety of organizations.

Select up to 6 organizations to see their guidance.

DMPTool

Find guidance from additional organizations below

[See the full list](#)

Submit



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B I :≡ ▾ ≡ ▾ 🔗

Briefly summarize your research project to help others understand the purposes for which the data are being collected or created.

Principal Investigator

Name

Kathryn Meyer

ORCID ID

[Empty input field]

Email

meyer@nceas.ucsb.edu

Data contact person

Same as Principal Investigator

Submit

Cancel

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Data contact person Same as Principal Investigator[Submit](#)[Cancel](#)

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Arctic Data Center DMP Demo

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Arctic Data Center: NSF Polar Programs [DRAFT]

This plan is based on the "Arctic Data Center: NSF Polar Programs [DRAFT]" template provided by National Science Foundation (NSF).

Instructions

[Write plan](#)

Types of data produced

- What types of data, samples, collections, software, materials, etc. will be produced during your project?
- What will be the approximate number and size of data files that will be produced during your project?
- What type of metadata (information others might need to use your data) will be collected during your project?

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.

Data and metadata formats

- What format(s) will data and metadata be collected, processed, and stored in?

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.

Roles and responsibilities

- 1. What parties and individuals will be involved with data management in this project?
- 2. What will be the roles and responsibilities of each party and or individual with respect to management of the data
- 3. Who will be the lead or primary person responsible for ultimately ensuring compliance with the Data Management Plan?

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.

Policies for access and sharing

- Will any of the data and/or related materials produced need provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements? If so describe them and detail any requested exceptions from the archiving requirements set for Arctic Sciences research.
- How will data be accessed and shared during the course of the project?

[Project details](#)[Plan overview](#)[Write plan](#)[Share](#)[Download](#)

Arctic Data Center: NSF Polar Programs [DRAFT]

This plan is based on the "Arctic Data Center: NSF Polar Programs [DRAFT]" template provided by National Science Foundation (NSF).

Instructions

[Write plan](#)

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Arctic Data Center DMP Demo

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0/12 answered

[+ Types of data produced \(0 / 3\)](#)[+ Data and metadata formats \(0 / 1\)](#)[+ Roles and responsibilities \(0 / 1\)](#)[+ Policies for access and sharing \(0 / 4\)](#)[+ Policies for re-use and re-distribution \(0 / 2\)](#)[+ Plans for archiving and preservation \(0 / 1\)](#)

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Arctic Data Center DMP Demo

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0/12 answered

+ Types of data produced (0 / 3)**+ Data and metadata formats (0 / 1)****+ Roles and responsibilities (0 / 1)****+ Policies for access and sharing (0 / 4)****+ Policies for re-use and re-distribution (0 / 2)****+ Plans for archiving and preservation (0 / 1)**

- Types of data produced (0 / 3)

What types of data, samples, collections, software, materials, etc. will be produced during your project?

B I ≡ ≡ ≡ ≡

Save

NSF example answer

The researchers will collect and record _____. (Enter data types here. Examples are conductivity, temperature, and depth (CTD) data, gas flux data, aerial photos, modeled atmospheric data, etc.)

These data will include the variables _____. (Enter data variables here. Examples are water temperature, water salinity, photosynthetically active radiation, methane flux, soil albedo, etc.)

Additional data products that will be made available include _____. (Enter additional products here. Examples are atmospheric model codes, educational materials, etc.)

What will be the approximate number and size of data files that will be produced during your project?

| Guidance | Comments |
|----------|----------|
| NSF | DMPTool |

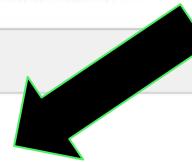
Guidance

| Guidance | Comments |
|----------|----------|
|----------|----------|

- Types of data produced (0 / 3)

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B I



Save

NSF example answer

The researchers will collect and record _____. (Enter data types here. Examples are conductivity, temperature, and depth (CTD) data, gas flux data, aerial photos, modeled atmospheric data, etc.)

These data will include the variables _____. (Enter data variables here. Examples are water temperature, water salinity, photosynthetically active radiation, methane flux, soil albedo, etc.)

Additional data products that will be made available include _____. (Enter additional products here. Examples are atmospheric model codes, educational materials, etc.)

What will be the approximate number and size of data files that will be produced during your project?

Guidance

Comments

NSF

DMPTool

Guidance

Guidance

Comments

- Data and metadata formats (0 / 1)

What format(s) will data and metadata be collected, processed, and stored in?

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.



Save

NSF example answer

_____ data will be collected in _____. (Examples are handwritten lab notebooks, Microsoft Excel files, CSV files, R scripts, etc. Make sure to specify the collection format for each type of data detailed in your description of data.)

All data will be transferred into the following formats for processing and storage: _____. (Examples are CSV files, NetCDF files, etc.)

Metadata will be collected in _____. (Examples are handwritten lab notebooks, Microsoft Word files, etc.)

All metadata will be transformed from text into EML files by the Arctic Data Center online submission tool when submitting to the Arctic Data Center.

| Guidance | Comments |
|----------|----------|
|----------|----------|

NSF DMPTool

Guidance

Arctic Data Center Data Format

Policy: The Arctic Data Center primarily supports the upload of open-source, ubiquitous, and easy-to-read data formats. Examples of such formats are Comma Separated Values (CSV) files, text (TXT) files, PNG, JPEG or TIFF image files, and NetCDF files among many others. If you plan to submit to the Arctic Data Center, include your planned methods to create open-source, ubiquitous, and easy-to-read data. If you plan to work with any proprietary data formats such as Excel workbooks or MATLAB files, please include a plan to transform all data stored in these formats into an open-source format before submission to the Arctic Data Center. If you anticipate any data will not be able to be transformed into an open-source format, please provide your reasoning.

– Data and metadata formats (0 / 1)

What format(s) will data and metadata be collected, processed, and stored in?

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.

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Save

NSF example answer

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|----------|----------|
|----------|----------|

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Guidance

Arctic Data Center Data Format

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- Roles and responsibilities (0 / 1)

1. What parties and individuals will be involved with data management in this project?
2. What will be the roles and responsibilities of each party and or individual with respect to management of the data
3. Who will be the lead or primary person responsible for ultimately ensuring compliance with the Data Management Plan?

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.

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Save

NSF example answer

The following organizations and individuals will be involved with data management in this project:

_____.

_____ will be responsible for _____. (Examples are collecting data, maintaining data storage and backup systems, interfacing with data repository personnel, etc. Make sure to specify the responsibilities for each organization/individual detailed above.)

The NSF Arctic Data Center will provide data archival, preservation, access and metadata authoring services for the project.

| Guidance | Comments |
|---|----------------|
| NSF | DMPTool |
| Guidance Arctic Data Center Identification Policy: The Arctic Data Center utilizes ORCIDs (https://orcid.org/) to identify individuals associated with each dataset. An ORCID will be required for the primary contact of each dataset. ORCIDs are not required for all associated parties but are encouraged so that proper identification and attribution can be given. Please plan on creating (when necessary) and recording ORCIDs for each individual involved with your project before submitting to the Arctic Data Center. | |

- Policies for access and sharing (0 / 4)

Will any of the data and/or related materials produced need provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements? If so describe them and detail any requested exceptions from the archiving requirements set for Arctic Sciences research.



Save

NSF example answer

_____ data are expected to need provisions for _____. (Examples are appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements. Make sure to specify all the types of data that are expected to need provisions.)

_____ data are expected to need provisions due to _____. (Examples are ethical restrictions, release of indigenous knowledge, etc. Make sure to specify explanations for all expected provisions detailed above.)

Because of these expected provisions, it is expected that _____ data will need to be exempted from the archiving requirements set for Arctic Sciences research.

| Guidance | Comments |
|--|----------|
| NSF | DMPTool |
| Guidance <ul style="list-style-type: none">• NSF Office of Polar Programs Guidelines• Arctic Data Center Guidelines on who must submit | |

- Policies for re-use and re-distribution (0 / 2)

How do you anticipate the data for this project will be used? Consider the following:

1. Which bodies/groups are likely to be interested in the data?
2. What and who are the intended or foreseeable uses/users of the data?

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NSF example answer

_____ data are expected to be used by _____. (Examples are academic researchers, government agencies, non-profit organizations, etc. Make sure to specify usage expectations for each type of data detailed in your description of data.)

Other groups that may be interested in _____ data are _____. (Examples are academic researchers, government agencies, non-profit organizations, etc. Make sure to specify interest expectations for each type of data detailed in your description of data.)

Will any permission restrictions need to be placed on the data? Consider the following:

| Guidance | Comments |
|----------|----------|
| NSF | DMPTool |

- Plans for archiving and preservation (0 / 1)

What is the long-term strategy for maintaining, curating, and archiving the data?

Note: The Office of Polar Programs policy requires that metadata files, full data sets, and derived data products be deposited in a long-lived and publicly accessible archive.

Note: if you plan to submit data to the Arctic Data Center please refer to the guidance in the panel on the right.

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NSF example answer

The data manager will follow the NSF Arctic Data Center guidelines to provide accurate and complete documentation for data preservation. The NSF Arctic Data Center will ensure that the data are curated in a relevant long-term archive and ensure data will be available after project funding has ended.

| Guidance | Comments |
|--|----------|
| <p>NSF DMPTool</p> <p>Guidance</p> <p>Arctic Data Center Data Preservation Policy: The Arctic Data Center ensures the long-term preservation of the data entrusted to the repository. The guiding principles for the preservation plan follow:</p> <ol style="list-style-type: none">1. Preserve the bits2. Open science, open standards3. Replicate data and metadata4. Strong versioning5. Frequent auditing6. A wind down plan | |

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Set plan visibility

Public or organizational visibility is intended for finished plans. You must answer at least 50% of the questions to enable these options. Note: test plans are set to private visibility by default.

- Private: visible to me, specified collaborators and administrators at my organization
- Organizational: anyone at my organization can view
- Public: anyone can view

Manage collaborators

Invite specific people to read, edit, or administer your plan. Invitees will receive an email notification that they have access to this plan.

| Email address | Permissions |
|----------------------|-------------|
| meyer@nceas.ucsb.edu | Owner |

Invite collaborators

* Email

* Permissions

- Co-owner: can edit project details, change visibility, and add collaborators
- Editor: can comment and make changes
- Read only: can view and comment, but not make changes

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Optional plan components

- project details coversheet
- question text and section headings
- unanswered questions

Format

pdf ▼

PDF formatting

Font

Face

Arial, Helvetica, Sans-Serif ▼

Size (pt)

10 ▼

Margin (mm)

Top

25 ▼

Bottom

20 ▼

Left

12 ▼

Right

12 ▼

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Public Plans

Public plans are plans created using the DMPTool service and shared publicly by their owners. They are not vetted for quality, completeness, or adherence to funder guidelines.



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1 2 3 4 5 ... Next Last



DMPTool Community Resources

The screenshot shows the DMPTool Blog homepage. At the top, it says "DMPTool Blog" and "Guidance & resources for your data management plan". Below that is a large "DMP Tool" logo with three blue squares above the text. A search bar with a magnifying glass icon and the word "Search" is below the logo. At the bottom of the sidebar are links: "About the DMPTool", "Go to the Tool", "DMPTool Webinars", "Presentations and Press", and "Maintenance".

Release notes: Templates and more

Posted on June 1, 2018 by stephaniesimms

The Roadmap development team just finished a huge chunk of work that we rolled out to DMPTool users this week. Prior to launching the new version of the tool we focused on optimizing the primary user side: creating DMPs. With this new release, we've made significant improvements to the administrative side, specifically to overhaul the way admins create and version templates.

In the midst of this major refactoring effort, we did some additional maintenance, upgrades, and accepted the first new feature contribution from our French partners at DMP OPIDoR (many thanks to Benjamin and Quentin!). The full release notes are available on GitHub. Most of the magic takes place behind the scenes, but keep reading for a summary of changes that affect the user interface.

- **Templates:** You'll notice some subtle changes as you create, edit, and update templates and customizations for funder templates. Previously, any changes you made to a template would trigger a new version. Now you can make changes to template details (Title, Description, update broken links) without versioning. Any structural changes, such as adding a new question or example answer or adding customized guidance to a funder template will create a new version. In the main templates table you will see a red editing icon (screenshot below) if you've made changes that created a new version. The icon includes a tooltip that alerts you to publish your changes (in the Actions menu) in order to make them available to users. You can always "Unpublish" templates and customizations at any time. You will only see the option to "Remove" (i.e. from the table/from view) a template that has not been used to create any plans (e.g. test templates) or a customization that has not been previously published. Detailed instructions are available in the Help for Administrators.



Summary

- Good data management plans will save you time and effort overall
- Data management plans are not static - revise as you do your research project
- Take advantage of DMP resources to create your plan
- The Arctic Data Center is available to assist with your DMP development



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**Arctic
Data
Center**

<https://arcticdata.io>