

# Community Resources for Data Management



Megan Mach and Amber Budden  
DataONE

Nancy Hoebelheinrich  
Knowledge Motifs

# DataONE Cyberinfrastructure





# Data Holdings

[dataone.org/current-member-nodes](https://dataone.org/current-member-nodes)



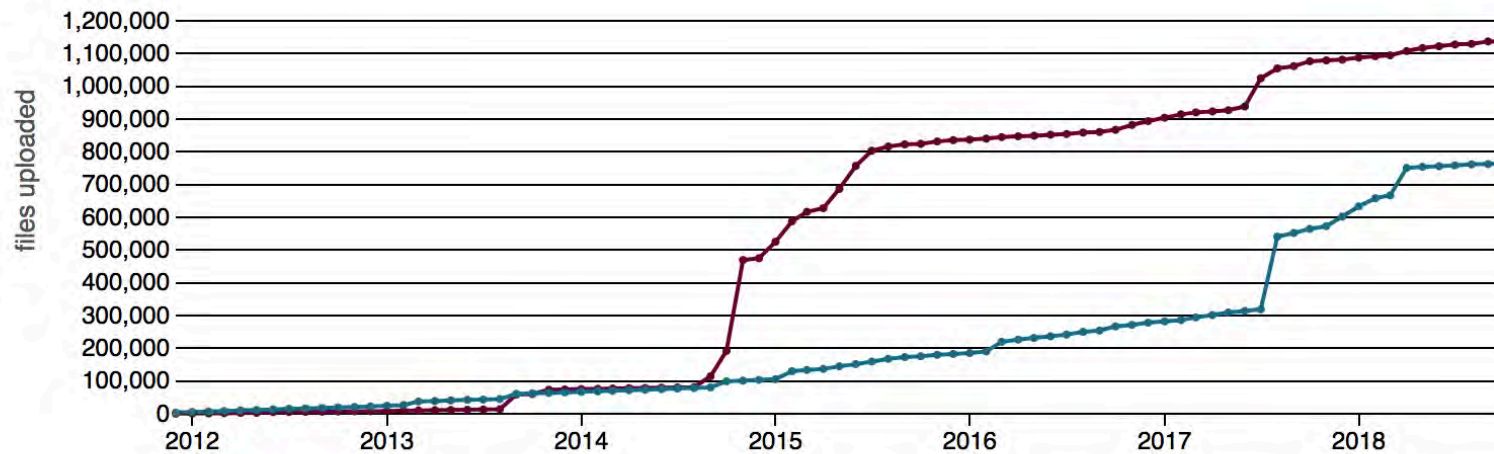
metadata



data

## Uploads

The number of individual metadata and data files uploaded over time. Only the first version of each file is counted.



# DataONE Search

*search.dataone.org*

**DataONE**

About News Participate Resources Education

DATAONE SEARCH: Search Summary Jump to:

Clear all filters

Search [Search phrase] [Q]

My Search: biodiversity

Filter by:

- Data attribute
- Data files
- Member Node**
- Creator
- Year
- Identifier
- Taxon
- Location

Datasets 1 to 25 of 16,342

1 2 3 ... 654

Coweeta Long Term Ecosystem Research from the metro area  
<https://pasta.lternet.edu>

Kendall R. Jones, Carolina Biological Field Station location and protection of Biocomplexity. doi:10.26434/chemrxiv-2015-01-01

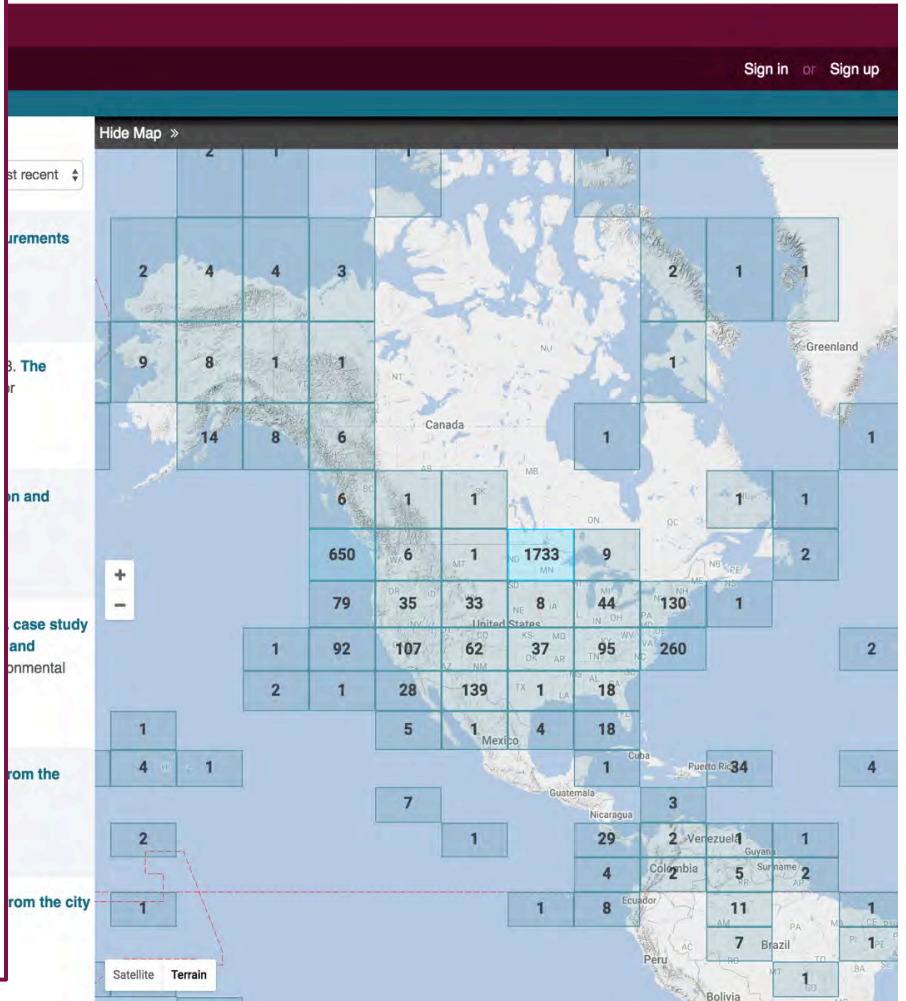
Moorea Coral Reef LTER Community Dynamics  
<https://pasta.lternet.edu>

Gregory Sonnier, Patagonia of the effects of wetlands on floristic quality of rivers  
<https://pasta.lternet.edu>

Coweeta Long Term Ecosystem Research Tennessean Bottomland  
<https://pasta.lternet.edu>

Coweeta Long Term Ecosystem Research of Robbinsville, Georgia  
<https://pasta.lternet.edu>

- ▼ Member Node
- Arctic Data Center
  - Biological and Chemical Oceanography
  - Cornell Lab of Ornithology eBird
  - Dryad Digital Repository
  - Earth Data Analysis Center (University of Texas)
  - Environmental Data for the Ocean
  - Environmental Data Initiative
  - ESA Data Registry
  - Europe Long-Term Ecosystem Research
  - Forest Ecosystem Monitoring
  - Gulf of Alaska Data Portal
  - Gulf of Mexico Research Initiative
  - Idaho Northwest Knowledge Network
  - International Arctic Research Center
  - Knowledge Network for Biocomplexity
  - LTER Network Member Node



# Data Management Education

**DataONE**  
Primer on Data Management: What you always wanted to know but were afraid to ask

Carly Strasser, Robert Cook, William Michener, Amber Budden

**Contents**

- Objective of This Primer
- Why Manage Data?
  - It will benefit you and your collaborators
  - It will benefit the scientific community
  - Journals and sponsors want you to share your data
- How To Use This Primer
- The Data Life Cycle: An Overview
- Data Management Throughout the Data Life Cycle
  - Plan
  - Collect
  - Assure
  - Describe: Data Documentation
  - Preserve
  - Discover, Integrate, and Analyze
- Conclusion
- Acknowledgements
- References
- Glossary

**1. Objective of This Primer**

The goal of data management is to produce self-describing data sets. If you give your data colleague who has not been involved with your project, will they be able to make sense of it and use it effectively and properly? This primer describes a few fundamental data management practices that will enable you to develop a data management plan, as well as how to effectively organize, manage, describe, preserve and share data.

**2. Why Manage Data?**

**2.1. It will benefit you and your collaborators**

Establishing how you will collect, document, organize, manage, and preserve your data, your research project has many benefits. You will spend less time on data management research by investing the time and energy before the first piece of data is collected. You will find it easier for you to find, use, and analyze, and it will be easier for your collaborators to use your data. In the long term, following good data management practices means that scientists with the project can find, understand, and use the data in the future. By documenting your data and recommending appropriate ways to cite your data, you can be sure to get credit for your data and their use [1].

*DataONE Best Practices Primer*

**DataONE** Lesson 10: Analysis and Workflows

View all Education Modules at <https://www.dataone.org/education-modules>

**Typical data analyses**

Data processing may include selecting a subset of data for analysis, merging multiple data sets, manipulating data for usability, or data transformation

Graphical analysis makes it easier to see patterns and can aid in the identification of outliers

**Statistical analysis:** conventional statistics are used to analyze experimental data; descriptive statistics are used to analyze observational or descriptive data

Science is iterative: the process that results in the final product can be complex.

**Reproducibility...**

...is at the core of the scientific process. If results are not reproducible, they lose credibility. Good documentation of the data and the analysis are essential!

**Workflows**

**Definition:** Precise description of the procedures used in a project. Can be formal or informal.

**Informal workflow**

No special software is needed to create workflow diagrams. Workflow diagrams include:

- Inputs and outputs
- Transformation rules or analytical processes
- Decision points
- Arrows indicating direction of process flow

**Formal Workflow**

Analytical pipeline where each step can be implemented in different software systems. Parameters and requirements for each step are formally recorded.

- Single access point for multiple analyses across software packages
- Keeps track of analysis and provenance to better enable reproducibility
- Workflow can be stored
- Allows sharing and reuse of individual steps or overall workflow

**Formal workflow example: Kepler software**

**Best practices for data analysis**

Formally or informally document the workflows used to create results. Include:

- Data provenance
- Analyses and parameters used
- Connections between analyses via inputs and outputs
- Document the code you write for analyses.
- Well-documented code is easier to review and share and enables repeated analyses
- Include project level information; script dependencies, inputs, and outputs; parameters; and what happens in individual sections

Construct end-to-end scripts that run the entire process from start to finish without intervention.

**Informal Workflow Example**

**Local contact information**

**DataONE** Tutorials on Data Management

Lesson 5: Data Quality Control and Assurance

Data Quality Control and Assurance

**DataONE**

DataONE Education Module 05: Data Quality, Control and Assurance 624 views



**DataONE**

About News Participate Resources Education Data

DATAONE SEARCH: Search Summary Jump to 2018 Go Sign In Sign Up

Clear all filters

Search small

Sort by Most recent

1 2 3 ... 444 Next

**My Search**

- soil
- water

**Filter by:**

- Data attribute
- Data files
- Member Node
- Creator
- Year
- Identifier

**Datasets 1 to 25 of 11,077**

1 John Yarie, and Bonanza Creek LTER, 2016. Soil Temperature at LTER Moisture Manipulation Treatments, U.S. LTER Network

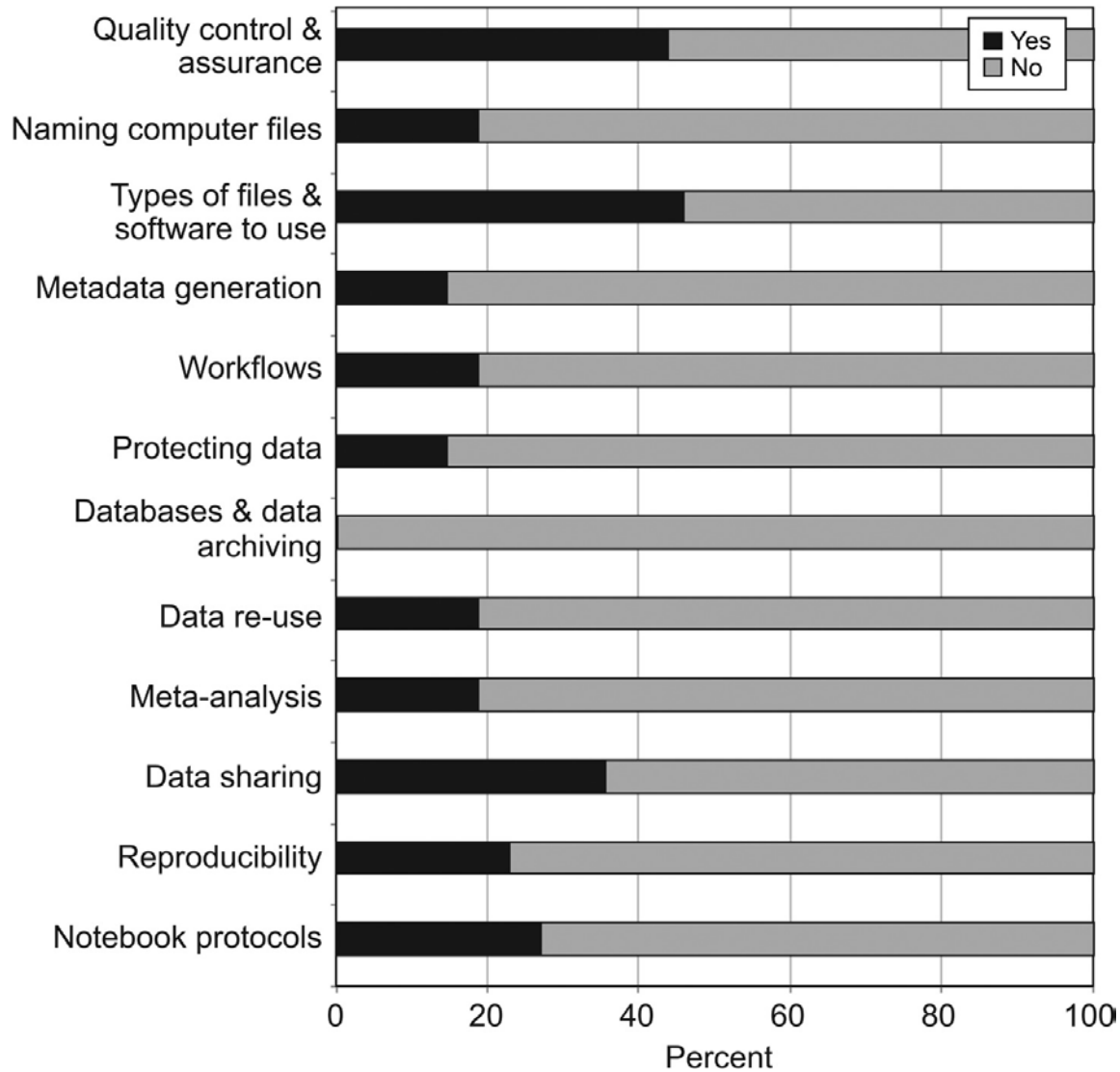
2 John Yarie, and Bonanza Creek LTER, 2016. Soil Moisture (VWC) at LTER Moisture Manipulation Treatments, U.S. LTER Network

**Hide Map**

1	42	15			
2	47	988	80		
201	484	7	98	1109	
1	72	211	146	233	167
7	259	102	137	1	

Satellite Terrain

# The Fractured Lab Notebook



Strasser & Hampton (2012) Ecosphere 3:12 DOI: 10.1890/ES12-00139.1



# DataONE Education Modules

[dataone.org/education-modules](http://dataone.org/education-modules)



**Tutorials on Data Management**

Lesson 1: Introduction to Data Management  
Why Data Management?




Why Data Management




**Tutorials on Data Management**

Lesson 2: Data Sharing



Data Sharing



**Tutorials on Data Management**

Lesson 3: Data Management Planning



Data Management Planning



# DataONE Education Modules

[dataone.org/education-modules](http://dataone.org/education-modules)

## Tutorials on Data Management

Lesson 1: Introduction to Data Management  
Why Data Management?




Why Data Management




## Tutorials on Data Management

Lesson 2: Data Sharing



Data Sharing



## Tutorials on Data Management

Lesson 3: Data Management Planning



Data Management Planning



## Hands-on Activity 3: Data Management Planning

Associated DataONE

Objectives: Student identify the basic of the DMPTool.

Outcomes: Student

Time Needed: One

URLs: DMPTool: <http://www.dataone.org/dmptool>

Additional Files Ne (such as a project

Key Readings:

- Data manag
- DCC How-<http://www.dcc.ac.uk>
- NSF requir
- DMPTool (
- Example D

Notes and Instr

This exercise will h DMPTool. The tool about terms used DMPTool FAQ, and the tool to familiar

- Decide on exercise, " accessibility is avo
- Allow stud on data m
- Have stud reasonably
- There is sk students w good prac

Hands-on Exercises for <http://www.dataone.org>

## Hands-on Activity 1: Accessing Data in the Literature

Associated DataONE

Objectives: Student challenges of acce

Outcomes: (1) Stu provide strategies the data.

Time Needed: One

URLs: Any resourc JSTOR, BioOne).

Additional Files Ne

Key Reading: Carly undergraduates at 3art116. doi: 10.1

Notes and Instr

An intended take-d difficult or imposi accessibility is avo have developed a studies, and geogr cultures, students' it may be worth re others' data: data data from public subscribers or pub

After students hav discuss the challen literature that are the challenges. Th with a report-out, question addresse published. Perhaps

Hands-on Exercises for <http://www.dataone.org>

## Lesson 6: Protecting Your Data

View all Education Modules at <https://www.dataone.org/education-modules>

Backups vs. Archiving

Why perform backups?

- Limit or negate data loss, particularly of data that is not reproducible
- Save time and money

Backups

- Periodic snapshots of current version
- Stored for short or near-long-term
- Often done on a somewhat frequent schedule
- Keep multiple copies of you case one s

Archiving

- Final version for historical reference or disasters

Backups: Questio

- Are there existing polici and when you do backu
- How often should you d
- Should you do partial or
- What will you do with n
- Where will you backu p
- Will backups be manual
- How do you recover file
- How will you verify that formed successfully?
- Do you need to create b
- How long will you keep
- What will happen to you ceases, the project ends,
- Can you read data off of
- How will outdated data

Only back up the data y

Data in r

A design firm's backup syst The backup software report successfully completed. The the backups right after they were good.

After a virus erased most of their backups and found the investigation revealed that it stored near an elevator. Whi past, magnets inside it erase Had they checked their back have noticed this before th

## Lesson 2: Data Sharing

View all Education Modules at <https://www.dataone.org/education-modules>

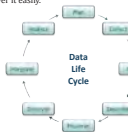
Address data sharing throughout the data lifecycle

Describe data content, character, and process.

Deposit in a location from which it can be accessed.

Preserve in formats & on media good for long term.

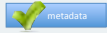
Publish information about the data so that others can discover it easily.



Concerns about data sharing

Concern	Solution
Inappropriate use due to misunderstanding of research purpose or parameters	<ul style="list-style-type: none"> <li>Provide rich, Abstract, Purpose, Constraints of Use, &amp; Supplemental Information as needed</li> </ul>
Security and confidentiality of sensitive data	<ul style="list-style-type: none"> <li>Provide metadata without actual data</li> <li>Use Constraints can be used to say who may access &amp; how</li> </ul>
Lack of credit or acknowledgement	<ul style="list-style-type: none"> <li>Specify required data citation in Use Constraints</li> </ul>
Loss of advantage when competing for research dollars	<ul style="list-style-type: none"> <li>Create a second, public version w/generalized Data Processing Desc.</li> </ul>

Good metadata is the solution to all these concerns!



Methods for making data sharable

Create discoverable, robust metadata.

Include unique IDs & citation information.

Have contributors review metadata for accuracy.

Publish metadata via a portal or clearinghouse.

Data sharing to understand Alzheimer's Disease

"It's not science the way most of us have practiced in our careers. But we all realized that we would never get biomarkers unless all of us parked our egos and intellectual-property noses outside the door and agreed that all of our data would be made public immediately." -- John Trojanowski, U. Penn

More at the NY Times: <http://nyd.ms/1pVKo44>

Local contact information

## Lesson 5: Data Management Planning

View all Education Modules at <https://www.dataone.org/education-modules>

Objectives: Student identify the basic of the DMPTool.

Outcomes: Student

Time Needed: One

URLs: DMPTool: <http://www.dataone.org/dmptool>

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Hands-on Exercises for <http://www.dataone.org>

## Lesson 4: Data Management Planning

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Objectives: Student identify the basic of the DMPTool.

Outcomes: Student

Time Needed: One

URLs: DMPTool: <http://www.dataone.org/dmptool>

Additional Files Ne (such as a project

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Hands-on Exercises for <http://www.dataone.org>

## Lesson 3: Data Management Planning

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Objectives: Student identify the basic of the DMPTool.

Outcomes: Student

Time Needed: One

URLs: DMPTool: <http://www.dataone.org/dmptool>

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Hands-on Exercises for <http://www.dataone.org>

## Lesson 1: Introduction to Data Management

View all Education Modules at <https://www.dataone.org/education-modules>

Objectives: Student identify the basic of the DMPTool.

Outcomes: Student

Time Needed: One

URLs: DMPTool: <http://www.dataone.org/dmptool>

Additional Files Ne (such as a project

Key Readings:

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Hands-on Exercises for <http://www.dataone.org>





# Community Use

Page ?	Total Events ? ↓
	<b>232,749</b> % of Total: 100.00% (232,749)
1. /education-modules 	<b>30,854</b> (13.24%)
2. /best-practices/create-and-document-data-back-up-policy 	<b>23,989</b> (10.30%)
3. /data-management-planning 	<b>23,604</b> (10.13%)
4. /best-practices 	<b>10,892</b> (4.67%)
5. /software-tools/fusion-lidar-software 	<b>8,562</b> (3.67%)
6. /current-member-nodes 	<b>8,198</b> (3.52%)
7. /find-data 	<b>7,635</b> (3.28%)
8. / 	<b>6,504</b> (2.79%)
9. /software-tools/dbdesigner-4 	<b>6,409</b> (2.75%)
10. /investigator-toolkit 	<b>5,756</b> (2.47%)

# Community Use

Page ?	Event Label ?	Total Events ? ↓
		<b>14,947</b> % of Total: 6.42% (232,749)
1. /education-module	1. /sites/all/documents/L01_DataManagement.pptx	<b>2,115</b> (14.15%)
2. /best-practices/cre up-policy	2. /sites/all/documents/education- modules/pptx/L01_DataManagement.pptx	<b>1,364</b> (9.12%)
3. /data-managemen	3. /sites/all/documents/L07_Metadata.pptx	<b>1,029</b> (6.88%)
4. /best-practices	4. /sites/all/documents/DataONE_Education_Modules_Full_Set.p ptx	<b>913</b> (6.11%)
5. /software-tools/fu	5. /sites/all/documents/L03_DataManagementPlanning.pptx	<b>793</b> (5.30%)
6. /current-member-r	6. /sites/all/documents/education- modules/pptx/L03_DataManagementPlanning.pptx	<b>762</b> (5.10%)
7. /find-data	7. /sites/all/documents/L02_DataSharing.pptx	<b>740</b> (4.95%)
8. /	8. /sites/all/documents/L04_DataEntryManipulation.pptx	<b>725</b> (4.85%)
9. /software-tools/db	9. /sites/all/documents/education- modules/pptx/L07_Metadata.pptx	<b>634</b> (4.24%)
10. /investigator-toolk	10. /sites/all/documents/L08_WriteQualityMetadata.pptx	<b>600</b> (4.01%)

# Maintenance

## Journal of eScience Librarianship

Volume 6 | Issue 2

Article 1

2017-09-08

### Using Peer Review to Support Development of Community Resources for Research Data Management

Heather Soyka  
*Kent State University*

Amber Budden  
*DataONE/University of New Mexico*

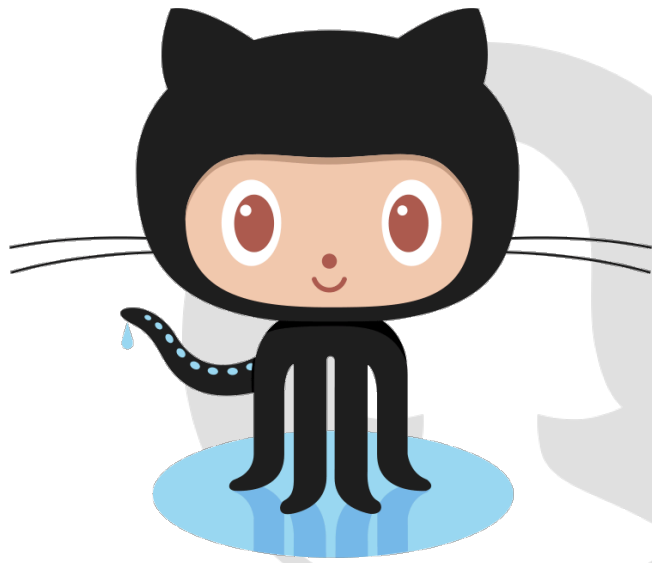
Viv Hutchison  
*US Geological Survey*



# Challenges



## Solutions



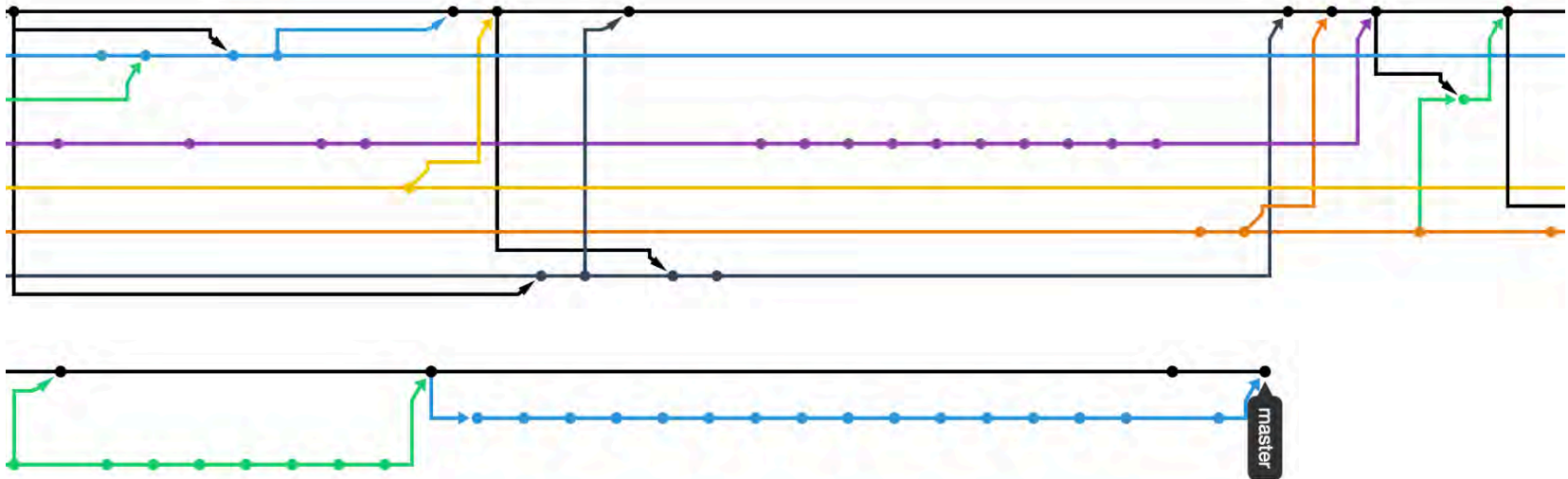
# GitHub

# Versioned work space

Clone or download ▾

Fork

11



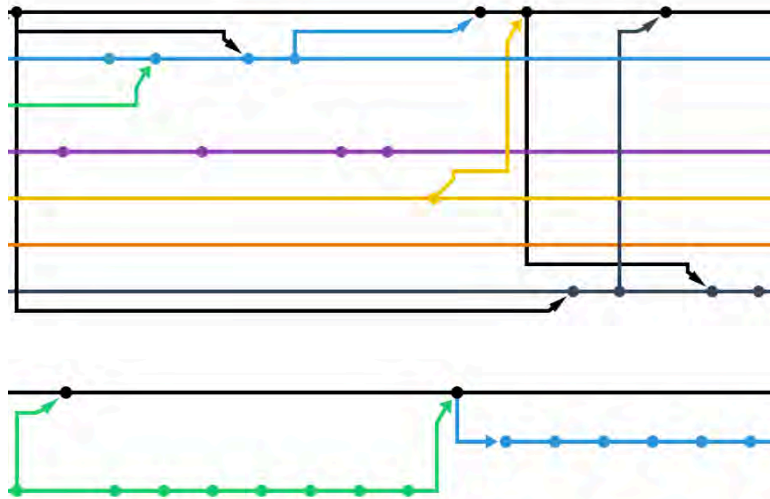













# Versioned work space

Clone or download ▾

Fork

11



- DataONEorg / Education
-  aebudden / dataone\_lessons
  -  amandawhitmire / dataone\_lessons
  -  andosmith / Education
  -  datadavev / d1\_Education\_fork
  -  dbloom / dataone\_lessons
  -  hsoyka / dataone\_lessons
  -  jduckles / dataone\_lessons
  -  lwasser / dataone\_lessons
  -  mayernik / dataone\_lessons
  -  vhutch / dataone\_lessons
  -  whshannon / dataone\_lessons

# Structured repository

DataONEorg / hub\_lessons

Unwatch 11 Star 5 Fork 18

Code Issues 0 Pull requests 0 Projects 1 Wiki Insights Settings

Tree: 23581c038b hub\_lessons / lessons /

Create new file Upload files Find file History

meg3mach update org info and title/author in front matter Latest commit f82cbb0 on Jul 23

File	Commit Message	Time Ago
..		
00_markdown	update org info and title/author in front matter	3 months ago
01_management	update org info and title/author in front matter	3 months ago
02_datasharing	update org info and title/author in front matter	3 months ago
03_planning	update org info and title/author in front matter	3 months ago
04_entry	update org info and title/author in front matter	3 months ago
05_qaqc	update org info and title/author in front matter	3 months ago
06_protect	update org info and title/author in front matter	3 months ago
07_metadata	update org info and title/author in front matter	3 months ago
08_citation	update org info and title/author in front matter	3 months ago
09_analysis	update org info and title/author in front matter	3 months ago
10_policy	update org info and title/author in front matter	3 months ago

# Structured repository

The screenshot displays the GitHub interface for the repository `DataONEorg / hub_lessons`. At the top, it shows repository statistics: 11 Unwatch, 5 Stars, and 18 Forks. Below this, navigation tabs include Code, Issues (0), Pull requests (0), Projects (1), Wiki, Insights, and Settings. The current view is the file browser for the `01_management` directory, showing a list of files and folders with their commit messages and dates.

File/Folder	Commit Message	Time Ago
..		
images	Changes to M1	2 years ago
01_management.pdf	Regenerated PDFs for lessons	2 years ago
L01_DataManagement_Handout.pdf	upload handout and exercise lesson 1	a year ago
L01_Exercise.pdf	upload handout and exercise lesson 1	a year ago
index.md	update org info and title/author in front matter	3 months ago
index.png	change all cover.png to index.png in lessons	5 months ago
slides.md	switch index to cover and vis versa in lessons	5 months ago



The Data Management Skillbuilding Hub contains resources for better data management and is open to community input and update. These resources are adaptable across a range of contexts and intended for use by researchers, teachers, librarians, or anyone who wants to learn better data management practices. Each tile below links to community contributed education materials, such as best practices and lesson plans

The resources presented on the Data Management Skillbuilding Hub can be updated by users to promote a current, well-maintained, and sustainable educational tool. Learn more about how you can [contribute](#).

## Using This Resource

Click individual tiles to learn more and use each resource. You can limit resources by content type and [Data Life Cycle](#) stage. Comprehensive information is available in the [FAQ](#).

» Filter by content type:

**ALL**

TEACHING MODULE

BEST PRACTICE

VIDEO

» Filter by stage of the Data Life Cycle

All

01.

Why Data  
Management

02.

Data  
Sharing

03.

Data Management  
Planning

04.

Data Entry  
and Manipulation

05.

Data Quality  
Control and Assurance

06.

Protecting  
Your Data

07.

Metadata

08.

Data  
Citation

# Data Management Skillbuilding Hub

- Structure: Data life-cycle
- Current holdings: Education modules and best practices
- Citation: Credit where credit is due
- Editing content (forking!)
- Creating new content (in the works)
- Future holdings



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» Filter by content type:

ALL

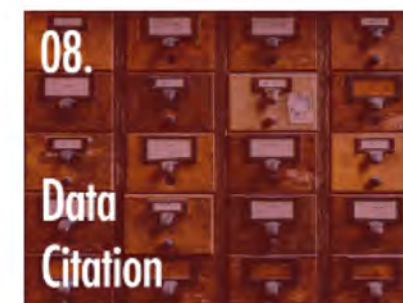
TEACHING MODULE

BEST PRACTICE

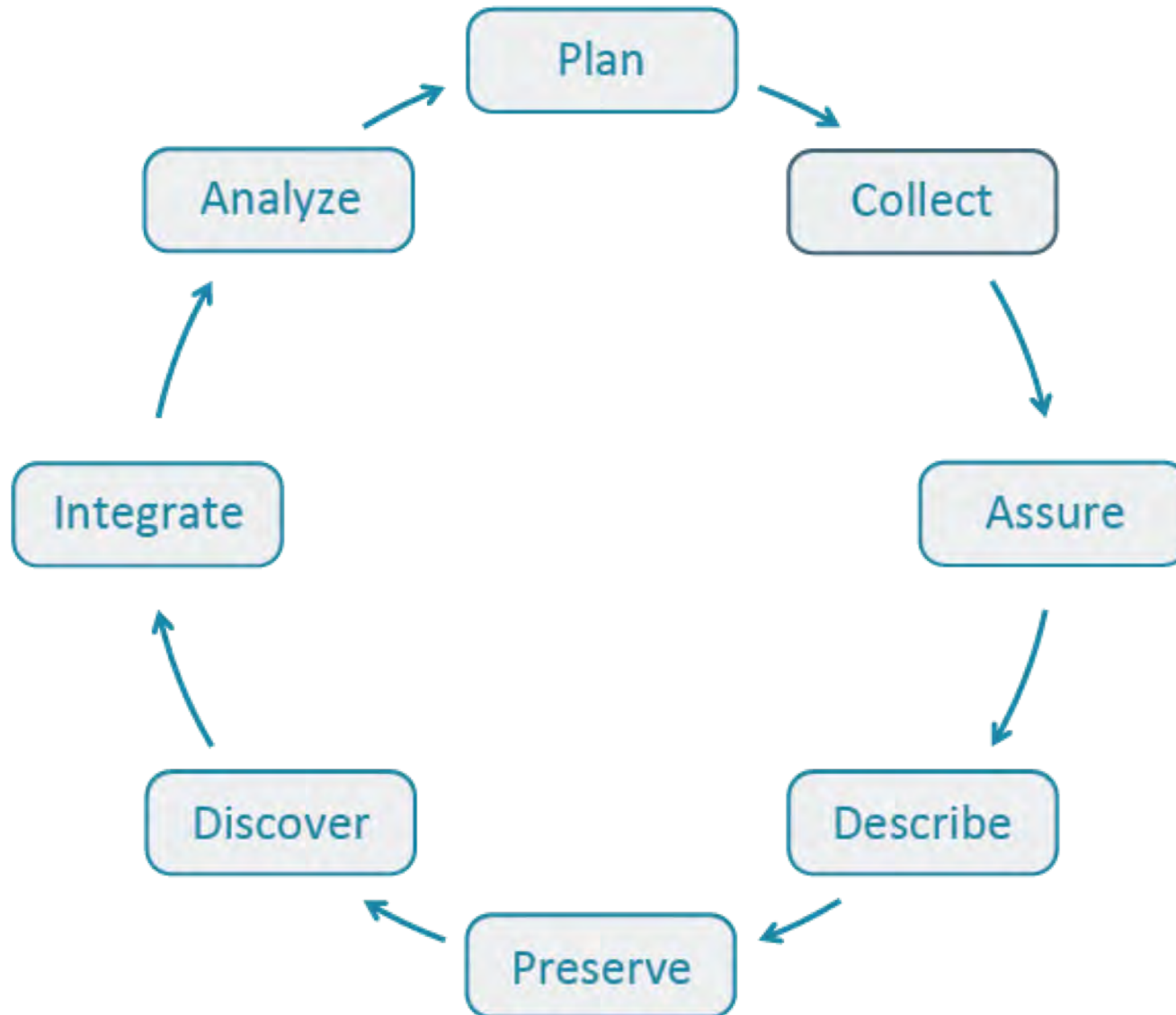
VIDEO

» Filter by stage of the Data Life Cycle

All



# Data life-cycle stages





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» Filter by content type:

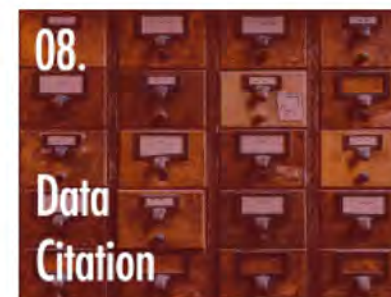
ALL

- All
- Plan
- Collect
- Assure
- ✓ Describe
- Preserve
- Discover
- Integrate
- Analyze

BEST PRACTICE

VIDEO

» Filter by stage of the Data Life Cycle



## Hosted by DataONE

In collaboration with the community, [DataONE](#) has developed high quality resources for helping educators and librarians with training in data management, including teaching materials, webinars and a database of best-practices to improve methods for data sharing and management.

🔗 If you have a question or concern, please open an [issue](#) in this repository on GitHub.

## TEACHING MODULE



### Presentation View

*Quick tips: Press p for presentation; f for full screen*

#### Supporting downloads:

[PDF Download](#)[PPT Download](#)[Handout](#)[Hands-on Exercise](#)

When first sharing research data, researchers often raise questions about the value, benefits, and mechanisms for sharing. Many stakeholders and interested parties, such as funding agencies, communities, other researchers, or members of the public may be interested in research, results and related data. This lesson addresses data sharing in the context of the data life cycle, the value of sharing data, concerns about sharing data, and methods and best practices for sharing data.

#### Cite this lesson:

DataONE Community Engagement & Outreach Working Group (2017) "Data Sharing". Accessed through the Data Management Skillbuilding Hub at [https://dataoneorg.github.io/Education/lessons/02\\_datasharing/index](https://dataoneorg.github.io/Education/lessons/02_datasharing/index) on Oct 04, 2018

[< Home >](#)



## The Data Lifecycle

Several stages require critical attention to ensure effective data sharing

Step	Action
<b>Describe</b>	document the data content, character and process
<b>Deposit</b>	store the data in a location from which it can be accessed
<b>Preserve</b>	select storage formats and media with long term use in mind
<b>Discover</b>	publish information about the data so that others can find it

## Why share data

Data sharing requires effort, resources, and faith in others. Why do it?

For the benefit of:

- the public
- the research sponsor
- the research community
- the researcher



CC Image by Jessica Lucia on Flickr



0:00:33

### NOTES FOR CURRENT SLIDE

Effective data sharing requires careful thought during each stage of the data development process including:

- description and documentation of the data process, content, and character;
- deposition and storage of the data in a location from which it can be accessed or shared;
- preservation of the data using a format and media that enable long term reuse; and
- making the data discoverable by publishing information about the data in research publications, data clearinghouses and data distribution portals.

### NOTES FOR NEXT SLIDE

Why expend the extra effort to share data? Because it benefits the public, the research sponsor, the research community and, perhaps most importantly, the researcher.

## TEACHING MODULE



### Presentation View

*Quick tips: Press p for presentation; f for full screen*

#### Supporting downloads:

[PDF Download](#)[PPT Download](#)[Handout](#)[Hands-on Exercise](#)

When first sharing research data, researchers often raise questions about the value, benefits, and mechanisms for sharing. Many stakeholders and interested parties, such as funding agencies, communities, other researchers, or members of the public may be interested in research, results and related data. This lesson addresses data sharing in the context of the data life cycle, the value of sharing data, concerns about sharing data, and methods and best practices for sharing data.

#### Cite this lesson:

DataONE Community Engagement & Outreach Working Group (2017) "Data Sharing". Accessed through the Data Management Skillbuilding Hub at [https://dataoneorg.github.io/Education/lessons/02\\_datasharing/index](https://dataoneorg.github.io/Education/lessons/02_datasharing/index) on Oct 04, 2018

[< Home >](#)



The Data Management Skillbuilding Hub contains resources for better data management and is open to community input and update. These resources are adaptable across a range of contexts and intended for use by researchers, teachers, librarians, or anyone who wants to learn better data management practices. Each tile below links to community contributed education materials, such as best practices and lesson plans

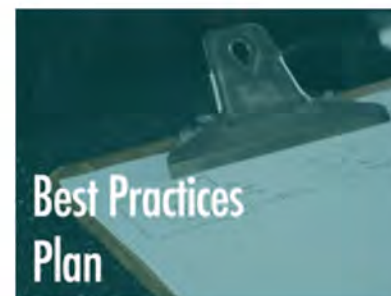
The resources presented on the Data Management Skillbuilding Hub can be updated by users to promote a current, well-maintained, and sustainable educational tool. Learn more about how you can [contribute](#).

## Using This Resource

Click individual tiles to learn more and use each resource. You can limit resources by content type and [Data Life Cycle](#) stage. Comprehensive information is available in the [FAQ](#).

» Filter by content type:

» Filter by stage of the Data Life Cycle



## Best Practice: Assure

Select a Best Practice below to learn more about the “Assure” stage in the *Data Life Cycle*.

### What is the “Assure” stage?

Employ quality assurance and quality control procedures that enhance the quality of data (e.g., training participants, routine instrument calibration) and identify potential errors and techniques to address them.

More information can be found in the [Best Practices Primer](#).



### Best Practices by Data Life Cycle

- All
- Plan
- Collect
- Assure
- Describe
- Preserve
- Discover
- Integrate
- Analyze

### Learn more:

[BP Primer](#)



## BEST PRACTICE

### Best Practice: Assure

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#### Best Practices by Data Life Cycle

- All
- Plan
- Collect
- Assure
- Describe
- Preserve
- Discover
- Integrate
- Analyze

#### Learn more:

[BP Primer](#)

#### Communicate data quality

Information about quality control and quality assurance are important components of the metadata: [\(click for more\)](#)

Tags: [assure](#) [flag](#) [qualify](#)

#### Confirm a match between data and their description in metadata

To assure that metadata correctly describes what is actually in a data file, visual inspection or analysis should be done by someone not otherwise familiar with the data and its format. This will assure that the metadata is sufficient to describe the data... [\(click for more\)](#)

Tags: [assure](#) [data consistency](#) [describe](#) [documentation](#) [metadata](#) [quality](#)

#### Consider the compatibility of the data you are integrating

The integration of multiple data sets from different sources requires that they be compatible. Methods used to create the data should be considered early in the process, to avoid problems later during attempts to integrate data sets. Note that just because... [\(click for more\)](#)

Tags: [analyze](#) [assure](#) [database](#) [integrate](#) [quality](#) [tabular](#)

#### Develop a quality assurance and quality control plan

Just as data checking and review are important components of data management, so is the step of documenting how these tasks were accomplished. Creating a plan for how to review the data before it is collected or compiled allows a researcher to

## BEST PRACTICE

# Communicate data quality

Data Life Cycle stage(s): [Assure](#)

Information about quality control and quality assurance are important components of the metadata:

- Qualify (flag) data that have been identified as questionable by including a flagging\_column next to the column of data values. The two columns should be properly associated through a naming convention such as Temperature, flag\_Temperature.
- Describe the quality control methods applied and their assumptions in the metadata. Describe any software used when performing the quality analysis, including code where practical. Include in the metadata who did the quality control analysis, when it was done, and what changes were made to the dataset.
- Describe standards or test data used for the quality analysis. For instance, include, when practical, the data used to make a calibration curve.
- If data with qualifier flags are summarized to create a derived data set, include the percent flagged data and percent missing data in the metadata of the derived data file. High frequency observations are often downsampled, and it is critical to know how much of the data were rejected in the primary data.

## Description Rationale

Data quality and any methods used for quality control should be communicated so others can assess the data independently.

## Additional Information

Hook, L.A., Beaty, T.W., Santhana-Vannan, S., Baskaran, L. and Cook, R.B. 2007. Best practices for preparing environmental data sets to share and archive. Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.

([daac.ornl.gov/PI/bestprac.html](http://daac.ornl.gov/PI/bestprac.html))

Sheldon, W., Henshaw, D. and Ramsey, K. 2007. Final Report: Workshop to define quality management standards for data completeness in derived data products. Long Term Ecological Research Network Document Archive, University of New Mexico, Albuquerque, NM.

## Additional Information (Biblio)

[Best Practices for Preparing Ecological and Ground-Based Data Sets to Share and Archive](#)

### Best Practices by Data Life Cycle

[All](#)  
[Plan](#)  
[Collect](#)  
[Assure](#)  
[Describe](#)  
[Preserve](#)  
[Discover](#)  
[Integrate](#)  
[Analyze](#)

### Learn more:

[BP Primer](#)





## Search the Data Management Skill Building Hub

Results are listed in order of find, not by best match to search word, and will be alphabetically ordered by result type.

**Teaching Module:** [Protecting Your Data: Backups, Archives & Data Preservation](#)

Life Cycle Step(s): preserve, assure

Authoring Organization: DataONE

**Best Practice:** [Create and document a data backup policy](#)

Life Cycle Step(s): plan, preserve

Authoring Organization: DataONE


**Best Practice:** [Ensure integrity and accessibility when making backups of data](#)

Life Cycle Step(s): preserve

Authoring Organization: DataONE

### ***Hosted by DataONE***

In collaboration with the community, [DataONE](#) has developed high quality resources for helping educators and librarians with training in data management, including teaching materials, webinars and a database of best-practices to improve methods for data sharing and management.

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[< Home >](#)

# Data Management Skillbuilding Hub

- Structure: Data life-cycle stage
- Current holdings: Education modules and best practices
- Citation: Credit where credit is due
- **Editing content (forking!)**
- Creating new content (in the works)
- Future holdings

## Guidelines for contributors and content editors

This document details our recommended processes to [update current content](#), [suggest changes to content](#), and [fork content for your own use](#), as well as an introduction to [how the content is organized](#) and the [tools we use to display content](#).

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### Update current content

Want to update a link or method? See a spelling error? Changes can be easily proposed by opening the [GitHub Education page](#) and editing content directly. For help, try this brief [GitHub tutorial](#) on forking and editing content.

### Edit content

1. Create a fork of the [lessons](#) or [best practices](#) repository into your github account, depending on which content you wish to edit.
2. Modify the files that you want to change (See ["Structure" below for tips on making changes](#)).
3. Submit a pull-request against the `master` branch of this repository.
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#### Page not rendering?

Check that the `title` field of the YAML header (the first line of each lesson) is in quotes.

### Suggest changes to content

1. Open an [Issue](#) on this repository.
  2. Provide your suggested changes with as much detail and guidance as possible. Be specific.
  3. Your suggestions will be reviewed by the repository admins.
  4. Changes will be pushed to the repository by the repository admins regularly/as needed.
-



DataONEorg / Education

Watch 1

Star 0

Fork 1

Code

Issues 0

Pull requests 0

Projects 0

Insights

is:issue is:open

Labels

Milestones

New Issue

0 Open ✓ 0 Closed

Author ▾

Labels ▾

Projects ▾

Milestones ▾

Assignee ▾

Sort ▾



There aren't any open issues.

You could search [all of GitHub](#) or try an [advanced search](#).

ProTip! Type `g i` on any issue or pull request to go back to the issue listing page.





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### Fork content for your own use

Fork and edit content through GitHub, rather than editing privately, to enable others to use your edited content and to track how these materials are used.

1. Create a fork of the [lessons](#) or [best practices](#) repository into your github account
  2. Modify the files that you want to change (See ["Structure" below for tips on making changes](#))
-



## Edit or fork content for your own use


Select one of the buttons below to open the appropriate GitHub repository:

[Teaching Module](#)

[Best Practice](#)

### *Hosted by DataONE*

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 If you have a question or concern, please open an [issue](#) in this repository on GitHub.



DataONEorg / [hub\\_bestpractices](#)

Watch

6

★ Star

0

Fork

8

<> Code

Issues 0

Pull requests 0

Projects 1

Insights

Tree: b10d396c32

[hub\\_bestpractices](#) / [bestpractices](#) /

Create new file

Find file

History



**meg3mach** updates to frontmatter and stage blurbs

Latest commit 407423d on Aug 30

..

images	adding organization info to bp front matter	3 months ago
logos	bestpractices citation	3 months ago
<a href="#">advertise-your-data.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">assign-descriptive-file.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">backup-your-data.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">check-data-and.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">choose-and-use.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">communicate-data-quality.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">confirm-a-match.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">consider-the-compatibility.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">create-a-data.md</a>	updates to frontmatter and stage blurbs	a month ago
<a href="#">create-and-document.md</a>	updates to frontmatter and stage blurbs	a month ago
<a href="#">create-manage-and.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">decide-what-data.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">define-expected-data.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">define-roles-and.md</a>	Add authorship and update date information to BP	2 months ago
<a href="#">define-the-data.md</a>	Add authorship and update date information to BP	2 months ago



Search or jump to...

[Pull requests](#) [Issues](#) [Marketplace](#) [Explore](#)



**meg3mach / BestPractices**  
forked from [DataONEorg/hub\\_bestpractices](#)

[Watch](#) 0 [Star](#) 0 [Fork](#) 8

[Code](#) [Pull requests](#) 1 [Projects](#) 0 [Wiki](#) [Insights](#) [Settings](#)

[BestPractices](#) / [bestpractices](#) /  [or cancel](#)

[Edit file](#)

[Preview changes](#)

Spaces

2

Soft wrap

```
1 ---
2 title: Confirm a match between data and their description in metadata
3 layout: bestpractice_cover
4 tags:
5   - assure
6   - data consistency
7   - describe
8   - documentation
9   - metadata
10  - quality
11 step:
12   - assure
13   - describe
14 related:
15   - consider-the-compatibility
16   - describe-the-contents
17   - define-the-data
18 update:
19   - May 11, 2011
20 author:
21   - Eric Lind
22   - John Porter
23   - Michael Grady
24 organization: DataONE
25 org_url: http://www.dataone.org
26 org_logo: DataONE.png
27 resource: true
28 categories: ["Best Practice"]
29 ---
30
31 To assure that metadata correctly describes what is actually in a data file, visual inspection or analysis should be done by someone not otherwise familiar with the data and its format. This will assure that the metadata is sufficient to describe the data. For example,
```



# Data Management Skillbuilding Hub

- Structure: Data life-cycle stage
- Current holdings: Education modules and best practices
- Citation: Credit where credit is due
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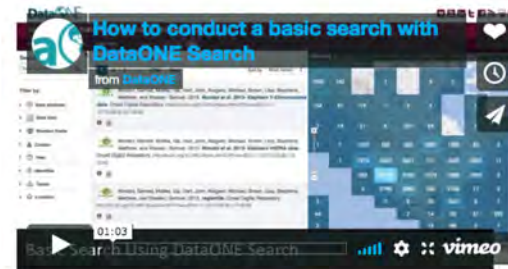
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## Upcoming Webinar:



## Tutorials:

### Conducting a Basic Search



DataONE Search: Basic Search from DataONE on Vimeo.



## Welcome to the DMT Clearinghouse

The Data Management Training (DMT) Clearinghouse is a registry for online learning resources focusing on research data management.

It was created in a collaboration between the [U.S. Geological Survey's Community for Data Integration](#), the [Earth Sciences Information Partnership \(ESIP\)](#), and [DataONE](#).

For questions or feedback, please contact [clearinghouseEd@esipfed.org](mailto:clearinghouseEd@esipfed.org)

[Read More](#)



DataONE Life Cycle - <https://www.dataone.org/data-life-cycle>

### Search

Find learning resources by keyword, name, date, license and cost

[Search](#)

### Browse

See a list of learning resources by educational framework

[Browse](#)

### Submit

Submit your learning resources to the Clearinghouse

[Submit](#)

# Data Management Training (DMT) Clearinghouse:



**A Convenient and Curated Source  
for Finding Educational Resources  
on Research Data Management**

**(RDM)**

DataONE Webinar

October 9, 2018

Nancy J. Hoebelheinrich

Knowledge Motifs LLC



*Mapping sensible data relationships*

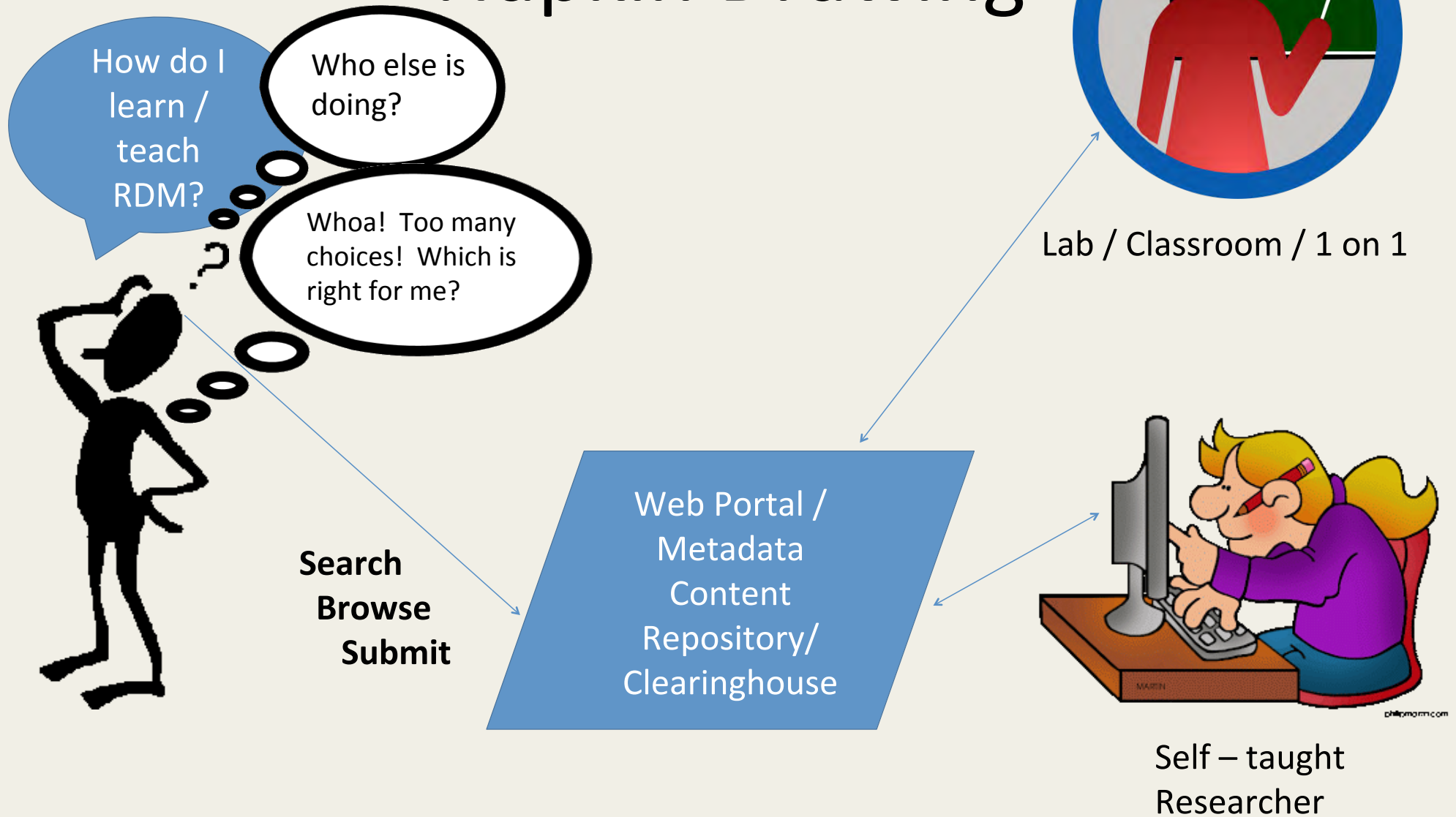
# Research Data Management Training – Sometimes you or your research team need it,

- Why is training needed?
  - Motivators:
    - Funders require
    - Publishers are beginning to require
    - For scientific reproducibility
    - For data re-use by colleagues & collaborators
    - Community culture beginning to expect open data
    - Others...?

but  
where to find  
training  
resources?



# Napkin Drawing



Excerpted from the SGCI BootCamp "Pitch Deck"

# Introducing the ESIP-hosted Data Management Training Clearinghouse!

The screenshot shows the homepage of the ESIP Data Management Training Clearinghouse. The header features the ESIP logo with the tagline 'EXPLORE' and the text 'Data Management Training'. Navigation links include Home, Browse, Search, Submit, Help, and About. A 'Log In' button is also present.

The main content area is titled 'Welcome to the DMT Clearinghouse'. It includes a brief description of the clearinghouse as a registry for online learning resources, its collaborative origin with the U.S. Geological Survey's Community for Data Integration, the Earth Sciences Information Partnership (ESIP), and DataONE. Contact information for 'cleaninghouseEd@esipfed.org' is provided, along with a 'Read More' button.

To the right of the welcome text is a diagram titled 'CDI SSF Components'. The diagram illustrates a multi-layered framework. At the top is '# Knowledge: Understanding of Earth Systems'. Below this are 'Communities of Practices' (top and bottom). The central core consists of 'Information' (top), 'Data' (bottom), and 'Applications' (middle). 'Applications' is further divided into 'Web Services' and 'Semantics'. A vertical bar on the right side of the core is labeled 'Data Management Knowledge Management'. A vertical bar on the left side is labeled 'Science Project Support'. At the bottom of the diagram is 'Monitoring, Assessment & Research'. Below the diagram is the text 'CDI SSF Components - <https://www2.usgs.gov/cdi-ssf/cdi-ssf-components.pdf>'.

Below the main content are three action boxes: 'Search' (Find learning resources by keyword, name, date, license and cost), 'Browse' (See a list of learning resources by educational framework), and 'Submit' (Submit your learning resources to the Clearinghouse). Each box contains a text input field and a corresponding button.

The footer contains three sections: 'CONNECT WITH US on social networks' with icons for Facebook, Twitter, and RSS; 'SUBSCRIBE to the monday updates' with an email input field and a 'join' button; and 'SEARCH this esip site' with a search input field and a 'search' button.

At the very bottom, there is a small text block: 'Questions or issues with the website? Please contact [cleaninghouseEd@esipfed.org](mailto:cleaninghouseEd@esipfed.org). ESIP is a collaboration among many partner organizations, activities are sponsored by NASA and NOAA and managed by the Foundation for Earth Science. Information reward and career opportunities for RSFS. We organize regular events to'.

<http://dmtclearinghouse.esipfed.org/>

# What is the Data Management Training (DMT) Clearinghouse??

## What?

- *Metadata registry* for educational resources on research data management
- Capabilities include:
  - *Search*
  - *Browse*
  - *Submit*
- Collaboratively developed & maintained

## What kind of training resources?

- Short courses ala “Kahn Academy” (7 – 15 min. modules)
- Videos
- Learning activities to supplement courses
- Presentations & webinars
- Data “recipes”
- Syllabi & curricula

<http://dmtclearinghouse.esipfed.org/>



# Why use the DMT Clearinghouse??

## Answers to these Researcher questions:

- What kind of resources are available on RDM & where did they come from?
- Do they pertain to my subject domain?
- Do they fit the data management framework of my organization?
- Are they appropriate for my role on my research team?
- What do they cost?

## Answers to these Data Specialist questions:

- I've been asked to provide some training to a research team on RDM . What have others done that I can adapt?
- Where can I find practical, subject-domain targeted exercises for my generic tutorials on RDM?
- Colleagues keep asking me for the training resources that I've created. Where can I share them easily?

# Where, how is the DMT Clearinghouse maintained??

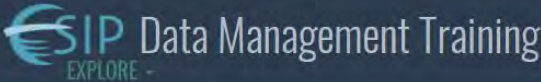
## Currently, hosted & maintained

- On & by the ESIP Federation Commons – a Drupal based content management system
- Don't need to register for Search / Browse / Suggest a Resource to add
- Do not need an ESIP Acct to “submit” a resource, unless planning to create full description

## Sustainability Plan

- Crowd-sourced submissions
- Domain-knowledgeable reviewers & editors to maintain quality & currency of resources
- Always seeking user interface & functionality feedback
- After initial seed \$\$, have been funded by IMLS for 3 year National Leadership Grant
- Exploring options for longer term Sustainability from NSF

# Let's take a look!



Home Browse Search Submit Help - About Log in


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CDI SSF Components - <https://www2.usgs.gov/cdi/cdi-ssf/cdi-ssf-components.pdf>

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<http://dmtclearinghouse.esipfed.org/>

# Browse Function

The screenshot shows the homepage of the Data Management Training (DMT) Clearinghouse. The browser address bar displays `dmtclearinghouse.esipfed.org`. The navigation menu includes `Home`, `Browse`, `Search`, `Help`, and `About`, with `Browse` circled in red. A `Log in` link is also present. The main content area features a welcome message, a description of the clearinghouse, and a circular diagram of the DCC Lifecycle. Below this are three main action boxes: `Search`, `Browse`, and `Submit`. The `Browse` box is circled in red. The footer contains social media links, a subscription form, and a search bar.

dmtdclearinghouse.esipfed.org

ESIP Data Management Training EXPLORE

Home Browse Search Help - About Log in

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[Read More](#)

DCC Lifecycle - <http://www.dcc.ac.uk/resources/curation-lifecycle-model>

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Find learning resources by keyword, name, date, license and cost

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SEARCH this esip site

your email

your search terms

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ESIP is a collaboration among many partner organizations, activities are sponsored by NASA and NOAA and managed by the Foundation for Earth Science.

Copyright © 2016 Federation of Earth Science Information Partners. All rights reserved.



# Browse Function

## All Learning Resources

### Browse

#### Framework

- DataONE Education Modules
- ESIP Data Management for Scientists Short Course
- ICSU - World Data System Training Resources Guide
- The Digital Preservation Network
- USGS Science Support Framework

#### DataONE Data Management Module 02: Data Sharing

More ▾



PUBLIC DOMAIN



DataONE Education Modules

May 2012

Analyze Assure Collect Describe Discover Integrate Plan Preserve

#### DataONE Data Management Module 03: Data Management Planning

More ▾



PUBLIC DOMAIN



DataONE Education Modules

Plan

May 2012

#### DataONE Data Management Module 01: Why Data Management

More ▾



PUBLIC DOMAIN



DataONE Education Modules

May 2012

Analyze Assure Collect Describe Discover Integrate Plan Preserve

#### DataONE Data Management Module 05: Data Quality Control and Assurance

More ▾



PUBLIC DOMAIN



DataONE Education Modules

Assure

Collect

May 2012

#### DataONE Data Management Module 07: Metadata

More ▾



PUBLIC DOMAIN



DataONE Education Modules

Describe

May 2012

#### Mozilla Science Lab's Open Data Primers

More ▾

#### Mozilla Science Lab Open Data Instructor Guides

More ▾

# Browse Function

## Browse

### Framework

- DataONE Education Modules
- ESIP Data Management for Scientists Short Course
- ICSU - World Data System Training Resources Guide
- The Digital Preservation Network
- USGS Science Support Framework

## All Learning Resources

### DataONE Data Management Module 02: Data Sharing

[More ▾](#)

PUBLIC DOMAIN



DataONE Education Modules

May 2012

[Analyze](#) [Assure](#) [Collect](#) [Describe](#) [Discover](#) [Integrate](#) [Plan](#) [Preserve](#)

### DataONE Data Management Module 03: Data Management Planning

[More ▾](#)

PUBLIC DOMAIN



DataONE Education Modules

[Plan](#)

May 2012

### DataONE Data Management Module 01: Why Data Management

[More ▾](#)

PUBLIC DOMAIN



DataONE Education Modules

May 2012

[Analyze](#) [Assure](#) [Collect](#) [Describe](#) [Discover](#) [Integrate](#) [Plan](#) [Preserve](#)

### DataONE Data Management Module 05: Data Quality Control and Assurance

[More ▾](#)

PUBLIC DOMAIN



DataONE Education Modules

[Assure](#)[Collect](#)

May 2012

### DataONE Data Management Module 07: Metadata

[More ▾](#)

PUBLIC DOMAIN



DataONE Education Modules

[Describe](#)

May 2012

### Mozilla Science Lab's Open Data Primers

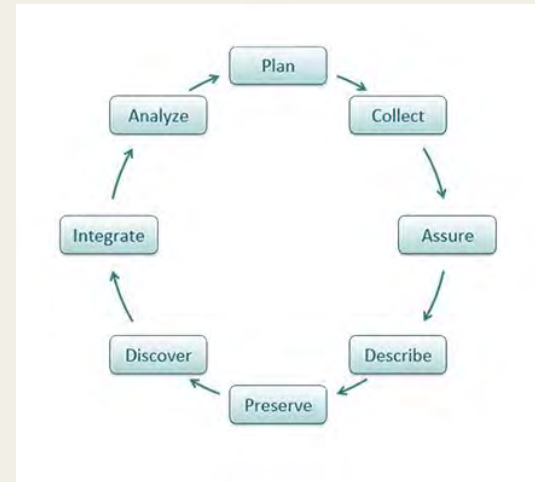
[More ▾](#)

### Mozilla Science Lab Open Data Instructor Guides

[More ▾](#)

# What is an educational framework?

- An [educational] framework is a plan or set of steps that defines or collects the content using clear, definable standards about what the student should know and understand.
- For purposes of the DMT Clearinghouse, a given learning resource may be associated with a community-defined standard for data management.
- For example, the DataONE framework represents the DataONE's "*Data Life Cycle*".



<https://www.dataone.org/data-life-cycle>


The DataONE data life cycle was developed ...in collaboration with the broader DataONE community ... [and] serves as an underlying framework for the development of tools, services and education materials by DataONE.

# Browse Function

From ~250 'published' resources → ~10

**Browse**







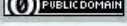

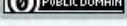

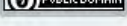

**Framework**

- DataONE Education Modules 
- ESIP Data Management for Scientists Short Course (33)
- FAIR Data Principles (12)
- ICSU - World Data System Training Resources Guide (76)
- The Digital Preservation Network (7)
- USGS Science Support Framework (19)

**Steps for DataONE Education Modules**

- Analyze (3)
- Assure (4)
- Collect (4)
- Describe (4)
- Discover (3)
- Integrate (3)
- Plan (3)
- Preserve (5)

## DataONE Education Modules

DataONE Data Management Module 01: Why Data Management	 PUBLIC DOMAIN  DataONE Education Modules	<a href="#">More v</a>	May 2012
DataONE Data Management Module 02: Data Sharing	 PUBLIC DOMAIN  DataONE Education Modules	<a href="#">More v</a>	May 2012
DataONE Data Management Module 03: Data Management Planning	 PUBLIC DOMAIN  DataONE Education Modules	<a href="#">More v</a>	May 2012
DataONE Data Management Module 04: Data Entry and Manipulation	 PUBLIC DOMAIN  DataONE Education Modules	<a href="#">More v</a>	May 2012
DataONE Data Management Module 05: Data Quality Control and Assurance	 PUBLIC DOMAIN  DataONE Education Modules	<a href="#">More v</a>	May 2012
DataONE Data Management Module 06: Data Protection and Backups	 PUBLIC DOMAIN  DataONE Education Modules	<a href="#">More v</a>	May 2012



# Browse Function -- you found one that looks useful! What next?

**Browse**

Framework

- DataONE Education Modules
- ESIP Data Management for Scientists Short Course
- ICSU - World Data System Training Resources Guide
- The Digital Preservation Network
- USGS Science Support Framework

**ICSU**

Open Teacher Information Management Courses [More ▾](#)

Essentials 4 Data Support [More ▾](#) August 2017

Open Teacher Data Management Courses [More ▾](#)

ISRIC Spring School [More ▾](#)

ISRIC - World Soil Information Educational Videos [More ▾](#)

NASA Earthdata Webinar Series [More ▾](#)

ORNL DAAC Data Management Workshops [More ▾](#)

Environmental Data Management Best Practices Part 2: Geospatial Data [More ▾](#) May 2014

You can either click on the Title or the More button to get more Info



Browse Function -- you found one that looks useful from the brief description!  
What next?

The screenshot shows a resource card for "ORNL DAAC Data Management Workshops". The title is in a light blue header bar. Below it, a paragraph of text is circled in red. A red arrow points from the text "What next?" in the text above to the "View resource" button. Another red arrow points from the "View resource" button to the "More" button in the top right corner of the card. At the bottom of the card, there are icons for "PUBLICDOMAIN" and "ICSU - World Data System Training Resources Guide".

ORNL DAAC Data Management Workshops [More ▾](#)

Educational workshops on various scientific data management best practices designed to (1) introduce new data collectors to best practices in data curation and (2) enhance the skillsets of experienced data providers. New workshops are added as they are made available.

[View full description](#) [View resource ↗](#)

PUBLICDOMAIN ICSSU - World Data System Training Resources Guide

# Browse Function -- you want to see more about this one! What next?

You can either ...

Click on the ***View full description*** to look at the full metadata ... or the ***View resource*** button to go directly to the “landing page” of the resource.

The screenshot shows a digital resource card with the following elements:

- Title:** ORNL DAAC Data Management Workshops
- Description:** Educational workshops on various scientific data management best practices designed to (1) introduce new data collectors to best practices in data curation and (2) enhance the skillsets of experienced data providers. New workshops are added as they are made available.
- Buttons:** A dark blue button labeled "View full description" and a light blue button labeled "View resource" with an external link icon.
- Metadata:** A footer bar containing a Creative Commons license icon (Public Domain), the text "PUBLICDOMAIN", and a logo for "ICSU - World Data System Training Resources Guide".

Two red stars are overlaid on the image: one on the "View full description" button and one on the "View resource" button.

# Search Function

The screenshot shows the homepage of the Data Management Training (DMT) Clearinghouse. The browser address bar displays `dmtclearinghouse.esipfed.org`. The navigation menu includes `Home`, `Browse`, `Search` (circled in red), `Help`, and `About`. A `Log in` link is also present.

**Welcome to the DMT Clearinghouse**  
The Data Management Training (DMT) Clearinghouse is a registry for online learning resources focusing on research data management. It was created in a collaboration between the U.S. Geological Survey's Community for Data Integration, the Earth Sciences Information Partnership (ESIP), and DataONE. For questions or feedback, please contact [clearinghouseEd@esipfed.org](mailto:clearinghouseEd@esipfed.org). [Read More](#)

**Search**  
Find learning resources by keyword, name, date, license and cost  
 [Search](#)

**Browse**  
See a list of learning resources by educational framework  
[Browse](#)

**Submit**  
Submit your learning resources to the Clearinghouse (login required)  
[Submit](#)

**CONNECT WITH US**  
on social networks  
[f](#) [t](#) [r](#)

**SUBSCRIBE**  
to the monday updates  
 [join](#)

**SEARCH**  
this esip site  
 [search](#)

Questions or Issues with the website? Please contact [clearinghouseEd@esipfed.org](mailto:clearinghouseEd@esipfed.org)  
ESIP is a collaboration among many partner organizations, activities are sponsored by [NASA](#) and [NOAA](#) and managed by the [Foundation for Earth Science](#).  
Copyright © 2016 Federation of Earth Science Information Partners. All rights reserved.



# Search Function: 3 approaches

You filter by pre-set categories (“filters”)

You enter your own search terms

The screenshot displays a search interface with a left sidebar for filters and a main content area for search results. A search bar at the top right contains the text "Your search terms" and a "Search" button. A red arrow points from the text "You enter your own search terms" to the search bar. Another red arrow points from the text "You filter by pre-set categories ('filters')" to the filter sidebar.

**Filter**

- Framework**
  - ESIP Data Management for Scientists Short Course (33)
  - USGS Science Support Framework (18)
  - DataONE Education Modules (10)
  - ICSU - World Data System Training Resources Guide (8)
  - The Digital Preservation Network (7)
- Keywords**
  - Data management (32)
  - Data sharing (27)
  - Data management planning (23)
  - Data preservation (15)
  - Data life cycle (11)
  - Data citation (10)
  - Data reuse - Core Trustworthy Data Repositories Requirements (10)
  - Community standards (9)
  - Data access methods (9)
  - Metadata (9)[Show more](#)
- Organizations**
  - Federation of Earth Science Information Partners (ESIP Federation) (34)
  - U.S. Geological Survey (16)
  - DataONE (10)

**Your search** 104 results [Clear all](#)

- DataONE Data Management Module 02: Data Sharing** [More v](#)  
 DataONE Education Modules May 2012  
Analyze Assure Collect Describe Discover Integrate Plan Preserve
- DataONE Data Management Module 03: Data Management Planning** [More v](#)  
 DataONE Education Modules Plan May 2012
- DataONE Data Management Module 01: Why Data Management** [More v](#)  
 DataONE Education Modules May 2012  
Analyze Assure Collect Describe Discover Integrate Plan Preserve
- DataONE Data Management Module 05: Data Quality Control and Assurance** [More v](#)  
 DataONE Education Modules Assure Collect May 2012
- DataONE Data Management Module 07: Metadata** [More v](#)  
 DataONE Education Modules Describe May 2012
- Mozilla Science Lab's Open Data Primers** [More v](#)

# Search Function: Approach 3: Combining Approach 1 & Approach 2 ...



# Search Function: Approach 1 = You search using your own terms

The screenshot displays a search interface with the following components:

- Search Bar:** A text input field containing "Your search terms" and a blue "Search" button.
- Filter Sidebar:** A sidebar on the left with sections for "Filter", "Framework", "Keywords", and "Organizations".
  - Framework:** ICSU - World Data System Training Resources Guide (76), FAIR Data Principles (70), ESIP Data Management for Scientists Short Course (33), USGS Science Support Framework (19), DataONE Education Modules (10), The Digital Preservation Network (7).
  - Keywords:** Data management (88), Data management planning (63), Data sharing (59), Data access (54), Data reuse - Core Trustworthy Data Repositories Requirements (44), Data publication (36), Accessible data - FAIR Data Principle (33), Open data (33), Data collection (32), Data preservation (31). A "Show more" link is at the bottom.
  - Organizations:** Federation of Earth Science Information Partners (ESIP Federation) (34), Facilitate Open Science.
- Search Results:** A green bar at the top indicates "Your search" with "250 results" and a "Clear all" button. Below are six search results, each with a title, a Creative Commons license icon (CC BY), a source link, and a date.
  - Creating Documentation and Metadata: Creating a Citation for Your Data (September 2012)
  - Local Data Management - Data Formats: Using Self-describing Data Formats (January 2013)
  - Responsible Data Use: Data Restrictions (February 2013)
  - Preserving the Scientific Record: Establishing Relationships with Archives (October 2012)
  - Preserving the Scientific Record: Preserving a Record of Environmental Change (October 2012)
  - USGS Data Management Training Modules—Metadata for Research Data

# Search Function: Approach 2 = You start by checking boxes within the pre-set categories (“filters”)

The screenshot displays a search interface with a left sidebar for filters and a main content area for search results. The 'Filter' section in the sidebar is circled in red. It includes three categories: Framework, Keywords, and Organizations. The search bar at the top contains the text 'Your search terms' and a 'Search' button. Below the search bar, a green banner indicates 'Your search' with '250 results' and a 'Clear all' button. The search results are listed in a table-like format, each with a 'More' button and a date. The first result is 'Creating Documentation and Metadata: Creating a Citation for Your Data' from 'ESIP Data Management for Scientists Short Course' dated September 2012. The second is 'Local Data Management - Data Formats: Using Self-describing Data Formats' from the same course dated January 2013. The third is 'Responsible Data Use: Data Restrictions' from the same course dated February 2013. The fourth is 'Preserving the Scientific Record: Establishing Relationships with Archives' from the same course dated October 2012. The fifth is 'Preserving the Scientific Record: Preserving a Record of Environmental Change' from the same course dated October 2012. The sixth is 'USGS Data Management Training Modules—Metadata for Research Data' from 'USGS Science Support Framework'.

**Filter**

**Framework**

- ICSU - World Data System Training Resources Guide (76)
- FAIR Data Principles (70)
- ESIP Data Management for Scientists Short Course (33)
- USGS Science Support Framework (19)
- DataONE Education Modules (10)
- The Digital Preservation Network (7)

**Keywords**

- Data management (88)
- Data management planning (63)
- Data sharing (59)
- Data access (54)
- Data reuse - Core Trustworthy Data Repositories Requirements (44)
- Data publication (36)
- Accessible data - FAIR Data Principle (33)
- Open data (33)
- Data collection (32)
- Data preservation (31)

[Show more](#)

**Organizations**

- Federation of Earth Science Information Partners (ESIP Federation) (34)
- Facilitate Open Science

Your search terms

**Your search** 250 results

**Creating Documentation and Metadata: Creating a Citation for Your Data**

ESIP Data Management for Scientists Short Course September 2012

**Local Data Management - Data Formats: Using Self-describing Data Formats**

ESIP Data Management for Scientists Short Course January 2013

**Responsible Data Use: Data Restrictions**

ESIP Data Management for Scientists Short Course February 2013

**Preserving the Scientific Record: Establishing Relationships with Archives**

ESIP Data Management for Scientists Short Course October 2012

**Preserving the Scientific Record: Preserving a Record of Environmental Change**

ESIP Data Management for Scientists Short Course October 2012

**USGS Data Management Training Modules—Metadata for Research Data**

USGS Science Support Framework



# Built-in Search Filters

**Filter**

**Framework**

- ESIP Data Management for Scientists Short Course (33)
- USGS Science Support Framework (18)
- DataONE Education Modules (10)
- ICSU - World Data System Training Resources Guide (8)
- The Digital Preservation Network (7)

**Keywords**

- Data management (32)
- Data sharing (27)
- Data management planning (23)
- Data preservation (15)
- Data life cycle (11)
- Data citation (10)
- Data reuse - Core Trustworthy Data Repositories Requirements (10)
- Community standards (9)
- Data access methods (9)
- Metadata (9)

Show more

**Organizations**

- Federation of Earth Science Information Partners (ESIP Federation) (34)
- U.S. Geological Survey (16)
- DataONE (10)

**People**

- Nancy J. Hoebelheinrich (33)
- Ruth E. Duerr (33)
- Matthew Mayernik (9)
- Robert R. Downs (7)
- Robert Cook (5)
- Chen Chiu (2)
- Curt Tilmes (2)
- Jason Kudulis (2)
- Kathy Martinolich (2)
- Lola Olsen (2)
- Mimi Tzeng (2)
- Suresh K.S. Vannan (2)
- Tyler Stevens (2)
- Zannah Marsh (2)
- Ben Wheeler (1)
- Dave Fearon (1)
- Dorothea Salo (1)
- Drew Ignizio (1)
- Elliot Metsger (1)
- Emily Fort (1)

Show more

**Publication Date**

- 2012 (34)
- 2017 (15)
- 2013 (13)
- 2015 (9)
- 2016 (5)
- 2014 (2)
- 2010 (1)

**License**

- Creative Commons Attribution 3.0 United States - CC BY 3.0 US (35)
- Creative Commons 0 - CC0 "No Rights Reserved" (Public Domain) (31)
- Creative Commons Attribution 4.0 International - CC BY 4.0 (15)
- Creative Commons Attribution-NonCommercial 4.0 International - CC BY-NC 4.0 (5)
- Creative Commons 1.0 Universal (Public Domain Dedication) (3)
- Creative Commons Attribution-ShareAlike 4.0 International License - CC BY-SA 4.0 (3)
- Creative Commons Attribution 3.0 Unported - CC BY 3.0 (1)

**Cost**

- No fee (101)
- Fee (3)

# Demonstrating Approach 3: Start by entering your own search term...

A search interface with a search bar containing the text "sharing practices" and a blue "Search" button. Below the search bar, a green banner displays "Your search" followed by "sharing practices" and "89 results" on the right. A "Clear all" button is located at the bottom right of the green banner.

# ... then limiting by Keyword filter...

The search results page shows the same search bar and green banner, but now with "Keywords - short phrases describing what the learning resource is about" and "Data sharing [X]" added. The result count is updated to "26 results". On the left, a "Keywords" filter section is visible, with "Data sharing" checked and circled in red. Below the banner, two search results are shown: "Best practices for preparing data to share and preserve" and "Research Data Management and Sharing MOOC".

# Demonstrating Search: finally, limiting even more by the Framework filter...

The screenshot shows a search interface with the following elements:

- Search Bar:** Contains the text "sharing practices". To the right is a blue "Search" button and the text "Still more precise!".
- Filter Panel (Left):**
  - Framework:** A red circle highlights this section, which includes: (-) DataONE Education Modules, ICSU - World Data System Training Resources Guide (11), FAIR Data Principles (10), ESIP Data Management for Scientists Short Course (2), and USGS Science Support Framework (1).
  - DataONE Framework Steps:** A red circle highlights this section, which includes: Describe (2), Discover (2), Preserve (2), Analyze (1), Assure (1), Collect (1), Integrate (1), and Plan (1).
  - Keywords:** Includes a checked checkbox for "Data sharing".
- Search Results Summary (Green Bar):** Shows "Your search sharing practices" with "2 results" circled in red. It also lists the selected filters: "Framework - A community-based organization plan or set of steps for education or training" (DataONE Education Modules [X]) and "Keywords - short phrases describing what the learning resource is about" (Data sharing [X]). A "Clear all" button is present.
- Search Results List:**
  - Item 1:** "DataONE Data Management Module 02: Data Sharing" (More ▾). Description: "When first sharing research data, researchers often raise questions about the value, benefits, and mechanisms for sharing. Many stakeholders and interested parties, such as funding agencies, ... data, concerns about sharing data, and methods and best practices for sharing data and includes a downloadable presentation (PPT or ...)". Metadata: PUBLIC DOMAIN, DataONE Education Modules, FAIR Data Principles, May 2012.
  - Item 2:** "DataONE Data Management Module 08: Data Citation" (More ▾). Description: "... the process for obtaining one, and to summarize best practices for supporting data citation. This 30-40 minute lesson includes a ...". Metadata: PUBLIC DOMAIN, DataONE Education Modules, FAIR Data Principles, May 2012.



# Demonstrating Search: however, if too precise, you can either *Clear all* to start over ... or uncheck filters / facets

The screenshot shows a search interface with a search bar containing 'sharing practices' and a 'Search' button. On the left, there are filter sections for 'Framework' and 'DataONE Framework Steps'. The search results are displayed in a green header bar with 'Your search sharing practices' and '2 results'. A 'Clear all' button is circled in red. Below the header, two search results are shown: 'DataONE Data Management Module 02: Data Sharing' and 'DataONE Data Management Module 08: Data Citation'. Each result includes a description, a 'More' button, and a row of tags including 'PUBLIC DOMAIN', 'DataONE Education Modules', and 'FAIR Data Principles'. The date 'May 2012' is also visible for each result.

**Filter**

**Framework**

- (-) DataONE Education Modules
- ICSU - World Data System Training Resources Guide (11)
- FAIR Data Principles (10)
- ESIP Data Management for Scientists Short Course (2)
- USGS Science Support Framework (1)

**DataONE Framework Steps**

- Describe (2)
- Discover (2)
- Preserve (2)
- Analyze (1)
- Assure (1)
- Collect (1)
- Integrate (1)
- Plan (1)

**Keywords**

- Data sharing

sharing practices [Search](#)

**Your search** *sharing practices* **2 results** [Clear all](#)

**Framework - A community-based organization plan or set of steps for education or training** DataONE Education Modules [X]

**Keywords - short phrases describing what the learning resource is about** Data sharing [X]

**DataONE Data Management Module 02: Data Sharing** [More ▾](#)

When first **sharing** research data, researchers often raise questions about the value, benefits, and mechanisms for **sharing**. Many stakeholders and interested parties, such as funding agencies, ... data, concerns about **sharing** data, and methods and best practices for **sharing** data and includes a downloadable presentation (PPT or ...)

May 2012

**DataONE Data Management Module 08: Data Citation** [More ▾](#)

... the process for obtaining one, and to summarize best practices for supporting data citation. This 30-40 minute lesson includes a ...

May 2012



# Full Description – 1 of 2

## ORNL DAAC Data Management Workshops

### Key Info

**URL - the landing page for the learning resource:**

<http://daac.ornl.gov/workshops/workshops.shtml>

**Description - a brief synopsis, abstract or summary of what the learning resource is about:**

Educational workshops on various scientific data management best practices designed to (1) introduce new data collectors to best practices in data curation and (2) enhance the skillsets of experienced data providers. New workshops are added as they are made available.

**Authoring Organization(s) Name:**

NASA ORNL DAAC (Oak Ridge National Laboratory Distributed Active Archive Center)

**License - link to legal statement specifying the copyright status of the learning resource:**

Creative Commons 1.0 Universal (Public Domain Dedication)

**Access Cost:**

No fee

**Primary language(s) in which the learning resource was originally published or made available:**

English

### More info about

**Keywords - short phrases describing what the learning resource is about:**

Appraisal - Core Trustworthy Data Repositories Requirements  
Data discovery and identification - Core Trustworthy Data Repositories Requirements  
Data integrity and authenticity - Core Trustworthy Data Repositories Requirements  
Data quality - Core Trustworthy Data Repositories Requirements  
Data reuse - Core Trustworthy Data Repositories Requirements  
Expert guidance - Core Trustworthy Data Repositories Requirements  
Preservation plan - Core Trustworthy Data Repositories Requirements

# Full Description – 2 of 2

**Subject Discipline - subject domain(s) toward which the learning resource is targeted:**

Engineering: Aerospace Engineering  
Physical Sciences and Mathematics: Earth Sciences  
Physical Sciences and Mathematics: Environmental Sciences

**Publisher - organization credited with publishing or broadcasting the learning resource:**

NASA ORNL DAAC (Oak Ridge National Laboratory Distributed Active Archive Center)

**Media Type - designation of the form in which the content of the learning resource is represented, e.g., moving image:**

Collection - a group or set of items that comprise a single learning resource, e.g., a PDF version of a slide presentation, an audio file of the presentation and a textual representation of the oral transcription of the presentation.

**Contributor Organization(s):**

**Name:**

ICSU - World Data System (WDS)

**Type:**

Endorser

**Contact Organization(s):**

NASA ORNL DAAC (Oak Ridge National Laboratory Distributed Active Archive Center)

## Educational Info

**Purpose - primary educational reason for which the learning resource was created:**

Professional Development - increasing knowledge and capabilities related to managing the data produced, used or re-used, curated and/or archived.

**Learning Resource Type - category of the learning resource from the point of view of a professional educator:**

Lesson - detailed description of an element of instruction in a course, contained in a unit of one or more lessons, and used by a teacher to guide class instruction.

**Target Audience - intended audience for which the learning resource was created:**

Data supporter  
Early-career Research Scientist  
Research Scientist

**Intended time to complete - approximate amount of time the average student will take to complete the learning resource:**

More than 1 hour (but less than 1 day)

**Framework - A community-based organization plan or set of steps for education or training:**

ICSU - World Data System Training Resources Guide

# Submit Function, briefly

## Welcome to the DMT Clearinghouse

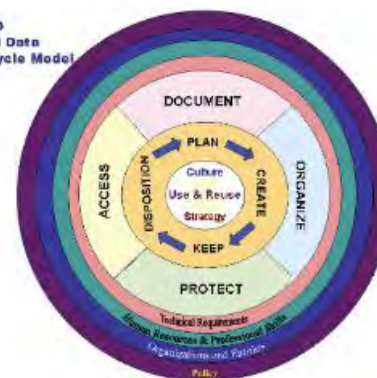
The Data Management Training (DMT) Clearinghouse is a registry for online learning resources focusing on research data management.

It was created in a collaboration between the [U.S. Geological Survey's Community for Data Integration](#), the [Earth Sciences Information Partnership \(ESIP\)](#), and [DataONE](#).

For questions or feedback, please contact [clearinghouseEd@esipfed.org](mailto:clearinghouseEd@esipfed.org)

[Read More](#)

IWGDD  
Digital Data  
Life Cycle Model



IWGDD Lifecycle - [https://www.nitrd.gov/About/Harnessing\\_Power\\_Web.pdf](https://www.nitrd.gov/About/Harnessing_Power_Web.pdf)

### Search

Find learning resources by keyword, name, date, license and cost

sharing practices

[Search](#)

### Browse

See a list of learning resources by educational framework

[Browse](#)

### Submit

Submit your learning resources to the Clearinghouse

[Submit](#)



# Submit Function, briefly



## Submit new Learning Resource

Your learning resource suggestion will be submitted to the Clearinghouse, but will not be published immediately as the information needs to be reviewed for quality control and relevancy.

If you would like to submit more information, please log in and return to this page. If you don't yet have an ESIP account, you can create one by clicking "Log in" above, then "I want to create an account."

From the Help pages, you can also find out more about how and what kind of information to submit. We do require that you give us your name and email address if you submit without having a user login in case reviewers or editors have questions. Rest assured that your contact information will not be shared publicly without your permission.

Thank you for your interest in making data management training resources widely available!

**Title \***

**URL - the landing page for the learning resource**

**Access Cost \***

- No fee
- Fee

**Submission Contact Name \***

**Submission Contact Email Address \***

CAPTCHA

This question is for testing whether you are a human visitor and to prevent automated spam submissions.

I'm not a robot





# As a community supported resource we'd love to have you to join us by...

- Submitting your learning resources
- Joining our Working Groups on
  - Assessment Framework
  - Metadata Enhancement
  - Content Diversification
- Editorial assistance
- Usability testing
- Spreading the word
- Jumping in on our crowdsourcing events



**Come on  
in!**

# Join us!

Join the ESIP Research Data Management Cluster at: [esip\\_dmtraining@lists.esipfed.org](mailto:esip_dmtraining@lists.esipfed.org)

Contact:

Nancy Hoebelheinrich ([nhoebel@kmotifs.com](mailto:nhoebel@kmotifs.com)) or  
[clearinghouseEd@esipfed.org](mailto:clearinghouseEd@esipfed.org)

The screenshot shows the homepage of the ESIP Data Management Training Clearinghouse. The header features the ESIP logo with the tagline 'EXPLORE -' and navigation links for Home, Browse, Search, Submit, Help, and About. A 'Log in' link is also present. The main content area includes a 'Welcome to the DMT Clearinghouse' section with introductory text and a 'Read More' button. To the right is a diagram titled 'CDI SSF Components' showing a layered structure of Knowledge, Information, Data, and Monitoring, Assessment & Research, supported by Science Project Support and Data Management. Below this are three action boxes: 'Search' (with a search input field and button), 'Browse' (with a 'Browse' button), and 'Submit' (with a 'Submit' button). The footer contains social media links (Facebook, Twitter, RSS), a 'SUBSCRIBE' section with an email input and 'join' button, and a 'SEARCH' section with a search input and 'search' button. A small search icon is also visible in the footer.

<http://dmtclearinghouse.esipfed.org/>

## Data Management Skillbuilding Hub

- One off lessons
- Host/store here
- Indexed at DMT Clearinghouse

<http://dataoneorg.github.io/Education>

## DMT Clearinghouse

- Index here
- Metadata
- This is a registry

<http://dmtclearinghouse.esipfed.org>



# FALL MEETING

Washington, D.C. | 10-14 Dec 2018

*Please take some time and come ask us questions at the help desk*

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*DataONE Webinar Series*

**[www.dataone.org/webinars](http://www.dataone.org/webinars)**

*Upcoming Webinar Event*

**[www.dataone.org/upcoming-webinar](http://www.dataone.org/upcoming-webinar)**

*Previous Webinar Events (Recording and Discussion)*

**[www.dataone.org/previous-webinars](http://www.dataone.org/previous-webinars)**



**#DWS2018**

**@DataONEorg**



## *Upcoming Webinar Event*

*[www.dataone.org/upcoming-webinar](http://www.dataone.org/upcoming-webinar)*

### **Schema.org: Improving access to data through a standardized language**

November 13, 2018

**Bryce Mecum**, Scientific Software Engineer, National Center for Ecological Analysis and Synthesis (NCEAS)

**Doug Fils**, Data Management Technical Expert, Consortium for Ocean Leadership (COL)

