Research Data Management Support at Cornell

https://data.research.cornell.edu

rdmsg-help@cornell.edu

Wendy Kozlowski (wak57), RDMSG Coordinator

What data management IS:

(v.) Action that contributes to effective storage, preservation and use of data and documentation throughout the research lifecycle

What data management is NOT:

- Data or computation science
- Database administration
- A research method
  - What data to collect
  - How to collect data
  - How to design an experiment

Why we want researchers to have good data management practices

- Reproducibility
  (Journals)
- Recognition
  (Researchers)
- Reuse
  (Funders)

"You can't keep coming in here and demanding data every two years!"

What is data management plan (DMP)?

In the context of research funders, a DMP is a document outlining a strategy for storage, preservation and sharing (reuse) of data related to a specific project.

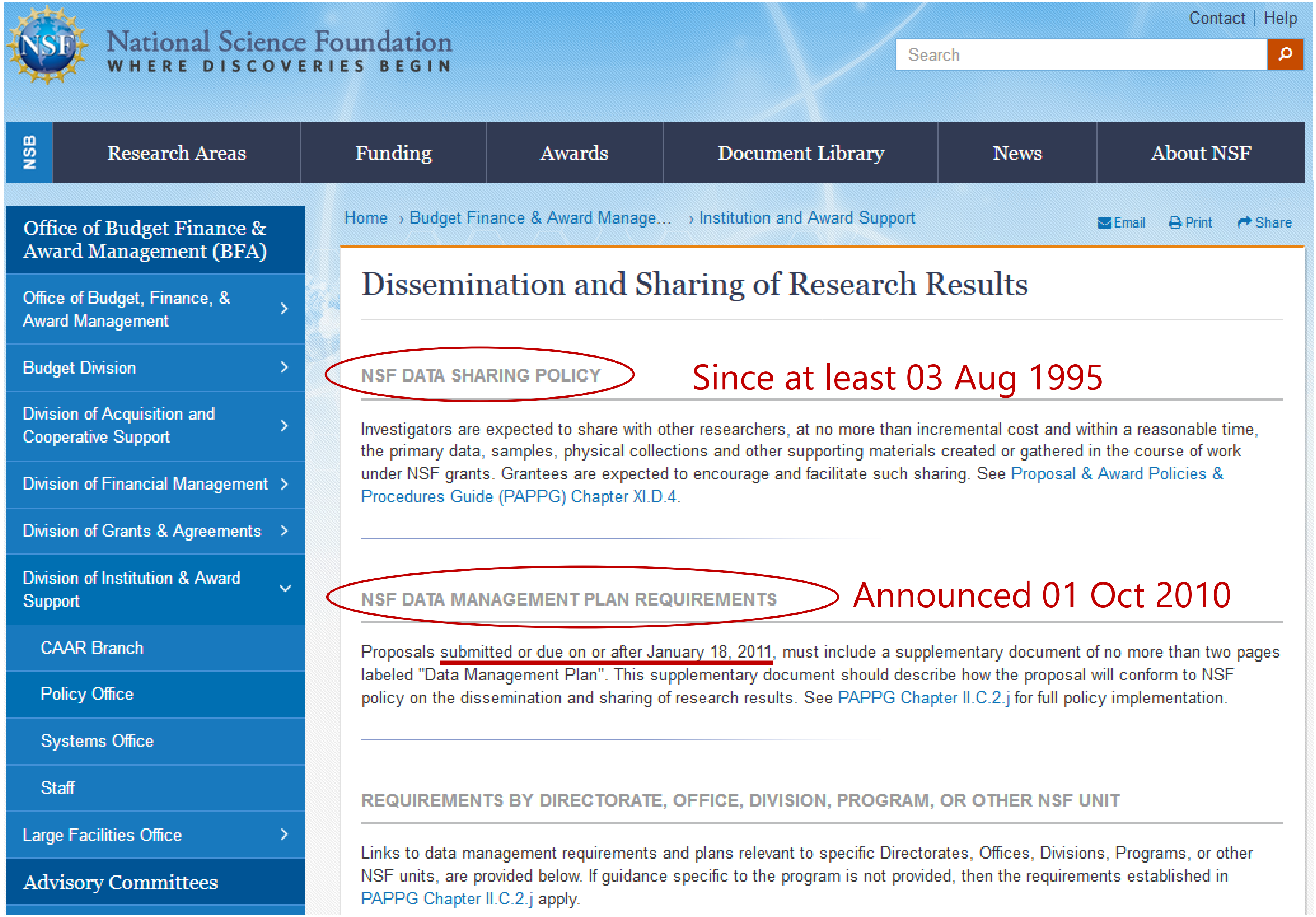
Who requires a DMP-like document with a proposal?

Key Cornell Funders

NSF	☑ DMP
NIH	☑ Data Sharing Plan
USDA/NIFA	☑ DMP
NOAA	☑ DMP
NASA	☑ DMP
USGS	☑ DMP
DOE	☑ DMP

Other Funders/More Information

- Gordon and Betty Moore Foundation
- Gulf of Mexico Research Institute
- IMLS
- NEH/Office of Digital Humanities
- Smithsonian Institute ☑ Digital Asset Management Plan
- https://data.research.cornell.edu/content/funder-data-requirements
- http://datasharing.sparcopen.org/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Dissemination and Sharing of Research Results

NSF DATA SHARING POLICY

Since at least 03 Aug 1995

Investigators are expected to share with other researchers, at no more than incremental cost and within a reasonable time, the primary data, samples, physical collections and other supporting materials created or gathered in the course of work under NSF grants. Grantees are expected to encourage and facilitate such sharing. See Proposal & Award Policies & Procedures Guide (PAPPG) Chapter XI.D.4.

NSF DATA MANAGEMENT PLAN REQUIREMENTS

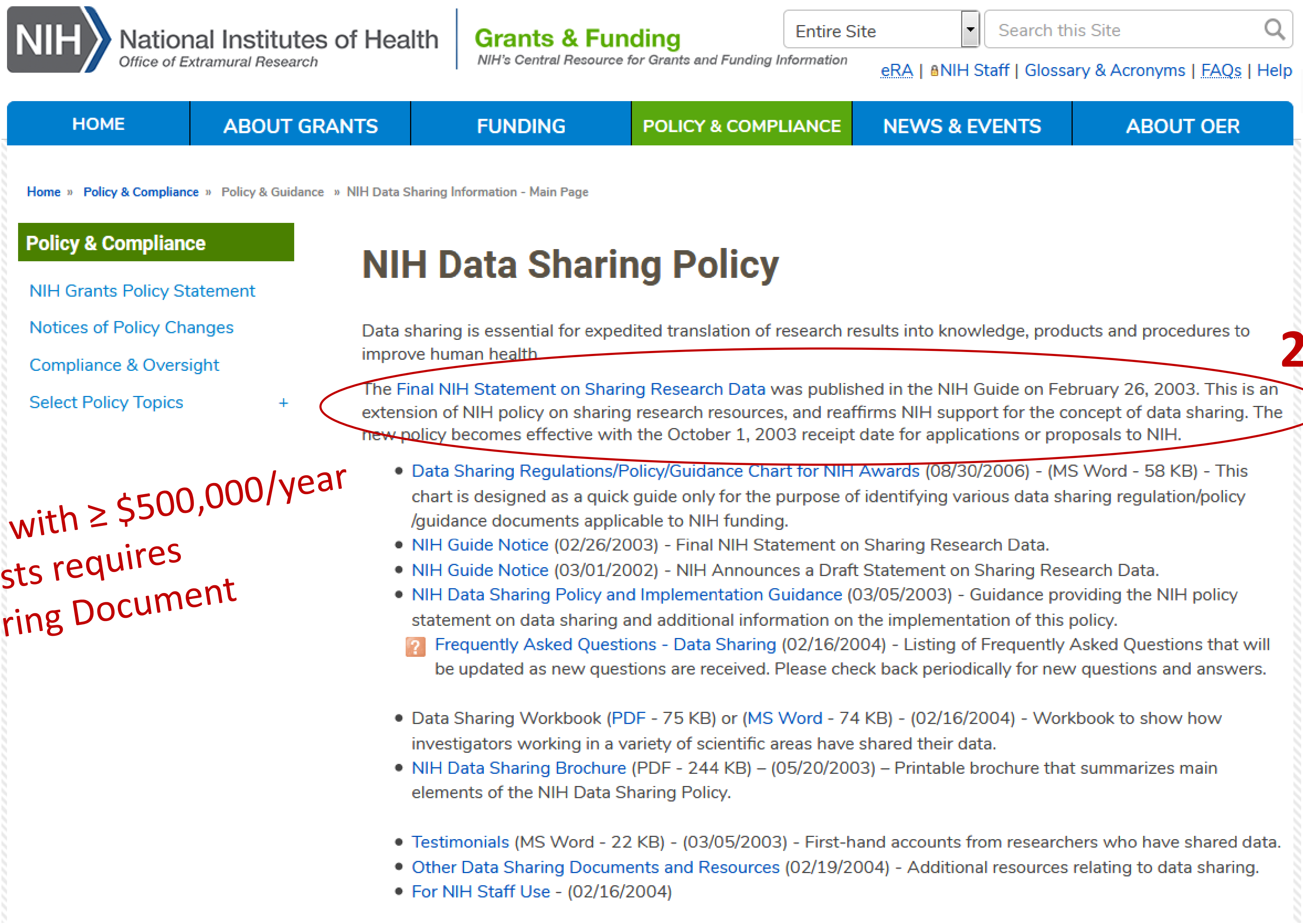
Announced 01 Oct 2010

Proposals submitted or due on or after January 18, 2011, must include a supplementary document of no more than two pages labeled "Data Management Plan". This supplementary document should describe how the proposal will conform to NSF policy on the dissemination and sharing of research results. See PAPPG Chapter II.C.2.j for full policy implementation.

REQUIREMENTS BY DIRECTORATE, OFFICE, DIVISION, PROGRAM, OR OTHER NSF UNIT

Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units, are provided below. If guidance specific to the program is not provided, then the requirements established in PAPPG Chapter II.C.2.j apply.

http://www.nsf.gov/bfa/dias/policy/dmp.jsp


NIH National Institutes of Health
Office of Extramural Research
Grants & Funding
NIH's Central Resource for Grants and Funding Information
Entire Site
Search this Site
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Home » Policy & Compliance » Policy & Guidance » NIH Data Sharing Information - Main Page
Policy & Compliance
NIH Grants Policy Statement
Notices of Policy Changes
Compliance & Oversight
Select Policy Topics +

NIH Data Sharing Policy

Data sharing is essential for expedited translation of research results into knowledge, products and procedures to improve human health.

The Final NIH Statement on Sharing Research Data was published in the NIH Guide on February 26, 2003. This is an extension of NIH policy on sharing research resources, and reaffirms NIH support for the concept of data sharing. The new policy becomes effective with the October 1, 2003 receipt date for applications or proposals to NIH.

2003

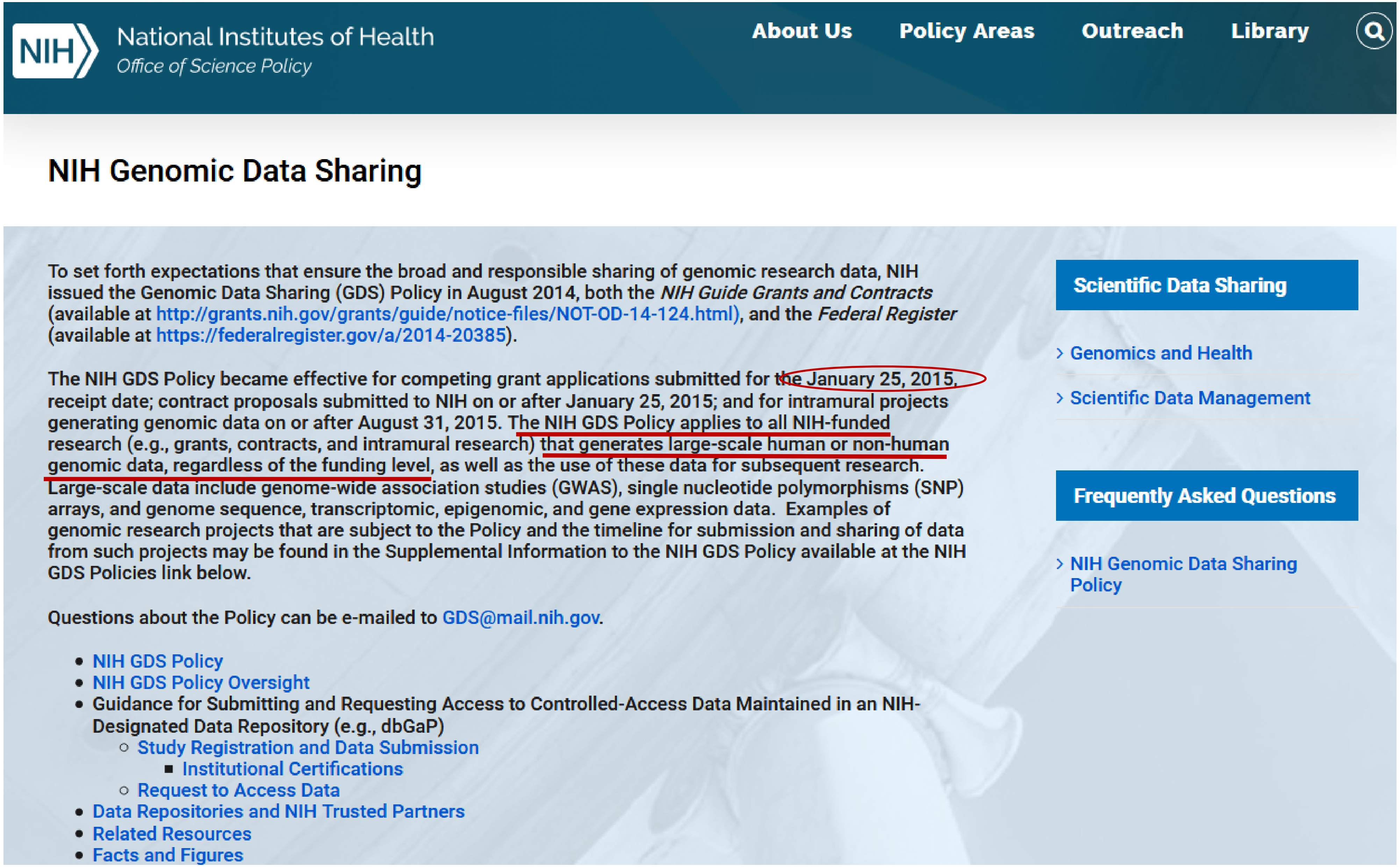
- Data Sharing Regulations/Policy/Guidance Chart for NIH Awards (08/30/2006) - (MS Word - 58 KB) - This chart is designed as a quick guide only for the purpose of identifying various data sharing regulation/policy /guidance documents applicable to NIH funding.
- NIH Guide Notice (02/26/2003) - Final NIH Statement on Sharing Research Data.
- NIH Guide Notice (03/01/2002) - NIH Announces a Draft Statement on Sharing Research Data.
- NIH Data Sharing Policy and Implementation Guidance (03/05/2003) - Guidance providing the NIH policy statement on data sharing and additional information on the implementation of this policy.
  - ? Frequently Asked Questions - Data Sharing (02/16/2004) - Listing of Frequently Asked Questions that will be updated as new questions are received. Please check back periodically for new questions and answers.

- Data Sharing Workbook (PDF - 75 KB) or (MS Word - 74 KB) - (02/16/2004) - Workbook to show how investigators working in a variety of scientific areas have shared their data.
- NIH Data Sharing Brochure (PDF - 244 KB) – (05/20/2003) – Printable brochure that summarizes main elements of the NIH Data Sharing Policy.

- Testimonials (MS Word - 22 KB) - (03/05/2003) - First-hand accounts from researchers who have shared data.
- Other Data Sharing Documents and Resources (02/19/2004) - Additional resources relating to data sharing.
- For NIH Staff Use - (02/16/2004)

Proposals with ≥ $500,000/year
Direct Costs requires
Data Sharing Document

http://grants.nih.gov/grants/policy/data_sharing/



NIH Genomic Data Sharing

To set forth expectations that ensure the broad and responsible sharing of genomic research data, NIH issued the Genomic Data Sharing (GDS) Policy in August 2014, both the *NIH Guide Grants and Contracts* (available at http://grants.nih.gov/grants/guide/notice-files/NOT-OD-14-124.html), and the *Federal Register* (available at https://federalregister.gov/a/2014-20385).

The NIH GDS Policy became effective for competing grant applications submitted for the January 25, 2015, receipt date; contract proposals submitted to NIH on or after January 25, 2015; and for intramural projects generating genomic data on or after August 31, 2015. The NIH GDS Policy applies to all NIH-funded research (e.g., grants, contracts, and intramural research) that generates large-scale human or non-human genomic data, regardless of the funding level, as well as the use of these data for subsequent research. Large-scale data include genome-wide association studies (GWAS), single nucleotide polymorphisms (SNP) arrays, and genome sequence, transcriptomic, epigenomic, and gene expression data. Examples of genomic research projects that are subject to the Policy and the timeline for submission and sharing of data from such projects may be found in the Supplemental Information to the NIH GDS Policy available at the NIH GDS Policies link below.

Questions about the Policy can be e-mailed to GDS@mail.nih.gov.

- NIH GDS Policy
- NIH GDS Policy Oversight
- Guidance for Submitting and Requesting Access to Controlled-Access Data Maintained in an NIH-Designated Data Repository (e.g., dbGaP)
  - Study Registration and Data Submission
    - Institutional Certifications
  - Request to Access Data
- Data Repositories and NIH Trusted Partners
- Related Resources
- Facts and Figures

Scientific Data Sharing

- Genomics and Health
- Scientific Data Management

Frequently Asked Questions

- NIH Genomic Data Sharing Policy

https://osp.od.nih.gov/scientific-sharing/genomic-data-sharing/

Key DMP Takeaways

- Funders are looking to know what data and metadata is going to be generated, how it will be kept secure and if, when and how it will be shared
- For cross-institutional proposals, most funders say data management is ultimately the responsibility of the lead-PI, and a proposal will require just one DMP.
- Be sure to read RFP/RFI calls carefully – some directorates/divisions/offices/programs have specific requirements that need to be addressed.
- Some funders consider them part of the peer-review portion, others consider them only once a project is funded.
- Don’t wait until the last minute to write them – they DO matter!

How to get help with Data Management Plans

- Agency guidance (see links provided throughout)
- RDMSG guidance https://data.research.cornell.edu
  - Data management planning
  - Data storage finder tool
  - Data management best practices
- DMPTool: Web-based tool to build and edit a customized plan according to select funder requirements. https://dmptool.org
- Ask for help! The RDMSG supports Cornell researchers and provides free consultations. rdmsg-help@cornell.edu

Publisher Data Sharing Requirements

http://journals.plos.org/plosone/s/data-availability

Data Availability

PLOS journals require authors to make all data underlying the findings described in their manuscript fully available without restriction, with rare exception.

When submitting a manuscript online, authors must provide a *Data Availability Statement* describing compliance with PLOS's policy. If the article is accepted for publication, the data availability statement will be published as part of the final article.

Refusal to share data and related metadata and methods in accordance with this policy will be grounds for rejection.

http://www.sciencemag.org/authors/science-journals-editorial-policies

Data and materials availability after publication

After publication, all data and materials necessary to understand, assess, and extend the conclusions of the manuscript must be available to any reader of a *Science* Journal. After publication, all reasonable requests for data, code, or materials must be fulfilled. Any restrictions on the availability of data, code, or materials, including fees and restrictions on original data obtained from other sources must be disclosed to the editors…

Unreasonable restrictions on data, code, or material availability may preclude publication.

http://www.nature.com/authors/policies/availability.html

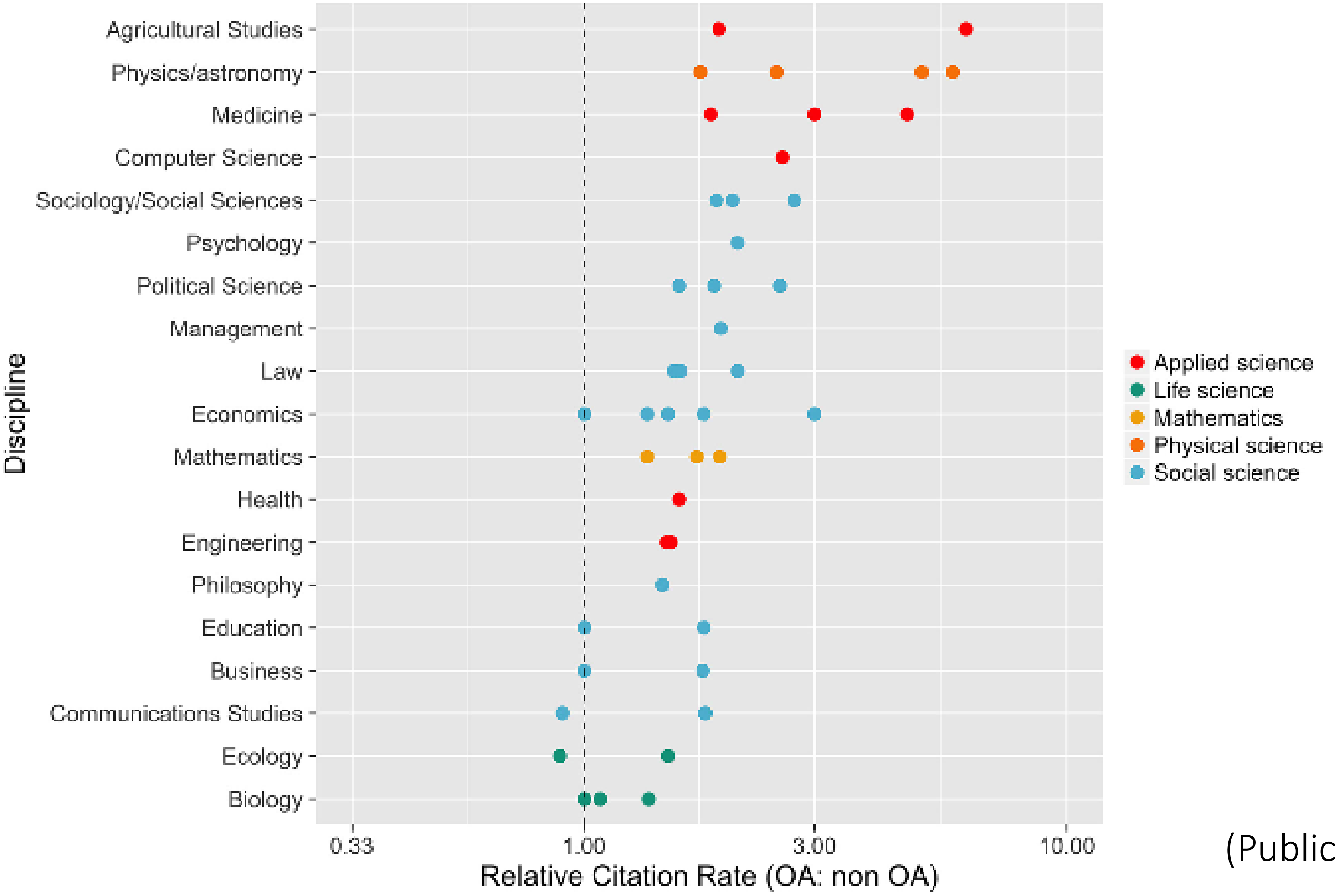
Availability of data, materials and methods

A condition of publication in a Nature journal is that **authors are required to make materials, data, code, and associated protocols promptly available to readers without undue qualifications.** Any restrictions on the availability of materials or information must be disclosed to the editors at the time of submission. Any restrictions must also be disclosed in the submitted manuscript.

Supporting data must be made available to editors and peer-reviewers at the time of submission for the purposes of evaluating the manuscript. … The preferred way to share large data sets is via public repositories.

https://elifesciences.org/lookup/doi/10.7554/eLife.16800.001

Researcher Recognition



(Publications)

https://elifesciences.org/lookup/doi/10.7554/eLife.16800.001

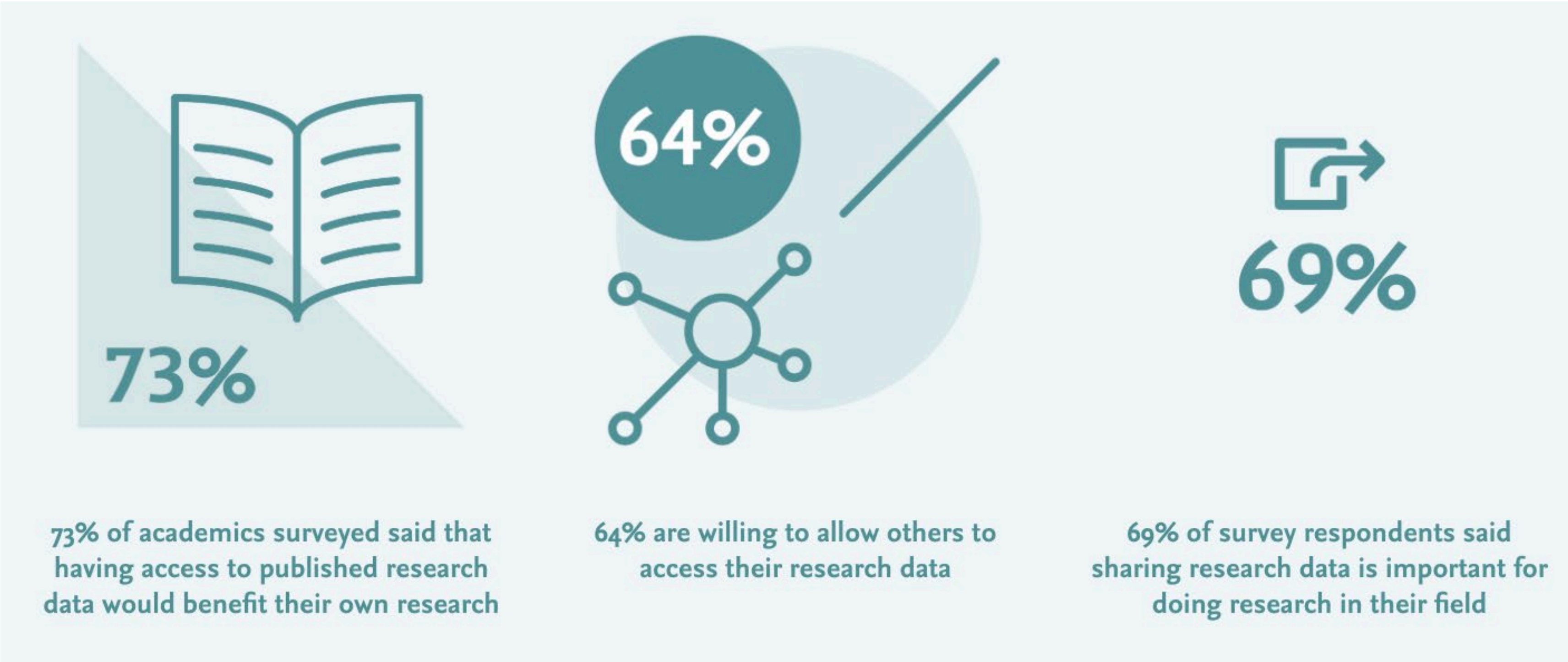
Researcher Recognition

Increased citation rate for studies with openly share datasets

Discipline	Rate of increased citation	Source
Gene expression microarray data	9% overall, 30% for older studies	Piowar and Vision, 2013
Astronomy	20%	Henneken and Accomazzi, 2011
Astrophysics	28-50%	Dorsch et al, 2013
Paleoceanography	35%	Sears, 2011

(Data)

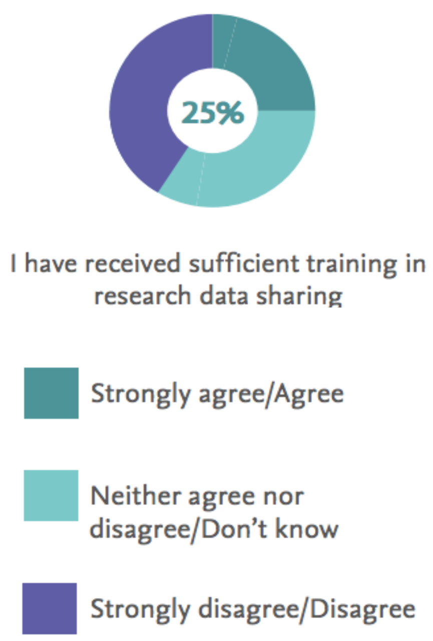
Data Sharing - Perceptions



73% of academics surveyed said that having access to published research data would benefit their own research

64% are willing to allow others to access their research data

69% of survey respondents said sharing research data is important for doing research in their field



I have received sufficient training in research data sharing

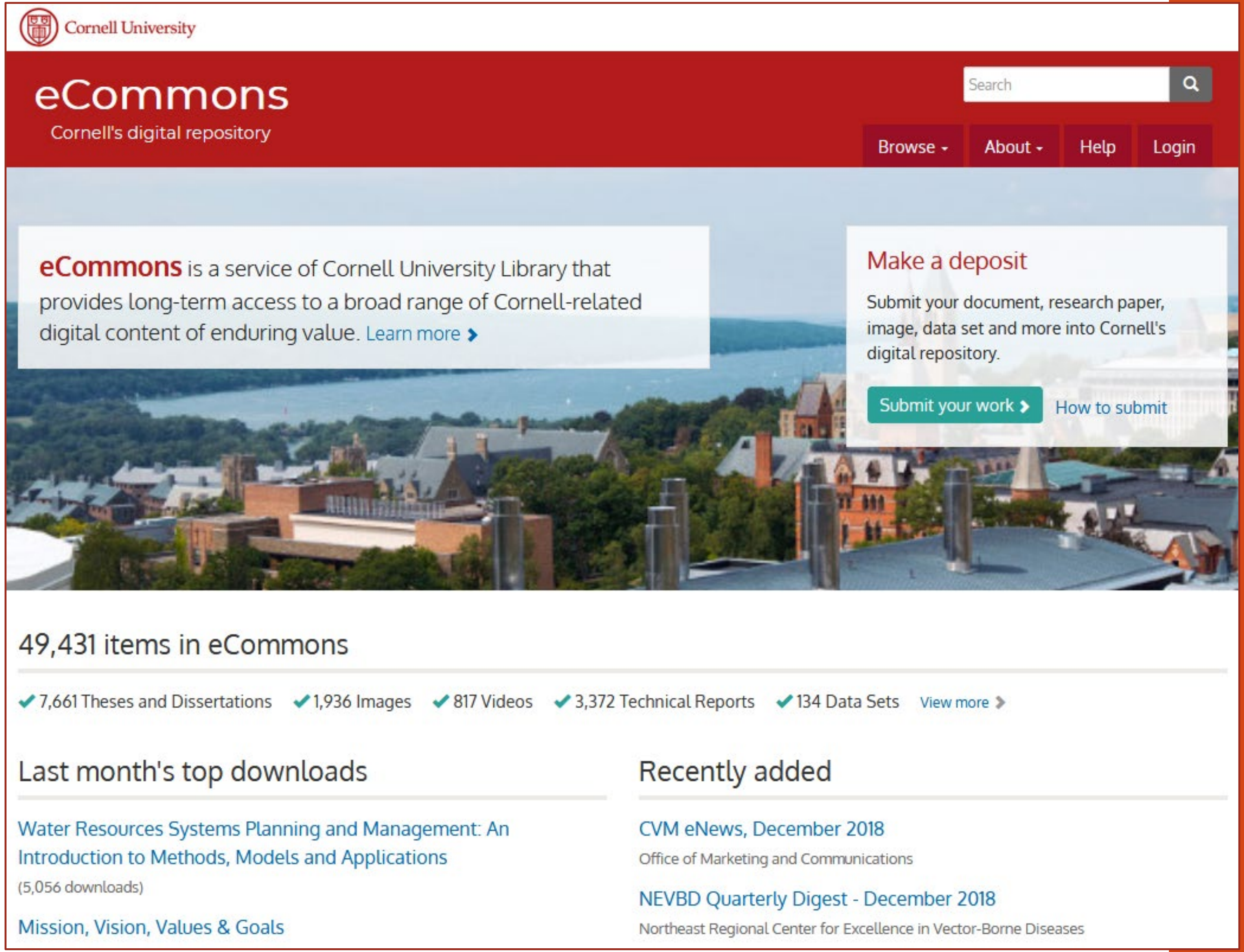
Source: Elsevier and the Centre for Science and Technology Studies (CWTS) - Open Data: the researcher perspective, 2017.
https://www.elsevier.com/about/open-science/research-data/open-data-report

Sharing data at Cornell

https://ecommons.cornell.edu

Available to Cornell affiliates and provides:

- Open access
- Persistent identifiers (handle, DOI)
- Flexible, optional licenses
- Curatorial review
- Links to and citations for related material
- Page and file analytics
- Long term sharing and preservation



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Last month's top downloads

Water Resources Systems Planning and Management: An Introduction to Methods, Models and Applications
(5,056 downloads)

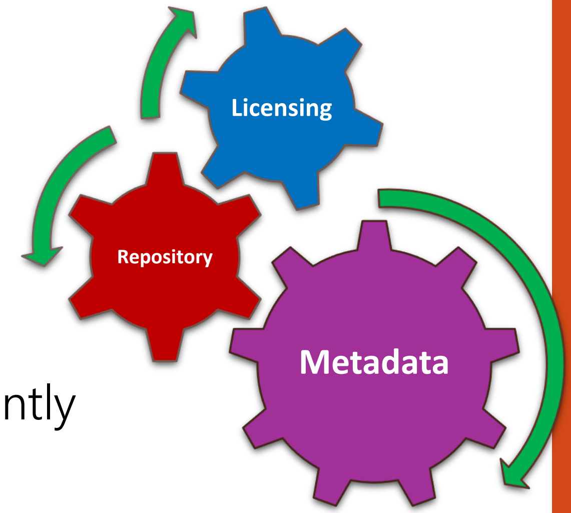
Mission, Vision, Values & Goals

Recently added

CVM eNews, December 2018
Office of Marketing and Communications

NEVBD Quarterly Digest - December 2018
Northeast Regional Center for Excellence in Vector-Borne Diseases

FAIR DATA



DATA SHOULD BE

Findable All Data Objects should be uniquely and persistently identifiable from other data types.

Accessible Data can be accessible machines and human users, through well-defined protocols and appropriate authorization.

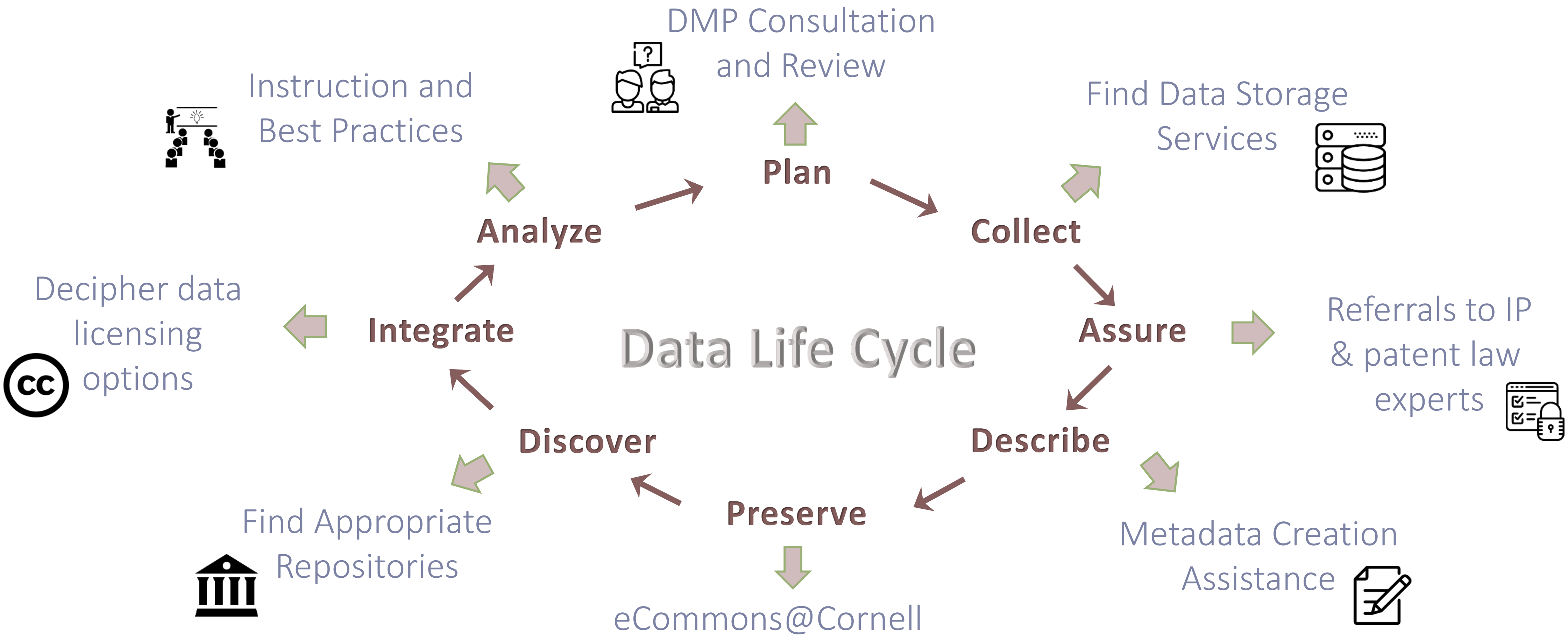
Interoperable Metadata are machine-actionable in automated workflows, syntactically parseable, and utilize shared vocabularies within and across domains.

Reusable Data are sufficiently well-described to be automatically linked and/or integrated, with sufficient provenance and citation.

BY HUMANS AND MACHINES

www.nature.com/articles/sdata201618 www.force11.org/fairprinciples

Data Management Services at Cornell



DMP Consultation and Review

Plan

Find Data Storage Services

Collect

Referrals to IP & patent law experts

Assure

Describe

Metadata Creation Assistance

Preserve

eCommons@Cornell

Discover

Find Appropriate Repositories

Integrate

Decipher data licensing options

Analyze

Instruction and Best Practices

Data Life Cycle

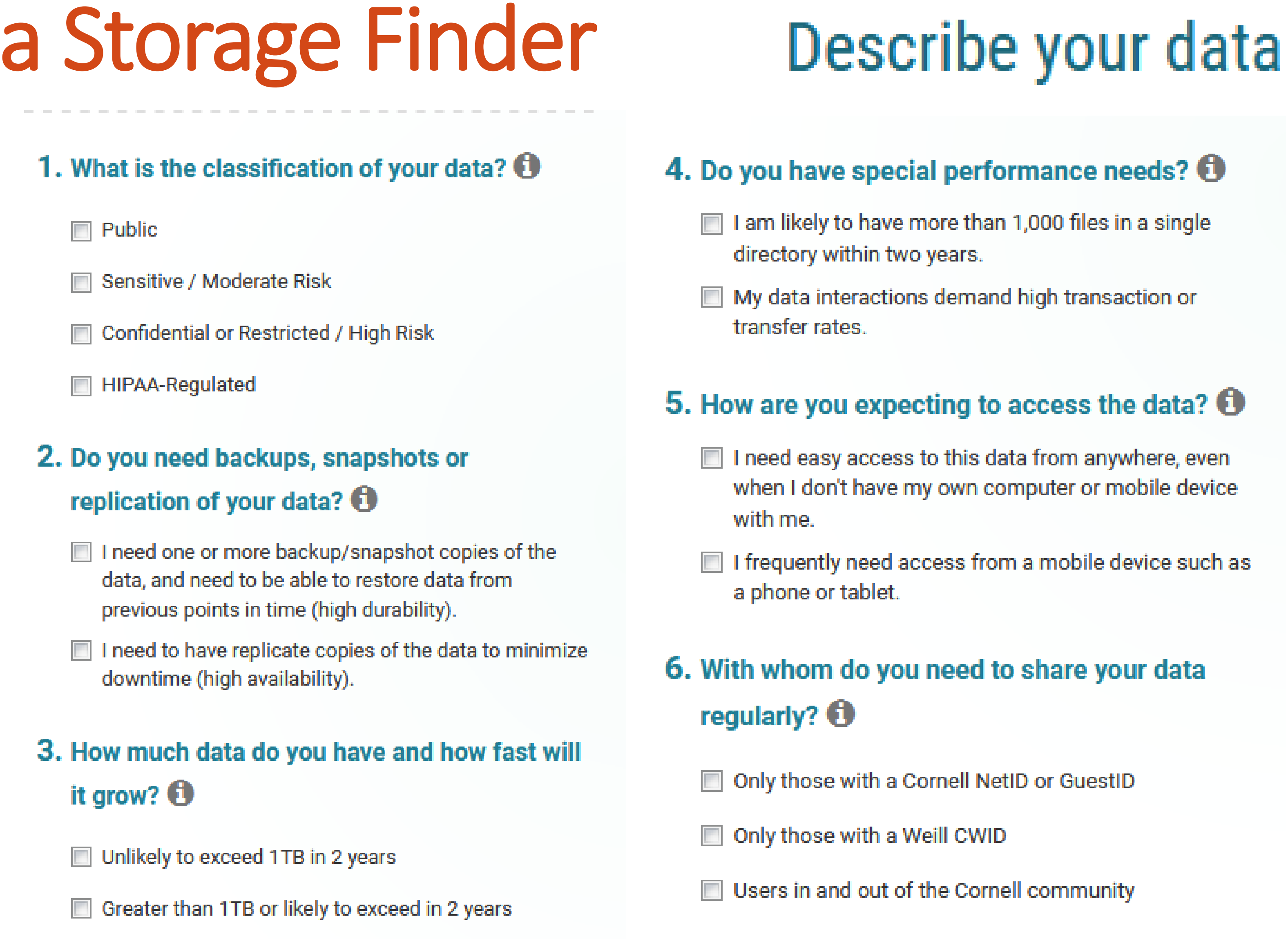
✉ rdmsg-help@cornell.edu

data.research.cornell.edu

https://finder.research.cornell.edu/storage

First:

Data Storage Finder



Describe your data

1. What is the classification of your data? ℹ

□ Public

□ Sensitive / Moderate Risk

□ Confidential or Restricted / High Risk

□ HIPAA-Regulated

2. Do you need backups, snapshots or replication of your data? ℹ

□ I need one or more backup/snapshot copies of the data, and need to be able to restore data from previous points in time (high durability).

□ I need to have replicate copies of the data to minimize downtime (high availability).

3. How much data do you have and how fast will it grow? ℹ

□ Unlikely to exceed 1TB in 2 years

□ Greater than 1TB or likely to exceed in 2 years

4. Do you have special performance needs? ℹ

□ I am likely to have more than 1,000 files in a single directory within two years.

□ My data interactions demand high transaction or transfer rates.

5. How are you expecting to access the data? ℹ

□ I need easy access to this data from anywhere, even when I don't have my own computer or mobile device with me.

□ I frequently need access from a mobile device such as a phone or tablet.

6. With whom do you need to share your data regularly? ℹ

□ Only those with a Cornell NetID or GuestID

□ Only those with a Weill CWID

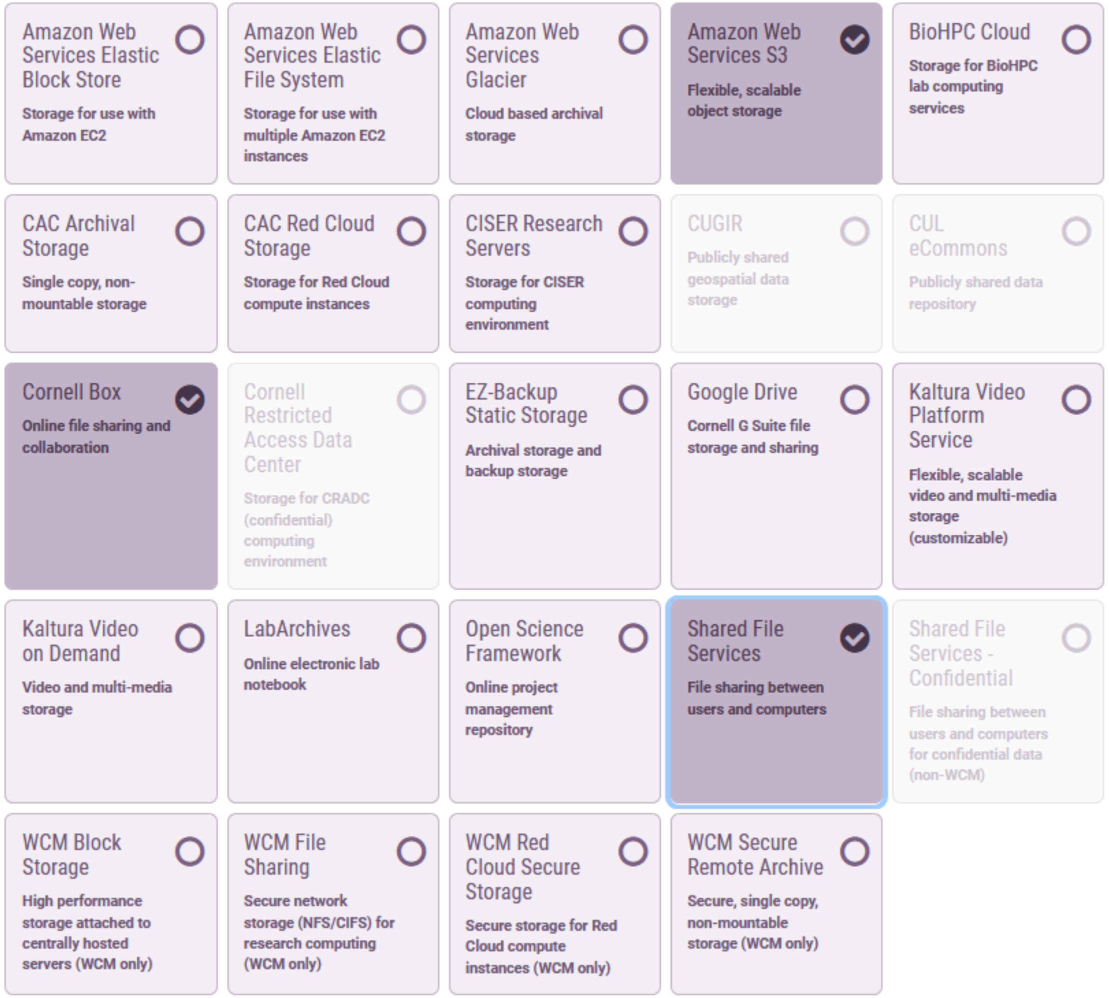
□ Users in and out of the Cornell community

https://finder.research.cornell.edu/storage

Second:

Data Storage Finder

Select data storage services you would like to compare.



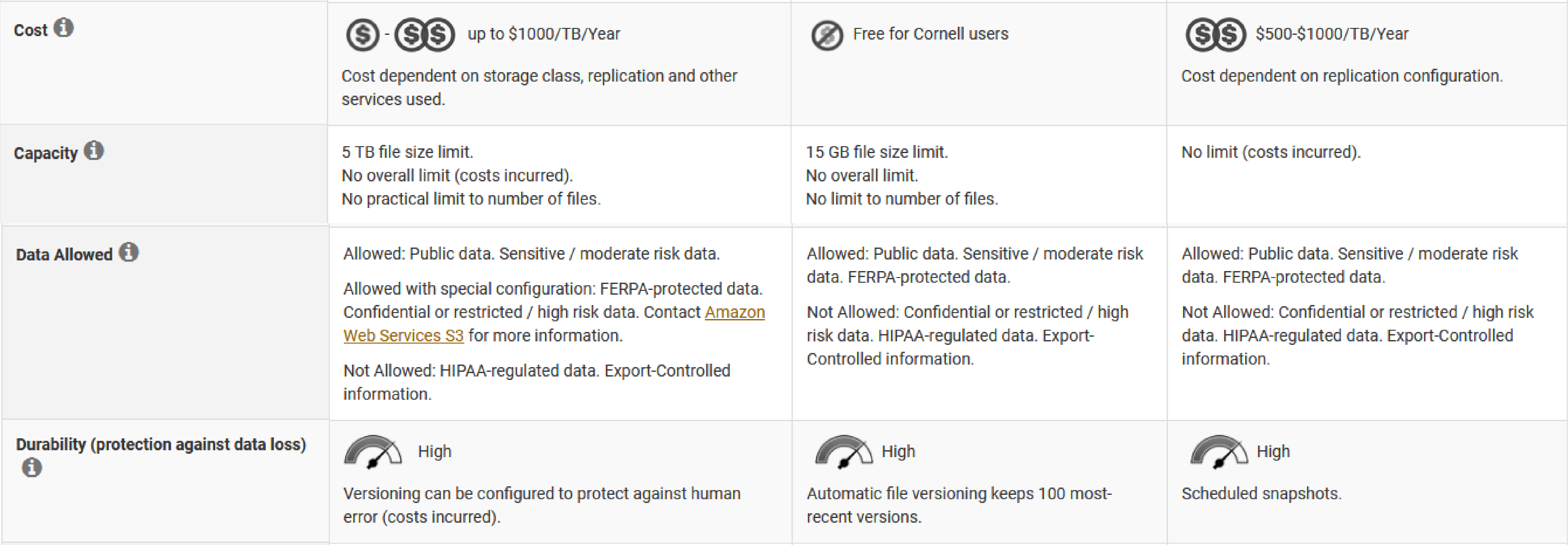
Amazon Web Services Elastic Block Store ○ Storage for use with Amazon EC2	Amazon Web Services Elastic File System ○ Storage for use with multiple Amazon EC2 instances	Amazon Web Services Glacier ○ Cloud based archival storage	Amazon Web Services S3 ✓ Flexible, scalable object storage	BioHPC Cloud ○ Storage for BioHPC lab computing services
CAC Archival Storage ○ Single copy, non-mountable storage	CAC Red Cloud Storage ○ Storage for Red Cloud compute instances	CISER Research Servers ○ Storage for CISER computing environment	CUGIR ○ Publicly shared geospatial data storage	CUL eCommons ○ Publicly shared data repository
Cornell Box ✓ Online file sharing and collaboration	Cornell Restricted Access Data Center ○ Storage for CRADC (confidential) computing environment	EZ-Backup Static Storage ○ Archival storage and backup storage	Google Drive ○ Cornell G Suite file storage and sharing	Kaltura Video Platform Service ○ Flexible, scalable video and multi-media storage (customizable)
Kaltura Video on Demand ○ Video and multi-media storage	LabArchives ○ Online electronic lab notebook	Open Science Framework ○ Online project management repository	Shared File Services ✓ File sharing between users and computers	Shared File Services - Confidential ○ File sharing between users and computers for confidential data (non-WCM)
WCM Block Storage ○ High performance storage attached to centrally hosted servers (WCM only)	WCM File Sharing ○ Secure network storage (NFS/CIFS) for research computing (WCM only)	WCM Red Cloud Secure Storage ○ Secure storage for Red Cloud compute instances (WCM only)	WCM Secure Remote Archive ○ Secure, single copy, non-mountable storage (WCM only)	

https://finder.research.cornell.edu/storage

Third:

Data Storage Finder

Compare services that match your selected criteria



Cost	$ - $$ up to $1000/TB/Year Cost dependent on storage class, replication and other services used.	Free for Cornell users	$$ $500-$1000/TB/Year Cost dependent on replication configuration.
Capacity	5 TB file size limit. No overall limit (costs incurred). No practical limit to number of files.	15 GB file size limit. No overall limit. No limit to number of files.	No limit (costs incurred).
Data Allowed	Allowed: Public data. Sensitive / moderate risk data. Allowed with special configuration: FERPA-protected data. Confidential or restricted / high risk data. Contact Amazon Web Services S3 for more information. Not Allowed: HIPAA-regulated data. Export-Controlled information.	Allowed: Public data. Sensitive / moderate risk data. FERPA-protected data. Not Allowed: Confidential or restricted / high risk data. HIPAA-regulated data. Export-Controlled information.	Allowed: Public data. Sensitive / moderate risk data. FERPA-protected data. Not Allowed: Confidential or restricted / high risk data. HIPAA-regulated data. Export-Controlled information.
Durability (protection against data loss)	High Versioning can be configured to protect against human error (costs incurred).	High Automatic file versioning keeps 100 most-recent versions.	High Scheduled snapshots.

Workshops and Instruction

Upcoming Data and GIS workshops at the Libraries
http://bit.ly/CULibraryWorkshops

- **Data Documentation: Intro to Science Metadata**| 2019-09-24 | 4:00-5:30 pm | Stone Classroom, Mann Library
- **Data Sharing and Publishing**| 2019-10-01 | 4:00-5:30 pm | Stone Classroom, Mann Library
- **Cleaning Messy Data with OpenRefine** | 2019-10-08 | 4:00-5:30 pm | Stone Classroom, Mann Library
- **Intro to QGIS** | 2019-09-19 | 2:30pm | Stone Classroom, Mann Library
- **Intro to QGIS** | 2019-10-25 | 2:30pm | Stone Classroom, Mann Library
- **Using Excel: Formulas and Functions** | 2019-10-22 | :30-6 pm | Uris B05
- **Using Excel: Pivot Tables** | 2019-10-29 | 4:30-6 pm | Uris B05
- **Using Excel: Macros** | 2019-11-12 | 4:30-6 pm | Uris B05
- **Research Record Keeping: Electronic Lab Notebooks and OSF**| 2019-9-19 | TIME 12-1pm | ILR

Cornell

DAY OF DATA 2019

Any person. Any study. Any data.

- Tuesday October 15, 2019, 9am-5pm
- ILR Conference Center
- More info and agenda: http://bit.ly/cornelldayofdata2019
- Registration required for lunch and afternoon workshops

- Keynote by Professor David Mimno
- Researcher panel on data-related challenges and solutions
- Lunch and a data services FAIR
- 4 tracks of concurrent afternoon workshops and informational sessions

✉ rdmsg-help@cornell.edu
🌐 data.research.cornell.edu

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RDMSG Coordinator
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NSF DMPs – a few logistics

- Supplementary document; 2 page limit
  - DMP can roll into project summary pages if needed, but DMP pages cannot be used for project summary
- DMP can simply state that no data are to be collected
- Subject to peer review (intellectual merit and/or broader impacts)
- Allowable DM costs should be included in budget line G2 and explained in budget justification

http://www.nsf.gov/bfa/dias/policy/dmp.jsp
https://www.nsf.gov/pubs/policydocs/pappg19_1/pappg_2.jsp#IIC2j

What NSF (generally) wants to see in a DMP

1. Expected data and research products
2. Formats and standards for data and metadata
3. Policies for access and sharing (dissemination)
   - Timeframe for availability
   - Data storage and security
4. Policies and provisions for re-use, re-distribution and production of derivatives
5. Plan for archiving and preservation of access
   - Period of data retention
6. Roles and responsibilities

NIH Genomic Data Sharing Policy

- Applies to all NIH-funded research that generates large-scale human or non-human genomic data, regardless of the funding level.
- Applies to large-scale data including genome-wide association studies (GWAS*), single nucleotide polymorphisms (SNP) arrays, and genome sequence, transcriptomic, epigenomic, and gene expression data.
- Basic plans must be included in the Resources Sharing Plan section of proposals; detailed plans must be provided prior to award.
- Investigators should contact appropriate IC Program Official or Project Officer to discuss data sharing expectations and timelines.

**GWAS applicants have had a data sharing requirement in place since 2008 (NCBI)*

http://grants.nih.gov/grants/guide/notice-files/NOT-OD-07-088.html#data
https://osp.od.nih.gov/scientific-sharing/genomic-data-sharing/

What NIH (generally) wants to see in a DSP

1. Schedule for sharing
2. Dataset format(s)
3. Description of accompanying data documentation
4. Plan to (or not to) provide analytical tools
5. Plan to (or not to) require data-sharing agreements; when required what that will include (provisions for re-use)
6. Mode of data sharing