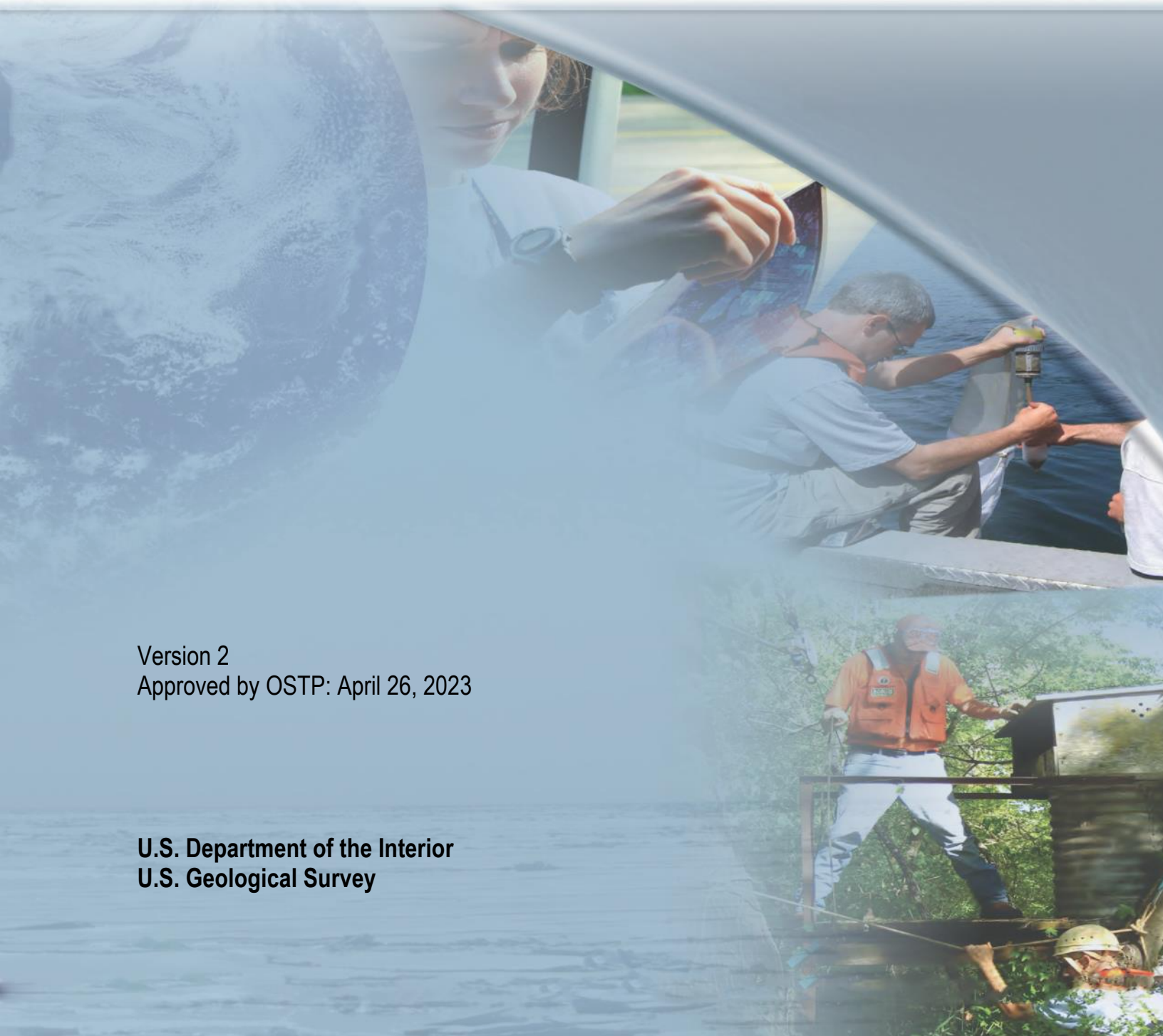




Public Access to Results of Federally Funded Research at the U.S. Geological Survey: Scholarly Publications and Digital Data (ver. 2.0)

Version 2
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**U.S. Department of the Interior
U.S. Geological Survey**



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1.0 Background and Purpose

The U.S. Geological Survey (USGS), a Bureau of the U.S. Department of the Interior, conducts objective scientific research in ecosystems, climate and land use change, energy and mineral assessments, environmental health, natural hazards, and water resources to inform effective decision making and planning; produces information to increase understanding of natural hazards such as earthquakes, volcanoes, and landslides; conducts research on oil, gas, and alternative energy potential, production, consumption, and environmental effects; and leads the effort on climate change science research for the Department. The results of USGS research (generally released in the form of publications, maps, data, and models) are used by policymakers at all levels of government and by the private sector to support appropriate decisions about how to respond to natural risks and manage natural resources.

Since its establishment in 1879, the USGS has had a firm commitment to providing public access to scientific results through timely, technically sound, peer-reviewed, and professionally presented scholarly publications and data generated from unclassified research funded wholly or in part by the USGS. The USGS adheres to rigorous policies, standards, and processes for the development, review, approval, and release of USGS scholarly peer-reviewed publications, whether they are published by the USGS Science Publishing Network in one of several series of USGS publications or externally in scientific journals or other outlets (refer to appendix A).

USGS data are being used to spur economic growth, competitiveness, and innovation in the private sector. For example, USGS streamgage data are widely used in many industries from tourism and recreation to construction planning, and USGS Landsat data are used globally to optimize crop production, identify drought, and inform decisionmakers on sustainable land use practices.

USGS scholarly publications and associated data are discoverable online. Scholarly information products published by the USGS and external publishers are cataloged in the USGS [Publications Warehouse](#) and data associated with these publications are available in the USGS [Science Data Catalog](#). As of February 2023, the Publications Warehouse includes citations for the more than 82,000 USGS series publications, 74,000 of which are available at no cost to the public as downloadable digital files, and more than 70,000 USGS-authored scholarly publications published externally, including links to original published sources. The Science Data Catalog contains more than 25,000 metadata records referencing data stored in multiple USGS repositories and a subset of non-USGS repositories.

On August 25, 2022, the White House Office of Science and Technology Policy (OSTP) released a memorandum titled, *Ensuring Free, Immediate, and Equitable Access to Federally Funded Research*. This builds upon the February 22, 2013, OSTP memorandum, *Increasing Access to the Results of Federally Funded Scientific Research* (Holdren, 2013), which called on Federal agencies with annual research and development (R&D) expenditures of more than \$100 million to develop a plan to increase public access to the direct results of federally funded scientific research, including specifically peer-reviewed publications and digital data. The updated USGS Public Access Plan described herein focuses specifically upon the USGS's public access activities, policies, and plans as they affect both intramural and extramural R&D. In the FY2022 budget allocation of \$1.9 billion, \$178 million (just over nine percent) was allocated for extramural R&D.

In January 2019, the *Foundations for Evidence-based Policymaking Act of 2018* (Evidence Act) was issued into law by the United States Congress. This overarching Act includes the *Open, Public, Electronic, and Necessary Government Data Act* (OPEN Government Data Act), and incorporated some of the requirements from multiple, previously instated, directives and memorandums, including Executive Order 13642, *Making Open and Machine Readable the New Default for Government Information* (Obama, 2013), and Memorandum M-13-13, *Open Data Policy--Managing Information as an Asset* (Burwell et al., 2013). These effectively establish the mandates for the Federal Government to transform data and information into useable and accessible digital assets and promote and accelerate their release, subject to certain limitations imposed by privacy, confidentiality, and national security considerations.

This document describes how the USGS currently provides and, upon the effective date of this plan, will further enable public access to USGS scholarly publications and digital data subject to law; agency mission; resource constraints; U.S. national, homeland, and economic security; and the objectives listed in the OSTP's public access memorandums. It also describes how existing USGS processes and procedures are being modified to meet the requirements of the OSTP "public access" and Office of Management and Budget (OMB) "open data" memoranda.

Note that at the first use of terms commonly referred to throughout this document, the term abbreviation directly follows, shown in parenthesis, and a complete list of the terms and their related abbreviations is found in Appendix B.

2.0 Scope

This plan applies to scholarly publications and unclassified or otherwise unrestricted digital scientific data (data) produced in whole or in part by USGS employees, contractors, financial assistant awardees, other grantees, and other contractor entities where the publication and data are produced with complete or partial USGS funding, unless otherwise prohibited by law, regulation, or policy.

This plan builds on other USGS policies, summarized in appendix A, which require that public access be provided for scholarly publications, their associated data, and other federally funded data.

This plan requires all data, including data not associated with scholarly publications, must be reviewed, approved, and released upon the conclusion of a project or in a timely manner as documented in the data management plan.

2.0 Definitions

For the purposes of this Plan, the following terms are defined:

Dark Archive – an archive that does not grant public access and preserves the information it contains. The purpose of a dark archive is to function as a repository for information that can be used as a failsafe during disaster recovery. Making a document “bright” refers to retrieving it from the dark archive and placing it in a publicly accessible repository.

Data – refers to USGS funded scientifically-relevant data. (Refer to *SM 502.8* for USGS definition of data) As defined by OSTP, “scientific data” include the recorded factual material commonly accepted in the scientific community as of sufficient quality to validate and replicate research findings. Such scientific data do not include laboratory notebooks, preliminary analyses, case report forms, drafts of scientific papers, plans for future research, peer-reviews, communications with colleagues, or physical objects and materials, such as laboratory specimens, artifacts, or field notes.”

Extramural Research – Research performed with USGS funding by scientists outside of the USGS.

Final Accepted Manuscript - A manuscript that has been accepted for publication that includes all modifications from the peer review process but may not include the final formatting of the Version of Record (VoR).

Fundamental Science Practices (FSP) – the set of mandated requirements, codified in USGS policy, that describe the peer review process for publishing research results, releasing data, and other aspects of the scientific process conducted by USGS scientists.

Information Product – compilation of scientific knowledge such as facts, data, or interpretations in any medium (e.g., print, digital, web) or form (including textual, numerical, graphical, cartographic, and audiovisual) for release and dissemination by the USGS or a non-USGS entity to an external audience. The term information product may be

referred to by other terms used in the Bureau, including but not limited to scientific publication, data product, software product, and map product.

Intramural Research – Research performed with USGS funding by scientists working for the USGS.

Scholarly Publications – any peer-reviewed USGS-funded publication defined below that presents the results of USGS-funded research.

USGS Series Publications – a set of numbered information products produced and published by the USGS. Each numbered series is established to meet a specific audience need is and publicly released for free on the USGS Publications Warehouse.

External Publications – publications that are published by a non-USGS entity and may include final formatting by the publisher. Though many different types of external publications are USGS-funded, only peer-reviewed journal articles are covered under the Public Access Plan.

USGS-funded – Any USGS-affiliated funds including appropriated and reimbursable.

USGS Information Product Data System (IPDS) – an internal web-based application and dark archive that documents and tracks the review, approval, and dissemination of information products that are subject to the USGS FSP. The IPDS also provides bibliographic metadata to the USGS Publications Warehouse for creating citations. The IPDS temporarily stores the Final Accepted Manuscripts.

[**USGS ScienceBase**](#) – a digital repository and collaborative data management platform providing public access to machine readable data and metadata. ScienceBase also serves as a cross-program institutional repository, ensuring long-term stewardship of the results of federally funded research, when a more specific Program-level data repository is not available. ScienceBase allows scientists to contribute new and original data content in any file format, providing advanced access and integration capabilities for certain types of formats (for example, shapefiles and GeoTIFF served via Open Geospatial Consortium Web services). ScienceBase is designed to integrate into the USGS Science Data Lifecycle Model (Faundeen et al, 2013), offering features for project teams to develop and manage data securely and to facilitate final review and approval for public release.

[**USGS Science Data Catalog**](#) – a public search and discovery tool for fully documented USGS science data, using either the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM) or the International Organization for Standardization (ISO) suite of metadata standards. Metadata records are available through the USGS Science Data Catalog, aggregated from across repositories and web databases hosted by USGS Mission Areas and Programs.

[**USGS Publications Warehouse**](#) – a public online citation index for USGS-authored and USGS-funded publications managed by the USGS Library that serves as the authoritative source for information and access to USGS-authored publications. Each publication has its own

descriptive citation page that is dynamically generated based on information derived from a variety of sources, including the USGS IPDS, publisher sites, and other bibliographic databases. The Publications Warehouse allows indexing by web search crawlers and provides both basic and advanced search capabilities. The Publications Warehouse also provides Web services, including a customizable RSS feed and an Application Programming Interface (API). USGS publications in the Publications Warehouse are available to download.

3.0 Requirements

This plan identifies requirements based on the 2022 OSTP memorandum that affect both USGS intramural and extramural activities funded by the USGS upon its effective date of December 31, 2025. Specifically, this plan requires that the USGS ensure that an electronic copy of either the final accepted manuscript or the external publication be available free-of-charge for public access at the publication date. Data that support a scholarly publication must be released commensurate with or prior to the release of the publication. Data (as defined for this document), even if not supporting a scholarly publication, must be released at the end of the project, unless the USGS determines that a demonstrated special circumstance prevents the data from being made publicly available, for example because it provides location data for endangered species. This plan also requires provision of formal data management plans (DMPs) for all new USGS research proposals. The DMP must describe how data collected with Federal funds will be released to the public free-of-charge. The DMP requirement became effective February 2015 for USGS intramural scientists and January 2016 for all USGS funded extramural scientists.

4.0 Applicability

Upon the effective date of this plan these requirements will apply to scholarly publications of research results and digital data arising from USGS funding, unless otherwise prohibited by law, regulation, or policy. These information products and data must be provided free-of-charge.

5.0 Authority

The mandate to publish data and findings from USGS science activities dates to the Bureau's creation by the signing of the Sundry Civil Bill (U.S. Statutes at Large, v. 20, p. 394-395) on March 3, 1879, establishing the USGS. This bill also defined the requirement to report the results of investigations by the USGS to the public.

In addition, 2 CFR § 200.315 Intangible Property provides the Federal awarding agency the right to reserve a royalty-free, nonexclusive and irrevocable right to reproduce, publish, or otherwise use any work that is subject to copyright and was developed, or for which ownership was acquired, under a Federal award for Federal purposes, and to authorize others to do so; and pursuant to 2 CFR § 215.36 Intangible Property, the Federal government has the right to: (1) Obtain, reproduce, publish, or otherwise use the data produced under a Federal award; and (2) Authorize others to receive, reproduce, publish, or otherwise use such data for Federal purposes.

Any non-USGS entity may not assert or attempt to assert copyright or any other intangible or intellectual property right in the final accepted manuscript or in the scholarly publication and in the respective data that would otherwise prevent, encumber, or frustrate release thereof without an embargo on their free and public release.

6.0 Roles and Responsibilities

USGS entities responsible for implementing the actions outlined in this Plan include:

- **The Office of Science Quality and Integrity (OSQI)** – responsible for maintaining USGS Fundamental Science Practices policy documents and in collaboration with the USGS Associate Directors and Regional Directors, ensures compliance with and advises on the execution of these policies, which provide the primary basis for the processes elucidated in this plan.
- **The Office of Communications and Publishing** – responsible for editing, production, preparation, section 508 compliance, and release of USGS series publications.
- **The Core Science Systems Mission Area** - responsible for the USGS Publications Warehouse system, the USGS Science Data Catalog, USGS ScienceBase data repository, and the USGS Data Management web site.
- **The Office of Enterprise Information** – responsible for the administration of specific repositories and archives.
- **USGS Science Center Directors** – responsible for ensuring all scientists reporting to those science centers follow the USGS Fundamental Science Practices, including release of final project data.
- **Office of Acquisition and Grants** – responsible for providing funding through grants to scientists extramural to the USGS and enforcing requirements that include creation and adherence to DMP and delivery to the USGS digital versions of their published manuscripts and associated data.
- **Fundamental Science Practices Advisory Council (FSPAC)** – responsible for helping ensure best practices for how USGS science is planned, conducted, and disseminated in accordance with USGS FSP policy and guidance. The FSPAC is the Bureau’s standing Council tasked to provide advice and recommendations to USGS leadership and others regarding FSP.

7.0 Implementation

Many of the organizational and technological resources needed to fully implement public access to USGS scholarly publications and digital data already exist within the USGS. The mechanisms for ensuring public access and measuring progress are established through the USGS FSP.

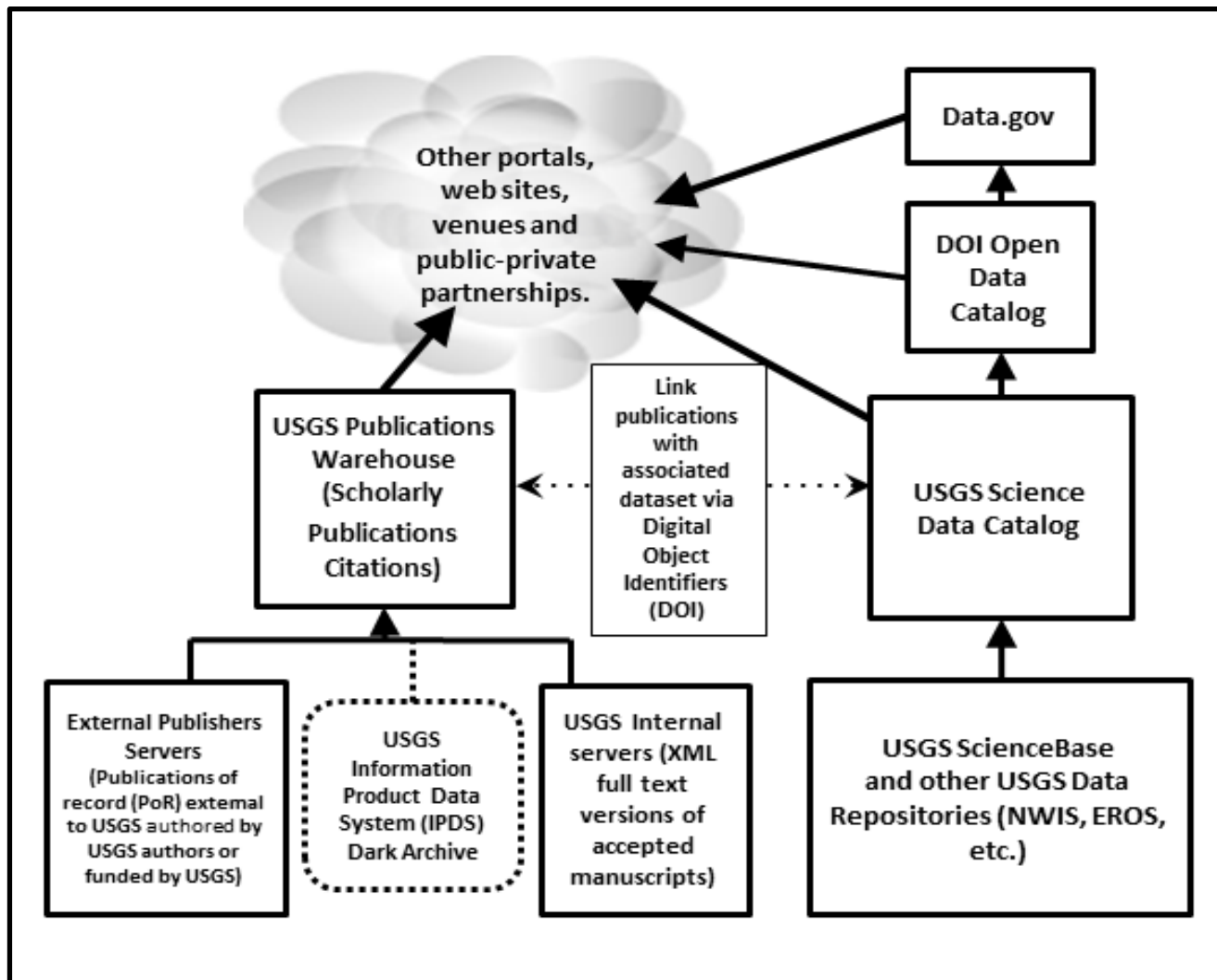


Figure 1. A generalized diagram illustrating the public release process for USGS scholarly publications and digital data. *Note: Metadata from the USGS Publications Warehouse meet Library of Congress metadata standards while USGS Science Data Catalog metadata meet Federal Geographic Data Committee or ISO metadata standards. Details of how publications and data are linked via use of digital object identifiers are described in text.*

Key elements include:

For scholarly publications

- Upon completion of peer review, Bureau approval, and production, USGS series publications are submitted to the USGS Publications Warehouse for cataloging and public release.
- As part of the USGS Bureau approval process, the final accepted manuscripts of external publications reside in the Information Product Data System (IPDS), a [National Archives and Records Administration](#) (NARA)-certified repository that functions in part as a dark archive for all USGS-funded information products. This includes electronic copies of USGS-funded publications by scientists extramural to the USGS. Publications by intramural scientists are entered in the IPDS dark archive by those scientists or an appointed designee, and publications by extramural scientists funded by the USGS are provided to the USGS project scientist responsible for the USGS funded extramural research, who places the publication into the IPDS dark archive.
- Upon release, all scholarly publications are cataloged in the USGS Publications Warehouse. Associated data are cataloged in USGS Science Data Catalog prior to, or concurrent with the release of either the final accepted manuscript or version of record. Links are provided to the full text of all information products regardless of publisher (USGS or non-USGS) and type of access.
- The Publications Warehouse is given a prominent access point on the USGS website (<https://www.usgs.gov>) to ensure the public is aware of a comprehensive search available for USGS publications.
- Researchers are allowed to include reasonable costs associated with submission, curation, and management of publications, public access fees, and special handling instructions in research budgets.

For digital data

- Data associated with USGS scholarly publications and other data products are released as a separate data entity (e.g., as digital datasets) after passing through quality assurance, quality control, formal description, review, and approval for release as established in USGS Survey Manual (SM) policy chapter SM 502.8.¹
- Data associated with USGS scholarly publications and other data approved for release are submitted to the USGS data repository most appropriate to their content, level of data management needed, and dissemination method required. A trusted third-party distribution repository may be used to increase access, but the authoritative version of the data is maintained by the USGS.
- All metadata describing the data are indexed in the USGS Science Data Catalog, enabling consistent public discoverability. The Science Data Catalog is given a prominent access point on the USGS website (<https://www.usgs.gov>) to ensure the public are aware of a USGS global search available for scientific data.

¹ Refer to Appendix A for links to USGS SM policy directives relevant to this Plan, including FSP chapters SM 502.2 through SM 502.10).

- USGS data are subject to Bureau approval under FSP; once approved for release, data are made available to the public in the appropriate forms and formats free-of-charge with no embargo period.

USGS information products (including publications and data) are assigned globally unique persistent identifiers, including digital object identifiers, to aid in unique identification, citation, recordkeeping, and cross-referencing between related resources. USGS researchers are also instructed to obtain a digital persistent identifier that meets common/core standards defined by NSPM-33 Implementation Guidance, and to include their digital persistent identifier in published research outputs. Researchers are required to provide USGS with the metadata associated with all published research outputs they produce, including these identifiers, as applicable.

In coordination with other Federal agencies, USGS will develop a process for assigning digital persistent identifiers to scientific research and development awards and intramural research protocols to enable proper reference of funding source from metadata associated with publications and data.

In keeping with the OSTP public access memorandum, the following sections describe how the USGS is either meeting required objectives or the actions that will be taken by fiscal year 2025 to ensure the objectives are met.

8.0 Objectives for Public Access to Scholarly Publications

The following objectives describe the USGS plan to provide public access to scholarly publications:

8.1 Timely digital access to publications

Timely search, discovery, and access to all publications subject to this plan will be provided by the USGS Publications Warehouse. USGS series publications (including historical publications) are made publicly available free-of-charge in digital form for download through the Publications Warehouse immediately upon public release. External publications are cataloged in the USGS Publications Warehouse with appropriate bibliographic metadata shortly after their publication in the respective journals, and links are provided to the full text of those scholarly publications. The full text will be made available free-of-charge to the public to read, download, and analyze in digital form within a timely manner after the official date of publication from either the publisher's website or from USGS.

8.1.1 Public search, discovery, and access

The USGS has enabled public search, discovery, and access to full text Section 508-compliant² digital versions of all USGS-funded publications resulting from its research via its existing USGS Publications Warehouse. The files and associated bibliographic metadata will continue to be released online through the USGS Publications Warehouse free-of-charge. The Publications Warehouse shall be given a prominent access point on the USGS website (<https://www.usgs.gov>) to ensure the public is aware of a comprehensive search available for USGS publications.

All USGS-funded, peer-reviewed and disseminated scholarly publications released outside of the USGS (e.g., as journal articles) will be cataloged in the Publications Warehouse with appropriate metadata to ensure discovery by the public. The full text of the final, accepted, peer-reviewed manuscript will be stored in the IPDS ready for release in a timely manner. Under existing terms of award for contracts and grants, the full text of publications produced by USGS-funded scientists extramural to the USGS must be stored electronically in the IPDS and thereby made available to the public free of charge.

The USGS will facilitate timely access to peer-reviewed scholarly publications and associated metadata directly arising from research funded by the USGS. This will allow the public to read, download, and analyze the publications by machine and will support downstream information processing and dissemination activities by using machine-readable and open formats, data standards, and common core and extensible metadata.

8.1.2 Metadata associated with Publications

Metadata for USGS series publications and external publications are included in the USGS Publications Warehouse and publicly available free-of-charge at the time of publication. This catalog is used to facilitate discovery of USGS intramural and extramural publications as well as aggregation of publications resources into other discovery mechanisms and specialized indexes, as illustrated in figure 1.

The USGS Publications Warehouse represents the authoritative source for discovery of published research or funded by the USGS. This resource provides metadata in standard formats and uses methods that conform to established industry standards. These methods (such as embedding structured metadata in web pages) facilitate the use of common commercial and open-source tools such as bibliographic management software and promote innovative access to research results in industry and the global scientific community.

Metadata for publications include all author and co-author names, author affiliations, and digital persistent identifiers that meet common/core standards for USGS authors. The metadata also include the date of publication and the unique, persistent digital object identifier assigned to the publication when applicable. By the effective date of this plan, USGS will also include sources of funding in metadata for publications.

² Meaning compliant with Section 508 of the Rehabilitation Act of 1973 as amended in 1998 (29 CFR § 794d).

8.1.3 Public-private collaboration

The USGS encourages public-private collaboration by allowing third parties to easily harvest metadata records and links from the USGS Publications Warehouse that may then be used in external discovery and repository systems. The USGS participates in Crossref, using persistent identifiers designed to promote access to research publications. USGS metadata are being harvested from and provided to a variety of third-party search engines and vendors of library systems. This metadata exchange greatly enhances discovery of USGS-funded publications. The USGS provides multiple options for accessing and extracting metadata records including via machine APIs and in downloadable formats including RIS, CSV, TSV, Excel, RSS, and JSON.

8.1.4 Attribution to authors, journals, and publishers

Using existing processes, metadata for both USGS series publications and external publications made accessible through the USGS Publications Warehouse comply with existing Library of Congress standards for metadata encoding and release so that publications are fully attributed to the appropriate authors, journals, and publishers. The USGS will continue to use these existing processes to meet this requirement and implement improved mechanisms as they evolve.

8.1.5 Unauthorized Distribution

The USGS Publications Warehouse does not provide a feature that enables mass downloading of multiple publication files, which assists in limiting unauthorized distribution.

8.1.6 Archiving

USGS series publications are currently stored as Section 508-compliant downloadable files from a system that is both replicated and accessible. The text and associated data for USGS series publications are currently stored in nonproprietary formats requiring no specialized software for access. The USGS Publications Warehouse (<https://pubs.er.usgs.gov/>) is the official online resource that provides access to USGS-authored and-funded publications. The online database provides for long-term preservation and access to the content without charge to the public. Publications in the Publication Warehouse are covered by the USGS Records Disposition Schedule. Therefore, the publications and metadata are retained at the National Archives according to NARA's requirements for federal records retention and disposition.

Bibliographic metadata and the digital contents of USGS series publications have been Section 508-compliant since 2001. Access to bibliographic metadata and the digital content of USGS series publications is provided using formats and digital services that are standard within the library and online access community. The USGS will continue to improve integration and interoperability across the Federal community through consultation with the scientific community and with other Federal agencies and facilitate the establishment of best practices and standards for identification, description and citation of resources, terms of use, information exchange, data integration, and trusted repositories.

9.0 Objectives for Maximizing Public Access to Digital Scientific Data

The USGS provides online public access to final quality-controlled data which have been approved for release and produced by its research and monitoring/observation programs through digital downloads and more robust digital service capabilities. Some data, such as records collected by the national streamgauge network, are provided in near real-time. All USGS-created or USGS-funded data approved for release are publicly accessible and free except for cases where restrictions must be applied because of security, privacy, confidentiality, and other legal constraints.

USGS data collected under confidentiality or proprietary agreements are managed separately. Classified data are not released to the public. All released data are compliant with appropriate safeguards under the Federal Information Security Management Act, the Privacy Act, and other authorities and thereby protect confidentiality and personal privacy, recognize proprietary interests, business confidential information, and intellectual property rights and thus avoid significant negative impact on intellectual property rights, innovation, and U.S. competitiveness. In addition, every reasonable attempt is made to assure that released data are stored in a manner that supports downstream information processing and dissemination activities by using machine-readable and open formats, data standards, and complete metadata.

The USGS will continue to work extensively with the private sector to develop and employ innovative ways of distributing data. The USGS remains responsible as a primary point of interface with its data but works with many partners to ensure broad distribution.

9.1 Timely digital access to data

Search, discovery, and access to all data subject to this plan will be provided by the USGS Science Data Catalog. The USGS Science Data Catalog represents the authoritative source for discovery of digital data produced or funded by the USGS, thus all metadata describing scientific data are indexed in the USGS Science Data Catalog. The Science Data Catalog shall be given a prominent access point on the USGS website (<https://www.usgs.gov>) to ensure the public are aware of a USGS global search available for scientific data. The USGS relies upon the Science Data Catalog to facilitate discovery of and provide access to digital data resulting from its funded research. This resource provides metadata in standard formats and uses methods that conform to established industry standards. With the creation of the USGS Science Data Catalog in 2013, USGS data are made available free in compliance with Federal Open Data standards, policies, and practices (as described in Obama, 2013 and Burwell et al., 2013). As a result, the ability of the public to locate and access USGS data improved greatly.

9.1.1 Metadata associated with data

Metadata associated with USGS data products are released free to the public through the USGS Science Data Catalog coincident with or before the publication dependent on those data or upon the conclusion of a project, or in a timely manner as documented in the data management plan, for data not associated with a scholarly publication.

The USGS continues to invest in new data documentation methodologies and formats that enhance the usability of metadata. This includes planning and guidance for international standards for metadata standards endorsed by the Federal Geographic Data Committee and improving practices for creating robust metadata associated with digital object identifiers for data. Metadata for data include the date of publication, all author and co-author names and identifiers, author affiliations, the digital object identifier assigned to the data product, restrictions or limitations on data access and use, and references to other digital persistent identifiers, as appropriate. By the effective date of this plan, USGS will also include sources of funding in metadata for data.

9.2 Data management plans (DMPs)

USGS FSP require DMPs as part of all research conducted or funded by the USGS, including such details that pertain to data acquisition and management. The purpose of the DMP is to ensure researchers using USGS funding meet USGS and Federal policies related to data and information management. Prior to initiating research, intra- or extramural, approved DMPs must identify appropriate methods for digital data management, data release, and appropriate preservation in accordance with the USGS Records Disposition Schedules. The DMPs must also address making data available in appropriate long-term repositories (refer to section 9.6) and stress the importance of non-proprietary, open formats for improved accessibility. Currently, USGS-funded data approved for release require, in all cases, preservation and access.

To further clarify the obligations of extramural researchers, extramural funding agreements with USGS include language requiring DMPs for all USGS funded research. Both intramural and extramural DMPs describe how to maximize access while protecting privacy, confidentiality, sensitivity, and proprietary and intellectual property rights, and balance the value of long-term preservation and access with the associated cost and administrative burden. This current language in extramural funding agreements related to required DMPs is similar to that used by the National Science Foundation (NSF) in its grants process. Existing funding agreement language is elucidated below in section 10 Metrics, Compliance and Evaluation, which requires a copy of any publication and data be provided to the USGS.

9.3 Data management costs

USGS FSP policy on data management requires estimation and inclusion of appropriate data management and release costs in the plans and clarification of management functions and responsibilities at various levels in the organization across the variety of data types and repositories. Researchers are allowed to include reasonable costs associated with submission, curation, management of data, and special handling instructions in research budgets. USGS will

develop criteria to assist repositories in assessing the continued value, usability, and relevance of data to scientific investigations to inform long-term preservation and accessibility.

9.4 Evaluation of data management plans

USGS FSP policy describes processes for evaluating data management plans in the overall research review process. By the effective date of this plan, these processes will be elucidated at the USGS Data Management Website and detailed guidance will be provided in the form of explanatory text and checklists to ensure appropriate evaluation of the merits of submitted data management plans by research proposal reviewers.

9.5 Data management compliance

Current USGS FSP policies ensure compliance by USGS intramural staff scientists with their approved data management plans through review of project plans. Awardees and other federally funded researchers are informed of their obligations to meet similar data management requirements during the planning process and as part of the award language (refer to 9.1.2 above). Compliance for awardees and other federal funding researchers is and will continue to be ensured through progress reporting as required in the funding agreement and the Financial Assistance Monitoring Protocol used by USGS pursuant to 2 CFR 200.205(c)(3). Starting in January 2016, USGS began reporting such recipients to Federal Awardee Performance and Integrity Information System (FAPIIS) as required by 2 CFR 200.212. Funds are withheld if an awardee is in noncompliance.

9.6 Data repositories and databases

The USGS has a long history of making data publicly accessible and usable by building and releasing integrated databases and robust data systems that promote the deposit of data in publicly accessible databases. Examples range from the longstanding access to robust water resources data via the [National Water Information System](#) (NWIS) to integrated databases that distribute value-added data products such as Protected Areas Data of the United States (PADUS), the official national inventory of U.S. terrestrial and marine protected areas. The developers of these types of systems have or are establishing clear policies and workflows for continuous contributions of appropriate new data. USGS has employed a Trusted Digital Repository (TDR) certification process that is in alignment with the Core Trust Seal, which established international criteria for trusted digital repositories, and in compliance with USGS FSP. The Bureau has certified multiple USGS repositories as TDRs such as ScienceBase and the USGS Alaska Science Center Data Repository. USGS will ensure that USGS TDRs align with the National Science and Technology Council (NSTC) “Desirable Characteristics of Data Repositories for Federally Funded Research.” All intramural data acquired with USGS funds must be stored and managed in one of the USGS TDRs or stored and managed by other acceptable repositories that meet USGS criteria. All data acquired by USGS funded extramural scientists are stored and managed in accordance with the data management plan that is part of the research proposal. All USGS funded data are cataloged in the USGS Science Data Catalog (see section 9.1). In instances where the USGS collects digital data resulting from supported research, additional requirements for data management may be necessary to ensure compliance with the

requirements of the Open Data Policy and Evidence-Based Policymaking Act (Public Law 115-435).

9.7 Public-private collaboration

The USGS actively participates and will continue to participate in collaborative forums with the private sector focusing on improving discovery, access, and use of USGS and other Federal data assets. Some specific partnerships include Environmental Systems Research Institute (ESRI), Google, the [Federation of Earth Science Information Partners \(ESIP\)](#), the National Science Foundation [EarthCube](#) initiative, and the USGS [Community for Data Integration \(CDI\)](#). These opportunities have resulted in creative problem solving to make USGS data available in more relevant and viable ways.

The USGS encourages public-private collaboration by allowing third parties to easily harvest metadata records and links from the USGS Science Data Catalog and USGS repositories, such as ScienceBase, that may then be used in external discovery and repository systems. The USGS provides multiple options for accessing and extracting metadata records including via machine Application Programming Interfaces (API). As a digital object identifier assigning authority, the USGS collaborates with DataCite for issuing unique digital object identifiers for data.

The USGS is actively examining shared cost models, budget initiatives, new partnerships, and other mechanisms to ensure adequate funding for data infrastructure. The USGS is working to identify and implement technical and management efficiencies in its cyberinfrastructure across underlying systems – Publications Warehouse, Science Data Catalog, ScienceBase, Cloud Hosting Solutions, and other Program-level data facilities – to help in applying more resources to data and information management and curation. However, efficiency gains alone will not be sufficient to accommodate the many new data resources that have not been previously managed and distributed to the level and methods needed to support public access, nor will they be sufficient to adequately support new approaches for managing and releasing USGS series publications.

The USGS will continue, as it has always done, to identify additional approaches involving both public and private sector entities to expand and improve public access to its science information and data. Using existing systems and relationships with other Departments and Agencies as models, the USGS will explore the development of a research data commons, a federated system of research databases for storage, discoverability, and reuse of data, with a particular focus on making the data underlying the conclusions of peer-reviewed scholarly publications resulting from federally funded scientific research available for free at the time of publication.

9.8 Attribution in scientific datasets

To provide appropriate attribution for data, data are linked to a corresponding publication by reference to the publication's Crossref digital object identifier in the FGDC-complaint metadata for the dataset and on the landing page of the data repository. In return, publications are linked to the data by the data's DataCite digital object identifier, which is displayed on the Publications

Warehouse landing page for the publication and is included in the publication's citations. This linkage is illustrated in figure 1.

9.9 Training, education, and workforce development

Currently the publicly available [USGS Data Management website](#) provides extensive training and educational materials related to data management, analysis, storage, preservation, and stewardship to USGS scientists and outside funded investigators, as well as other interested parties. The [USGS FSP website](#) provides further guidance and training specific to USGS scientists. In addition, the USGS relies heavily on informal networks throughout the organization where scientific best practices are generally tested and developed such as the USGS Community for Data Integration (CDI). Through community of practice activities including the USGS CDI and partnerships with the Federation for Earth Science Information Partners, along with several formalized training programs such as CDI Carpentries Workshops, quarterly webinars on data release process in ScienceBase, and FSP training led by the USGS Bureau Approving Officials, the USGS is committed to developing a workforce knowledgeable in the application of data management policies and practices.

9.10 Data preservation

USGS has policy that addresses its [digital data preservation requirements](#). The USGS also conducts a [National Geological and Geophysical Data Preservation Program](#) in collaboration with State Geological Surveys and other Department of the Interior Bureaus for physical geoscience data and materials (e.g., rock cores, samples, paper records, etc.) as well as other data preservation activities for specific collections and data assets. Programs that conduct data rescue and preservation activities constantly weigh the relative costs and benefits of preserving these resources on the basis of current research needs and public demand for them. Metadata record development resulting from inventories of non-public scientific data and physical (not digitally accessible) artifacts will make more assets discoverable in the USGS Science Data Catalog and will help set priorities for digitization and other preservation actions.

10.0 Metrics, Compliance and Evaluation

Increasing access to scholarly publications and data is a responsibility shared by all USGS employees and as stated in the various [FSP and related policies](#). It is the responsibility of authors and data producers under these policies to ensure that the products they develop are valid and robust. It is the responsibility of the Bureau to establish policy requirements and procedures that ensure scientific quality and integrity of the Bureau's products as indemnified in the directives established in the USGS Survey Manual (SM). Requirements for these actions are embodied in the SM chapters and instructional memoranda. It is the responsibility of USGS technology professionals to continually enhance the discoverability, accessibility, and usability of the Bureau's scholarly publications and data. Compliance to these requirements can be measured and evaluated for continuous improvement.

All Federal financial assistance awards must adhere to the OMB Administrative Requirements and Cost Principles as identified in [OMB 12/26/2013 Omni Circular](#). These Federal regulations

are currently incorporated by reference in all USGS awards, which also require extramural funded researchers to provide copies of their related publications and data to the agency. Compliance with this requirement will be overseen by the USGS Office of Acquisition and Grants.

In addition, compliance is ensured through progress reporting as required in the funding agreement and the Financial Assistance Monitoring Protocol used by USGS pursuant to 2 CFR § 200.205(c)(3). Starting in January 2016, USGS has required reporting such recipients to the FAPIIS as required by 2 CFR § 200.212. Funds are withheld if an awardee is in noncompliance. Upon request, USGS will report to OSTP on the status of this plan and policy implementation, including the number of all scholarly publications and data funded by the USGS.

11.0 Engagement with Tribal Governments, Outside Organizations, Interagency Coordination, & the Public

USGS engages with federally recognized Tribes both formally (such as during government-to-government consultation in accordance with SM 500.6) and informally (such as during technical training or educational events) to identify Tribal scientific data needs. Researchers are encouraged to discuss plans for Tribal engagement with their Regional Tribal Liaison or Mission Area Tribal Advisors.

The Bureau also engages with various outside organizations and the public in a variety of ways, including the co-sponsoring and planning meetings open to the public, national conferences, and community listening sessions on topics such as public access and open data. Stakeholders at these meetings include libraries, publishers, users of federally funded research results, civil society groups, federally funded researchers, and universities.

The USGS is an active participant in OSTP-sponsored interagency working groups on public access and related activities. This includes the OSTP Subcommittee on Open Science and associated working groups, where USGS collaborates with other Federal agencies on policy and implementation to make Federal publications and data more widely accessible to the public. It also includes interagency coordination with the Federation of Earth Science Information Partners (ESIP), the National Science Foundation EarthCube initiative, and the USGS Community for Data Integration (CDI). The USGS also conducts a National Geological and Geophysical Data Preservation Program in collaboration with State Geological Surveys and other Interior Bureaus for physical geoscience data and materials (e.g., rock cores, samples, paper records, etc.) as well as other data preservation activities for specific collections and data assets.

12.0 Public Notice

The USGS does not intend to publish this Plan for public notice/comment in the Federal Register. This plan will be posted publicly on the USGS Office of Science Quality and Integrity website and a link to the plan will be included on the Interior Open Government Web page.

13.0 Timeline for Implementation

All policies, practices, and technologies necessary to meet the objectives outlined in this plan are in place now. Most requirements identified in this plan are currently in place, those requirements identified in this plan as not currently in place will be operational by the effective date. The effective date for full implementation of this plan is December 31, 2025.

14.0 Resources

The OSTP memorandum calls for the “identification of resources within the existing agency budget to implement the plan”. Both budget and personnel resources will be needed to implement this USGS Plan, and the lack of identified resources is a critical risk. The long-established tradition of public access to USGS scholarly publications and data as well as the activities underway to improve policies, practices, and technologies will support successful implementation of this Plan; however, significant Bureau-wide resources will be necessary to support the increased number of datasets being placed in Bureau repositories and to make scholarly publications publicly accessible with no embargo period. Many elements of this plan are in place, operational, and using existing funding, while other aspects of this plan, such as expansion of digital archives and repositories and modification of IPDS input and output mechanisms and workflows, will require additional resources beyond those currently committed in related budgets. Overall funding needs and priorities for implementation will be reflected in future budget submissions. This Plan is not a budget document and does not imply support of approval of any specific action or investment.

15.0 Risks

The USGS identifies several risks that may hinder execution of this plan:

- Lack of identified resources or lack of cohesion and coordination of resources across organizational units within the USGS.
- Lack of adequately funded, and fully curated, trusted Bureau-level data repositories.

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Appendix A -- Summary of USGS Survey Manual (SM) Policies Relating to Public Access and Open Data

Policy	SM No.	Purpose and Scope
Fundamental Science Practices: Foundation Policy	SM 502.1	"The scientific reputation of the U.S. Geological Survey (USGS) for excellence, integrity, and objectivity is one of the Bureau's most important assets. This reputation for reliable science brings authority to data and findings, creates and protects long-term credibility, and ensures that the public trust is met. This chapter provides the foundation for a set of fundamental principles that are detailed in accompanying policy chapters. These principles collectively are USGS Fundamental Science Practices (FSP) that underlie USGS science activities, uphold the Bureau's scientific reputation, and underscore its mandate to provide reliable science to address pressing societal issues. The FSP also promote the broad release and communication of results of USGS science activities in information products (SM 1100.1). This policy applies to all employees and science activities funded by the USGS."
Fundamental Science Practices: Planning and Conducting Data Collection and Research	SM 502.2	"The USGS has a legacy as the producer of long-term datasets for multiple uses, many of which are geographically extensive. Part of the value of these datasets is dependent on USGS scientists describing and documenting the methods used to collect data and making these data accessible in information products. Proper documentation (including appropriate metadata) and broad dissemination ensure that USGS data and research can be interpreted appropriately, meet the highest scientific standards of excellence, and can be used broadly by the scientific community. This chapter updates the Fundamental Science Practices (FSP) policy for planning and conducting data collection and research to ensure that scientific goals are achievable and are appropriate to the mission of the USGS; the proposed methods have a reasonable likelihood of achieving the desired results; and where appropriate, methods conform to accepted standards and procedures."

Policy	SM No.	Purpose and Scope
Fundamental Science Practices: Peer Review	SM 502.3	"Peer review, as a cornerstone of scientific practice, validates and ensures the quality of published USGS science. This policy updates the Fundamental Science Practices (FSP) requirements for peer review of USGS information products and applies to all USGS scientific and technical information, whether published by the USGS or an outside entity."
Fundamental Science Practices: Review, Approval, and Release of Information Products	SM 502.4	"As a public agency, the U.S. Geological Survey (USGS) has a responsibility to make the results of its scientific investigations widely available to the public in the form of timely, technically sound, and professionally presented information products. USGS scientists are encouraged to publish their data and findings in ways that contribute to the most effective release of USGS science and best enhance the Bureau's reputation for reliable science. This chapter provides the requirements and responsibilities for the appropriate review and approval of information products prior to release. This policy applies to all Bureau science information products (SM 1100.1), whether they are published by the USGS or an outside entity. The following information products are excluded from this policy: news releases, letters to the editor (not to scientific journals), and opinion pieces or op-eds; poster sessions and presentation materials used as single-use representation of USGS work at scientific meetings, briefings, conferences, and hearing testimony; real-time hazards data and alerts; and satellite data."
Fundamental Science Practices: Safeguarding Unpublished U.S. Geological Survey Data, Information, and Associated Scientific Materials	SM 502.5	"This chapter provides the requirements for safeguarding unpublished U.S. Geological Survey (USGS) science data and information, including unpublished deliberative and predecisional information, proprietary data and information, nonproprietary USGS data and information, and associated scientific materials (for example, physical samples). The term "unpublished" in this chapter refers to draft, interim, or background information and materials developed or collected and used to finalize USGS information products for approval and release."
Fundamental Science Practices: Scientific Data Management Foundation	SM 502.6	"This chapter establishes the Bureau's overarching scientific data management requirements on the basis of a data lifecycle model. The model offers a high-level view of USGS data collection, data handling, and data dissemination activities."

Policy	SM No.	Purpose and Scope
Fundamental Science Practices: Metadata for Scientific Data, Software, and Other Information Products	SM 502.7	"This chapter provides the metadata requirements for U.S. Geological Survey (USGS) scientific information products (includes USGS series publications and outside scholarly publications such as journal articles) and scientific data (includes data in datasets and databases) that are Bureau-approved for release. This chapter also provides guidance for complying with appropriate USGS and other Federal standards, such as the metadata standards endorsed by the Federal Geographic Data Committee (FGDC), the interagency committee that provides metadata guidance for all Federal Government scientific data."
Fundamental Science Practices: Review and Approval of Scientific Data for Release	SM 502.8	" This chapter provides requirements and procedures for review and approval of U.S. Geological Survey (USGS) scientific data prior to release. This chapter applies to all USGS approved scientific data and preliminary scientific data that are released to the public. These data include, but are not limited to geospatial and non-geospatial data that are made available in datasets, databases, and data services; data associated with other information product publications; model outputs and derived products; and data from other sources that are subsequently made part of a USGS dataset, database, or data service."
Fundamental Science Practices: Preservation Requirements for Digital Scientific Data	SM 502.9	"This chapter provides requirements and procedures to ensure the preservation of all U.S. Geological Survey (USGS) digital scientific data and associated metadata. Preservation requirements for other scientific information products, nondigital data, paper records containing data or descriptions of data, or physical samples are addressed in other SM chapters.."
Fundamental Science Practices: USGS Authorship of Scientific Information Products	SM 502.10	"U.S. Geological Survey (USGS) authorship provides credit and assigns responsibility to those who create content for scientific information products. This policy provides requirements and guidance for those who are involved in the preparation and release of USGS scientific information products. The policy applies to all scientific information products (including data releases and software releases) published by the Bureau and by outside entities when authors of these products use their USGS affiliation."
Authority to Approve Information Products	SM 205.18	"This chapter updates the delegations of authority to approve various U.S. Geological Survey (USGS) science and other

Policy	SM No.	Purpose and Scope
		information products for release (refer to SM 1100.1 and SM 500.5)."
Publishing: Information Product Planning	SM 1100.1	"This chapter establishes policy for information product planning. Each information producer of the U.S. Geological Survey (USGS) must develop and adhere to information product plans. The topics to be addressed in a typical plan are described in general terms. This policy applies to all USGS Disciplines, Offices, and activities and all scientific, educational, and outreach information products of the USGS, with the following exclusions: immediate-turnaround, time-sensitive products (e.g., news releases, letters to the editor, and op-eds) and brief or single-use representations of USGS work (e.g., poster session and informal meeting materials). This policy is to be referred to when planning, reviewing, and executing each information product."
Publishing: U.S. Geological Survey Publication Series	SM 1100.3	This SM chapter describes the USGS publication series used to release the results of the Bureau's scientific research projects.
Publishing: Use of Outside Publications, Including Abstracts	SM 1100.4	This chapter describes the use of outside publications including abstracts, which are appropriate venues for some U.S. Geological Survey (USGS) information products.
Scientific Integrity	SM 500.25	"This SM chapter updates the USGS scientific integrity policy (including the scientific code of conduct and procedures for reporting, investigating, and adjudicating allegations of scientific misconduct) and provides guidance for implementing and complying with the Department of the Interior (DOI), Departmental Manual (DM) chapter 305 DM 3, Integrity of Scientific and Scholarly Activities, the Scientific Integrity Procedures Handbook, and the Handbook Appendices. USGS Fundamental Science Practices (FSP) requirements partially implement this chapter and support the scientific integrity of USGS activities. This SM chapter applies to all USGS employees, including political appointees (hereafter employees) and volunteers, including emeriti, when they use, engage in, supervise, manage, or influence scientific activities in making and supporting DOI and Bureau policies, management, and regulatory decisions or when they publicly communicate information about scientific activities. Contractors, cooperators, partners, permittees, lessees, grantees, and other outside parties who assist with developing or applying the results of scientific and scholarly

Policy	SM No.	Purpose and Scope
		activities must comply with the principles contained within this chapter and 305 DM 3 (Section 3.10)."
Integrity of Scientific and Scholarly Activities	305 DM 3	"This chapter provides policy to guide and ensure the integrity of science and scientific products developed and used by the Department. The policy and requirements in this chapter apply to all Department of the Interior (DOI) employees, including political appointees (hereafter employees)."

Appendix B -- List of Abbreviations

CDI	USGS Community for Data Integration
CSDGM	Content Standard for Digital Geospatial Metadata
CHORUS	Clearinghouse for the Open Research of the United States
DMP	Data Management Plan
ESIP	Federation of Earth Science Information Partners
FGDC	Federal Geospatial Data Committee
FSP	Fundamental Science Practices
FSPAC	Fundamental Science Practices Advisory Council
FY	Fiscal Year
MODS	Metadata Object Description Service
NARA	National Archives and Records Administration
IM	USGS Instructional Memorandum
IPDS	Information Product Data System
ISO	International Organization for Standardization
JATS	Journal Article Tag Suite
OAG	Office of Acquisition and Grants (USGS)
OMB	Office of Management and Budget
OSQI	Office of Science Quality and Integrity (USGS)
OSTP	Office of Science and Technology Policy
PDF	Portable Document Format
R&D	Research and Development
RSS	Rich Site Summary/Really Simple Syndication
SM	U.S. Geological Survey Manual
SPN	Science Publishing Network
USGS	U.S. Geological Survey
VoR	Version of Record
XML	Extensible Markup Language