

Data Management Plan for Species Inventories

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Created: 04/03/2025

Updated: 07/27/2026

Mission

Species inventories are conducted within the Inventory and Assessment Program (I&A). I&A ensures that all data products are Findable, Accessible, Interoperable, and Reusable ([FAIR](#)), while safeguarding sensitive information and complying with relevant [laws](#) and [policy](#). Our mission is to provide high-quality, open data that supports scientific research, informed decision-making, and long-term stewardship of natural and cultural resources.

The scope of this document is for projects pertaining to species observations.

Goals

- Collect new data on species occurrence, abundance, or distribution to inform park management decisions and planning.
- Publish data in open, machine-readable formats to support transparency and repeatable science, as required under Title II of the Foundations for Evidence-Based Policymaking Act of 2018.
- Ensure data products comply with FAIR principles to support evidence-based decision-making and meet federal standards for open data and evaluation.
- Preserve data as permanent records per National Park Service (NPS) retention policy.
- Protect sensitive species information under Freedom of Information Act (FOIA) and Controlled Unclassified Information (CUI) guidelines.

Workflow: Data Lifecycle

The Inventory Program follows a standardized workflow and preserves project materials, makes them discoverable, and ensures compliance with NPS data management best practices. The lifecycle from draft materials to public release proceeds through the following stages:

1. Project Kickoff

- Awardees are informed of required deliverables and data standards.
- All working materials, including proposals, Statements of work (formerly DIP), project notes, agreements, budgetary information, and communications are retained.
- TBD, Project drafted in [CATER](#), an internal project workspace.

2. Draft Data and Report Submission

- Awardees submit draft data in a customized dataset template before project close for review.
- Report is drafted by awardee following NPS science publication standards.

3. Quality Review

- Project managers and data scientist review draft data and report for completeness, alignment, and adherence to standards.

4. Final Data and Report Preparation

- Awardees submit corrected data.
- Metadata is created following IMD data management guidance and NPS [Data Publication Best Practices](#). Data package is created, then reviewed using this [process](#) by another team member.
- Final report revisions are completed with oversight from a member of the NPS science publication team using the [Science Report series](#).

5. Submission to NPS DataStore

- Final report, data package, and related products are drafted in the NPS DataStore using appropriate reference types.

6. Activation and DOI Registration

- Activate the DataStore reference for the report, this action publishes the project report, makes it publicly viewable, and registers its Digital Object Identifier (DOI).
- Activate the DataStore reference for the open data package, a key component for repeatable science. This step makes the package publicly viewable and registers its DOI.
- Activate the remaining deliverables and entire project reference in DataStore once both the report and data package are published and activated.
- Appropriate information is entered or linked in CATER and project set to closed. Workflow into this system TBD.

7. Public Discovery

- Activated records are discoverable in DataStore through searching and linked to related project materials.
- Connect science communication products to appropriate NPS DataStore project and ensure there is a 508 compliant version.
- Project added to the completed projects section on the main Inventory project site, [Species Inventories \(U.S. National Park Service\)](#), to improve discoverability.

8. Versioning (If Needed)

- Updates are managed through version control in NPS DataStore, preserving transparency and provenance.

Data Preservation and Access

We preserve Inventory data and make it accessible by publishing all final products in an approved NPS repository. NPS DataStore provides tools to document, manage, preserve, and share a wide range of documents, media, and datasets.

We publish the final report and open data package in NPS DataStore and assign each an NPS [Digital Object Identifier \(DOI\)](#), a persistent identifier registered with DataCite. This promotes their citation, discoverability, and compliance with [federal open data mandates](#). Even for restricted reports and datasets, metadata remains visible to ensure discoverability while safeguarding sensitive information.

We organize Inventory data packages with related information products, such as reports, scripts, photographs, and imagery into a single project reference in DataStore. This reference acts as a container that describes the project and provides a landing page where users can access all associated materials. Grouping references in a project adds rich context about the origin of the data and makes it easy for users to locate everything they need.

NPS DataStore
Integrated Resource Management Applications
Data Store-2.11.0.23805-20240206-174347

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Natural Resource Stewardship and Science

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Macroinvertebrate Inventory at Big Bend National Park

Citation Macroinvertebrate Inventory at Big Bend National Park. 2022. National Park Service

Visibility Public

Citation with All Authors Macroinvertebrate Inventory at Big Bend National Park. 2022. National Park Service

Reference Type Project (Code: 2301755)

Products Created By This Project (5)

File Count	Code	Type	Title	Year
1	2302769	Published Report	Toxicological reconnaissance of Arsenal® use along the Rio Grande River through Big Bend National Park: Final report	2024
4	2301863	Data Package	Macroinvertebrate Inventory at Big Bend National Park 2022 - Open Format Dataset	2024
2	2301879	Photograph	Macroinvertebrate Inventory at Big Bend National Park - Project Photos	2022
1	2301888	Generic Dataset	Macroinvertebrate Inventory at Big Bend National Park - Toxicology Response	2023
1	2301893	Generic Document	Macroinvertebrate Inventory at Big Bend National Park - Project Maps	2023

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Type

- Published Report
- Data Package
- Photograph
- Generic Dataset
- Generic Document

Figure 1. A Datastore reference for an Inventory project contains the published report, data package, and other related information such as photographs, maps, and scripts.

Roles and Responsibilities

- Data Scientist – Oversees data quality checks, metadata creation, repository submission, compliance and retention. Reviews data packages and metadata.

- Assistant Data Manager – Prepares all data deliverables for entry into the NPS DataStore, except the final report. Creates the data package and metadata.
- Project Managers – Ensure awardees meet deliverable requirements and timelines and ensures CATER is updated.
- Awardees – Collect, format, and deliver data according to program standards.
- Science Publication Team – ensures adherence to science report series publication standards and creates the NPS DataStore report reference.
- Regional Teams – Prioritize projects based on resource management needs.

Records Management

Species observation data and reports fall under Category A.2. Cultural and Natural Resource Management Program and Planning, which requires permanent retention because they document resource management activities essential for understanding policy and scientific outcomes (NPS 2010).

References

Baker R, Patterson J, DeVivo J (2026). *NPSdataverse: Tools and Packages for Data and Metadata Manipulation*. R package version 0.0.2. <https://github.com/DOI-NPS/NPSdataverse>.

Baker R, Patterson J (2026). *EMLEditor: View and Edit EML Metadata*. R package version 0.1.5 <https://github.com/DOI-NPS/EMLEditor>.

GBIF (2021) *Darwin Core Archives – How-to Guide, version 2.2*. Copenhagen: GBIF Secretariat. <https://ipt.gbif.org/manual/en/ipt/3.0/dwca-guide>

Goodro M (2019) To: Calvert A. Re: *Lake Mead NRA Protected Data Memo*. National Park Service <https://irma.nps.gov/DataStore/Reference/Profile/2266651>

Michener, W K (2015) *Ecological Data Sharing* Ecological Informatics, 29:33-44. <https://doi.org/10.1016/j.ecoinf.2015.06.010>.

National Park Service (2010) *National Park Service (NPS) Records Schedule Resource Management and Lands (Item 1) (schedule N1-79-08-1)*. <https://doimsp.sharepoint.com/sites/nps-ir-pim-information-management/SiteAssets/Forms/AllItems.aspx?id=%2Fsites%2Fnps%2FDir%2Dpim%2Dinformation%2Dmanagement%2FSiteAssets%2FSitePages%2FRetention%20Schedules%2FNPS%20Service%2Dwide%20Retention%20Schedule%2Epdf&parent=%2Fsites%2Fnps%2FDir%2Dpim%2Dinformation%2Dmanagement%2FSiteAssets%2FSitePages%2FRetention%20Schedules>

National Park Service Inventory and Monitoring Division (2026) *NPS DataStore Home*. National Park Service Inventory and Monitoring Division. <https://irma.nps.gov/DataStore/>

National Park Service Inventory and Monitoring Division (2026) *Simple Project Deliverable Standard for NPS Inventory Program Species Projects: Species Observation Data and Report*. National Park Service Inventory and Monitoring Division.

<https://irma.nps.gov/DataStore/Reference/Profile/2318279>

Appendix: Technical Details

- Data Standards: GBIF Darwin Core Archive format used for species occurrence data using a dataset template in Excel that contains three worksheets or tables (Event, Occurrence, and Taxon) and a standard vocabulary for transmitting information about biodiversity. Column names are clearly defined on reference pages within the workbook (NPS Inventory and Monitoring Division, 2026; [Simplified Inventories GBIF Darwin Core Archive Excel Template](#)).
- Metadata: Ecological Metadata Language (EML) encoding and generation using R tools. [Data Package Workflow](#) explains in detail how data packages are created and best practices followed. This [SOP](#) describes in detail the deliverable workflow specific to species-related projects.
- Quality Control: Checks for ISO date formats, taxonomic hierarchy, and congruence between data and metadata.
- Tools and Software: R packages (NPSdataverse, EMLeditor), SQL Server queries, DataStore API workflows. EML is generated using the R packages contained within the NPSdataverse (Baker et al. 2026; <https://github.com/DOI-NPS/NPSdataverse>)
- Handling Sensitive Data: Procedures for Threatened & Endangered species, FOIA compliance, and CUI designation. Further, most park units have a Protected Data Memo authored by the park superintendent (e.g., Goodro 2019; [DataStore - Lake Mead NRA Protected Data Memo \(nps.gov\)](#)) that lists protected species.
- High-Volume Data: Strategies for storing wildlife camera images and acoustic recordings. There is a physical storage inventory with basic information.
- Future-Proofing: Continuous improvement through feedback and evolving standards. Integration with emerging technologies (e.g., APIs, machine-readable metadata)