Laurie Porth

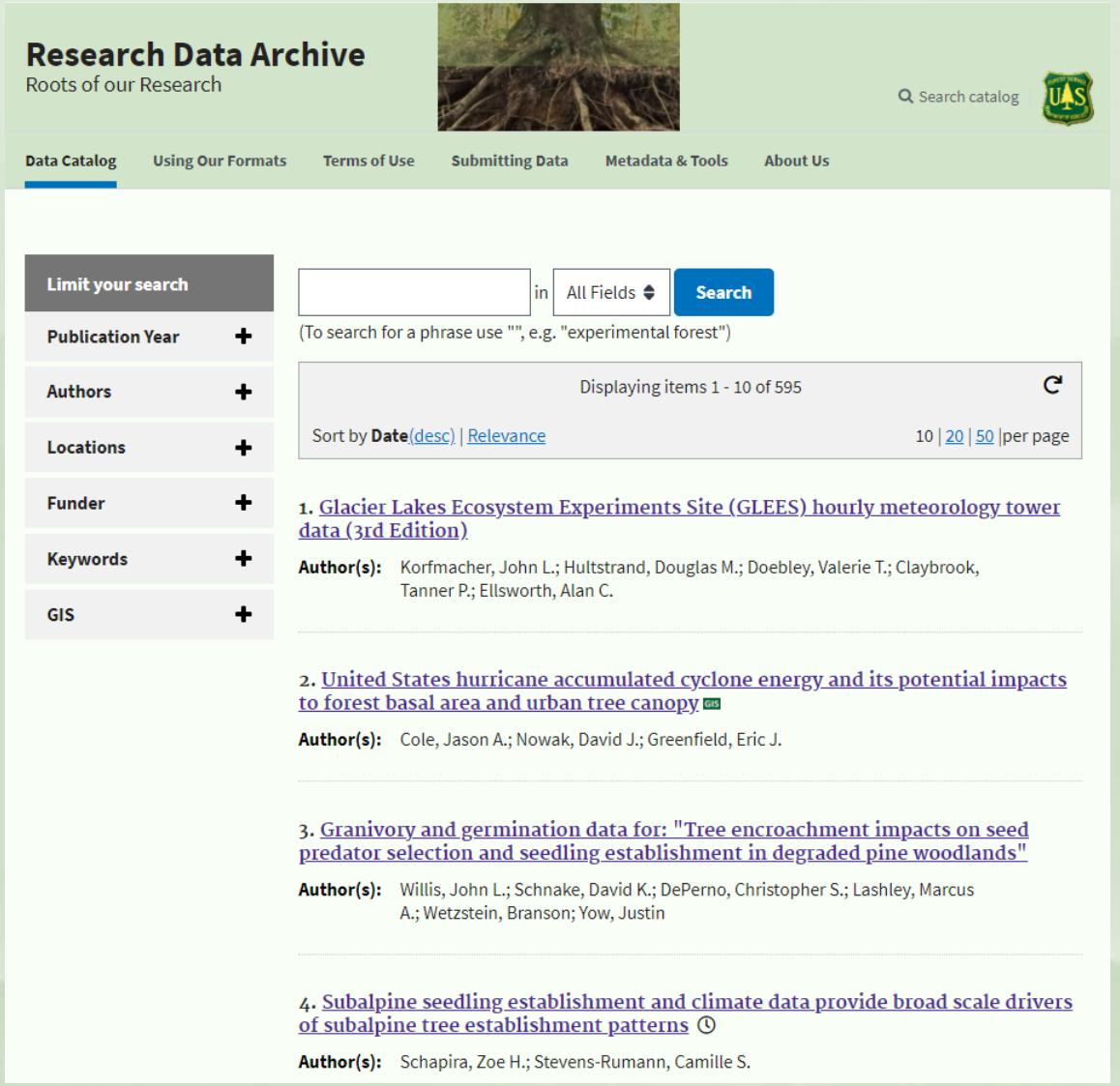
FS RESEARCH DATA ARCHIVE

Making data discoverable, accessible, and usable

Forest Service Research Data Archive (FS-RDA)

www.fs.usda.gov/rds/archive

- Purpose
  - Publish digital research data funded by
    - FS Research & Development
    - Joint Fire Science Program
    - APHIS National Wildlife Research Center
- What we publish
  - Long-term research data
  - Data from specific studies
  - Supplements to FS publications
  - Image libraries



What we will cover

- How to find and obtain data from the FS-RDA
- How to prepare files for submission to the FS-RDA
- How to submit and publish data in the FS-RDA

How to find and obtain data in the FS-RDA

Step 1: Go to Data Catalog

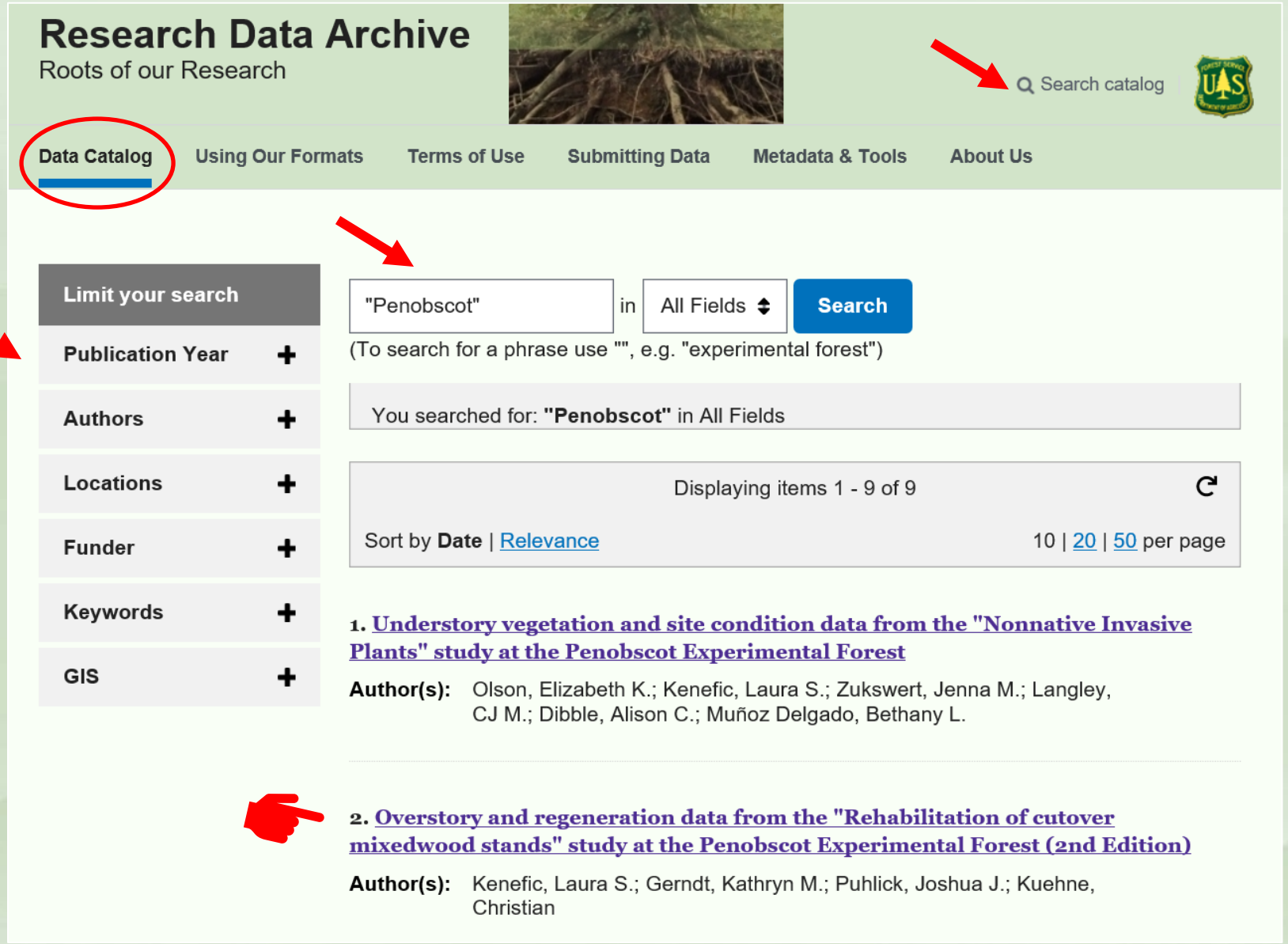
Step 2: Limit your search

OR

Do your own search

Step 3: Click on data pub title of interest

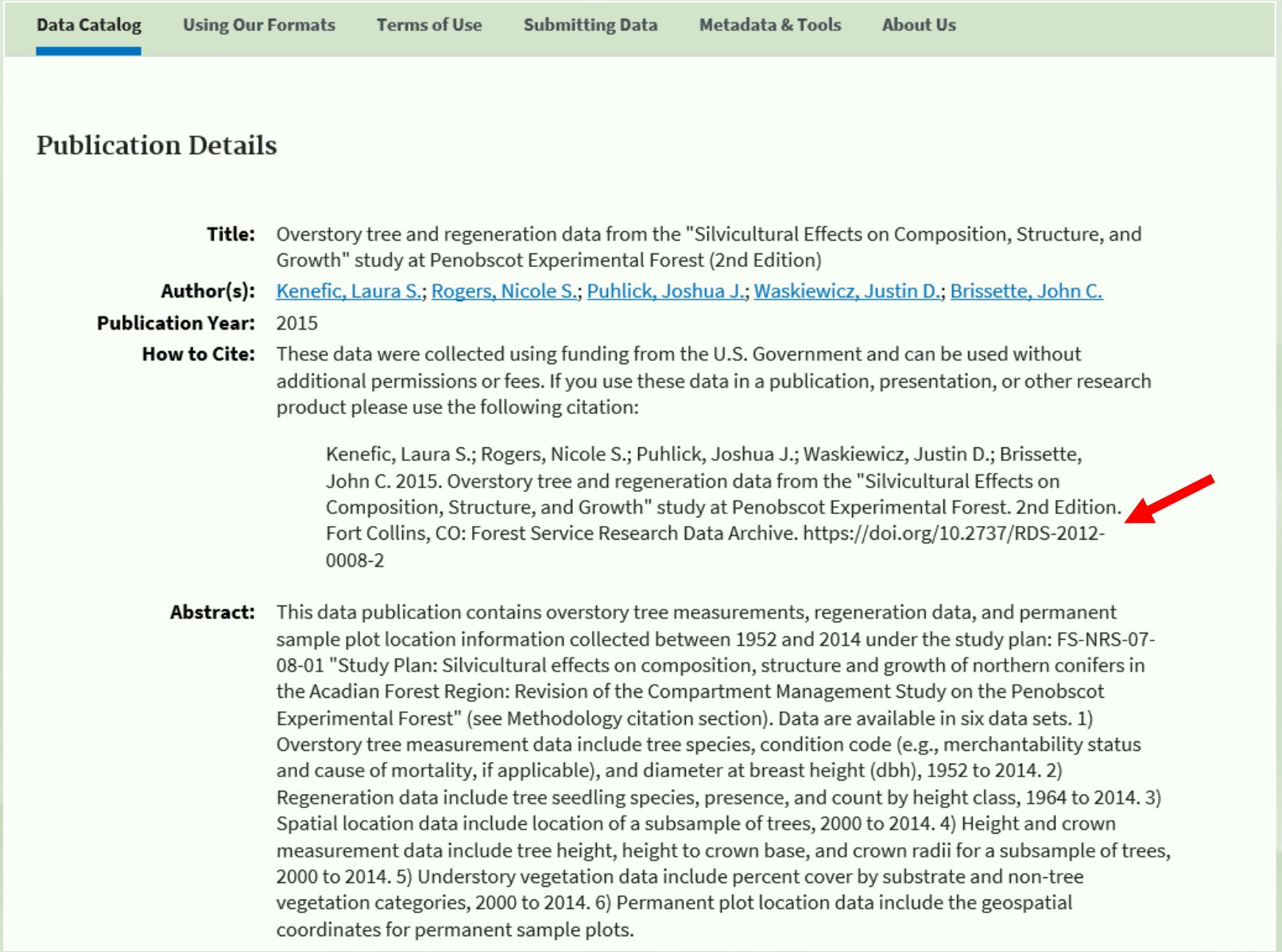
Making data discoverable…



How to find and obtain data in the FS-RDA

Step 4: View publication details & citation info

*Note: We assign DOIs to **internal** data publications, which also helps meet journal requirements.*

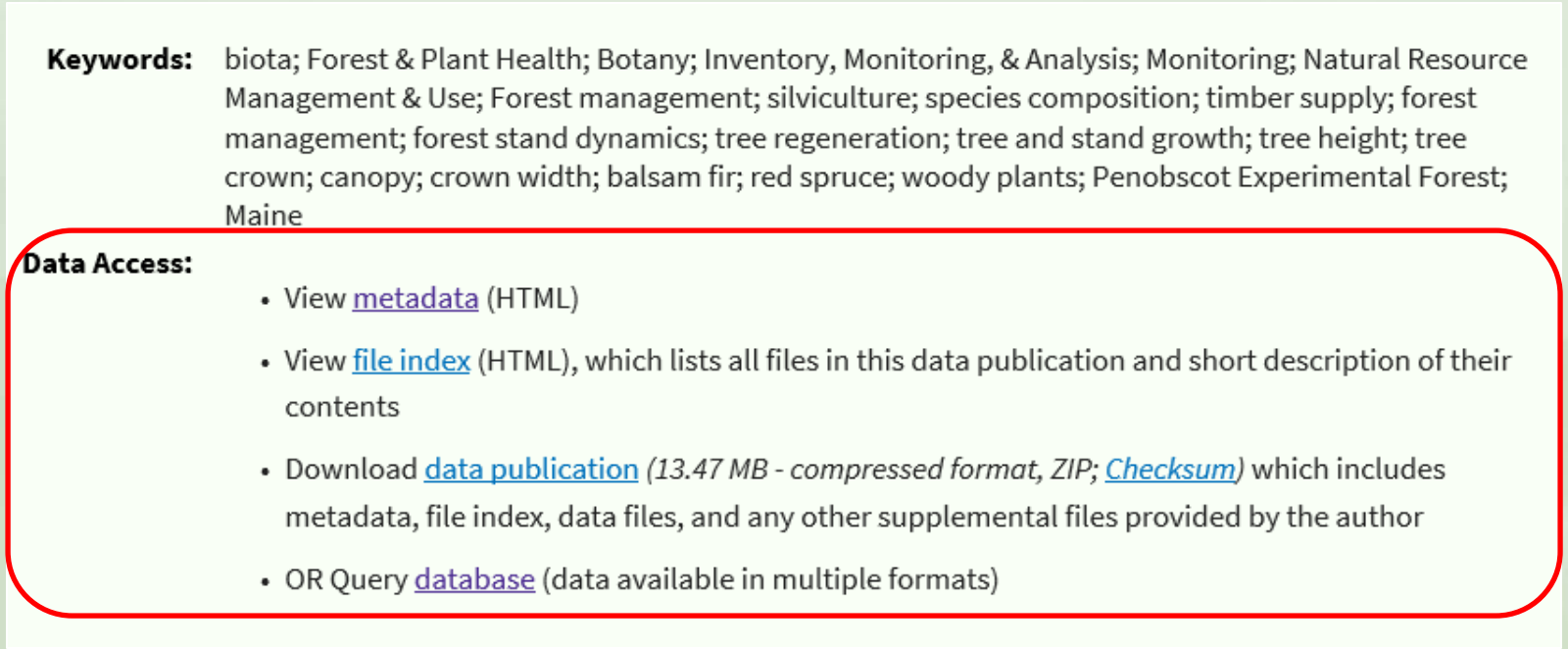


How to find and obtain data in the FS-RDA

Step 5: View documentation

Step 6: Download data - multiple options available

- Zip file (most common)
- Query database
- Image library (new)
- External repository



Keywords: biota; Forest & Plant Health; Botany; Inventory, Monitoring, & Analysis; Monitoring; Natural Resource Management & Use; Forest management; silviculture; species composition; timber supply; forest management; forest stand dynamics; tree regeneration; tree and stand growth; tree height; tree crown; canopy; crown width; balsam fir; red spruce; woody plants; Penobscot Experimental Forest; Maine

Data Access:

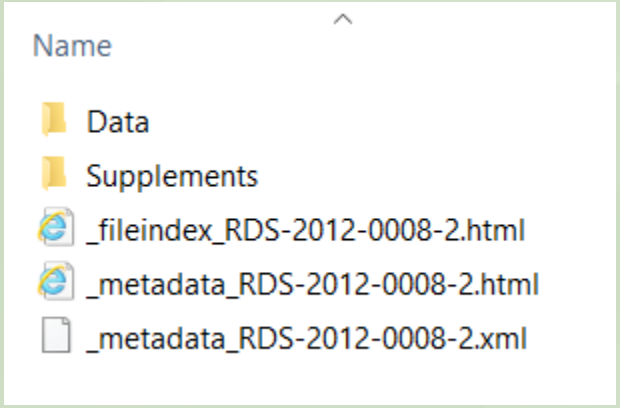
- View metadata (HTML)
- View file index (HTML), which lists all files in this data publication and short description of their contents
- Download data publication *(13.47 MB - compressed format, ZIP; Checksum)* which includes metadata, file index, data files, and any other supplemental files provided by the author
- OR Query database (data available in multiple formats)

Note: Download options are specific to each data publication.

Making data accessible…

Example 1: Zip file

Download and unzip file



Fileindex explains contents

Overstory tree and regeneration data from the "Silvicultural Effects on Composition, Structure, and Growth" study at Penobscot Experimental Forest (2nd Edition)

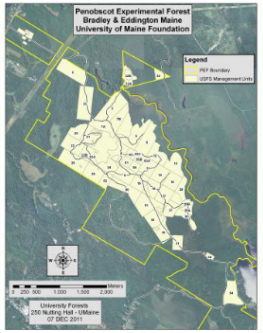
Research Data Product File Index

File	Folder	Description
_metadata_RDS-2012-0008-2.html		Metadata file in HTML format containing a description of the content, quality, and other characteristics of the data.
_metadata_RDS-2012-0008-2.xml		Metadata file in Extensible Markup Language (XML) format containing a description of the content, quality, and other characteristics of the data.
PEF_CompartmentStudy_HeightCrownData.csv	\Data	Comma-delimited ASCII text file containing height and crown measurements for a subsample of USFS CFI plots, collected from 2000 through 2014.
PEF_CompartmentStudy_PlotLocationsData.csv	\Data	Comma-delimited ASCII text file containing permanent sample plot location information.
PEF_CompartmentStudy_RegenerationData.csv	\Data	Comma-delimited ASCII text file containing plot regeneration data from 1964 through 2014.
PEF_CompartmentStudy_SpatialTreeLocationsData.csv	\Data	Comma-delimited ASCII text file containing tree location data in relation to plot center from 2000 through 2014.
PEF_CompartmentStudy_TreeData.csv	\Data	Comma-delimited ASCII text file containing live tree data from 1952 through 2014, mortality data from 1959 through 2014, and deadwood data from 1996 through 2014.
PEF_CompartmentStudy_UnderstoryVegData.csv	\Data	Comma-delimited ASCII text file containing the understory vegetation data collected from 2000 through 2014.
PEF_CompartmentStudy_ActivityDates_INV_REGEN.csv	\Supplements	Comma-delimited ASCII text file containing numbers and dates of regeneration inventories in each management unit (MU) in the compartment management study (CMS).
PEF_CompartmentStudy_ActivityDates_INV_TREE.csv	\Supplements	Comma-delimited ASCII text file containing numbers and dates of tree inventories in each management unit (MU) in the compartment management study (CMS).
PEF_CompartmentStudy_ActivityDates_TRMT.csv	\Supplements	Comma-delimited ASCII text file containing numbers and dates of treatments in each management unit (MU) in the compartment management study (CMS).
PEF_CompartmentStudy_DatabaseChangesV1toV2.pdf	\Supplements	Adobe Acrobat PDF\a file containing a list of changes between the previously published compartment study database and the current compartment study database.
PEF_CompartmentStudy_Kcodes.pdf	\Supplements	Adobe Acrobat PDF\a file containing descriptions of tree condition codes.
PEF_CompartmentStudy_Map.jpg	\Supplements	JPEG file containing an image showing the location of management units in the Penobscot Experimental Forest Silvicultural Study.
PEF_CompartmentStudy_MUdesc.pdf	\Supplements	Adobe Acrobat PDF\a file containing descriptions of management units.

Example 2: Query Database

Penobscot Research Data

Introduction



The mission of the Penobscot Experimental Forest (PEF) is to afford a setting for long-term research conducted cooperatively by USDA Forest Service scientists, university researchers, and professional forest managers in Maine; to enhance forestry education of students and the public; and to demonstrate how the timber needs of society are met from a working forest. Though owned by the University of Maine Foundation, the PEF has been a Forest Service experimental forest since 1950. Today the PEF is the site of a number of collaborative research programs.

Located 15 km north of Bangor, Maine, the PEF is in the Acadian Forest, a region covering much of Atlantic Canada and adjacent Maine. An ecotone between boreal and broadleaf biomes, the region is dominated by mixed conifers. Red spruce is the signature species of the Acadian Forest.

More information can be found on the Penobscot EF website.

Data Description

Scientific studies on the PEF have traditionally been focused on management of mixed conifer stands for timber. Over the past 30 years, research was broadened to include fundamental studies of tree growth and maturation, wildlife habitat, spruce budworm predation, biodiversity, root structure and function, coarse woody material, economics, and growth and yield modeling, among other topics. The long-term silvicultural experiment that is the basis for most of the Forest Service's research on the PEF includes 10 replicated treatments representing a range of even- and uneven-aged prescriptions: clearcutting, variants of shelterwood, selection with three cutting cycles,

Penobscot > Silvicultural study

Silvicultural study

The data sets available for query/download are displayed below.
If you click the "Metadata" button, a new window will open that displays the metadata for that data set.
If you click the "Query/Download" button, you can extract all or a subset of the data and download it.

Height and crown	Metadata	Query/Download
Plot locations	Metadata	Query/Download
Regeneration	Metadata	Query/Download
Spatial tree locations	Metadata	Query/Download
Tree data	Metadata	Query/Download

Penobscot Experimental Forest

Visitor count: 8,721

Find results by query id

Penobscot > Silvicultural study > Height and crown

Height and crown

Output variables:

The following variables are always included:

- Experiment number
- Inventory
- Management unit
- Plot number
- Month

Optional variables:

- [x] All
- [x] Total tree height (ft)
- [x] Height to base of live crown
- [x] Crown radius (ft) at 0 Degree
- [x] Crown radius (ft) at 90 Degre

Filter criteria:

Inventory:

(11 to 25)
Minimum:

Maximum:

Management unit:

- [x] All
- [x] 10
- [x] 12
- [x] 15
- [x] 16
- [x] 17

Summarize data:

(Skip if you want to see raw data for your selected time period.)

Summary statistics:

- [ ] Mean
- [ ] Minimum
- [ ] Maximum

Summarize by factors:

- [x] None
- [ ] Inventory
- [ ] Management unit
- [ ] Plot number
- [ ] Month
- [ ] Year

Example 3: Image Library

Research Data Archive

Research Image Library

You are here: Home > Search Results

Limit your search

Search for [ ] Search

Selected

Click to remove

- Collection - Fort Valley Experimental Forest Historic Images
- Photographer - Krauch, Hermann
- Subjects - grounds

Publication Year +

Locations +

Subjects +

Organisms +

Displaying items 1 - 3 of 3

Sort by Date | **Relevance** 10 | 20 | 50 per page

more info/bigger image

collection:	Fort Valley Experimental Forest Historic Images
subjects:	equipment personnel grounds
Location:	Fort Valley, Coconino N.F.; AZ; United States
caption:	Krauch, Talbot, and Forbes leaving tool shack for work.
date:	1913

collection:	Fort Valley Experimental Forest Historic Images

ID:	9531
File name:	fv000012.jpg
Caption:	Krauch, Talbot, and Forbes
Subjects:	equipment personnel grounds
Photographer:	Hermann Krauch?
Collection Call num.:	16929A
Media:	3.5 in. x 4.5 in. black and white print
Collection:	Fort Valley Experimental Forest Historic Images
Quality:	4
People:	Hermann Krauch, M.W.Talbot, Forbes
Location:	Fort Valley, Coconino N.F.; AZ; United States
Date(yyyy):	1913
Comments:	Fort Valley grounds; Fort Valley scientists leaving tool shack for work. From left: Hermann Krauch, M.W. Talbot, and Reginald Forbes.
Citation:	Olberding, Susan D.; Huebner, Daniel P.; Edminster, Carleton B. 2007. Fort Valley Experimental Forest historical photographs. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. https://doi.org/10.2737/RDS-2007-0005

DOWNLOAD

Example 4: External Repository

Publication Details

Title: Stambaugh - Pine Camp - PIEC - ITRDB TN032

Author(s): Stambaugh, Michael C.; Guyette, Richard P.; Marschall, Joseph M.

Publication Year: 2013

How to Cite: These data were collected using funding from the U.S. Government and can be used without additional permissions or fees. If you use these data in a publication, presentation, or other research product please use the following citation:

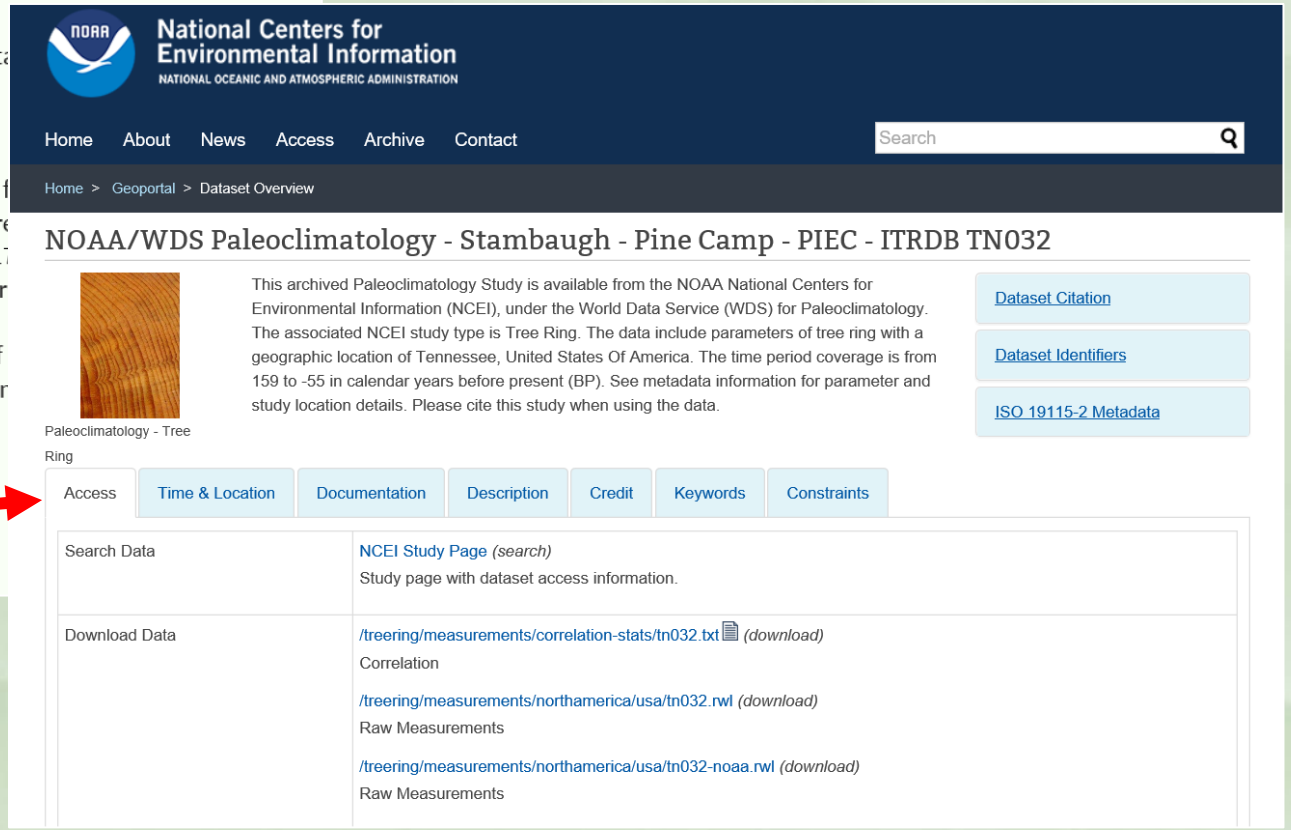
> Stambaugh, Michael C.; Guyette, Richard P.; Marschall, Joseph M. 2013. Sta
> Camp - PIEC - ITRDB TN032. Boulder, CO: NCDC-Paleoclimatology.
> https://doi.org/10.25921/hhr9-v632

Abstract: Fire scar histories are a critical fire data source because they form a foundation f
This data package contains crossdated tree-ring measurements used to date fire
Camp in Land Between the Lakes National Recreation Area in Tennessee from 17
are part of a larger project to archive fire history data in the southern and easter

Keywords: earth science; paleoclimate; tree-ring; ring width; Pinus echinata Mill.; shortleaf
Science Program; geoscientificInformation; Fire; Fire detection; Fire ecology; Pir

Data Access:

- View metadata (HTML)
- Access data (available via external archive)



How to prepare files for the FS-RDA

Step 1: Determine what files to include

- Raw research data files
  - Data directly associated with a particular publication
  - Observational or historical data related to a short or long-term study
  - Secondary data that has been substantially modified (with documented concurrence of originating sources)
- Supplemental files, examples include…
  - Maps
  - Photos
  - Unpublished reports
  - Lab notes
  - Study plan
  - Data analysis documentation (helps meet journal requirements)

How to prepare files for the FS-RDA

Step 2: Prepare data and supplemental files

- Ensure data are complete and correct
  - Data should have already gone through rigorous quality checks before submission, or the metadata must clearly note why.
  - Things to double-check (common issues we see)
    - Does your data contain outliers? If so, please note why if known.
    - Ensure all categorical variables have valid values and descriptions for each value.
    - Verify missing data are in fact missing and note why if known.
    - Ensure zeros, blank cells, and/or missing data are clearly defined and consistently used.
- Use transparent filenames
- Convert files to stable and usable format
  - Can be submitted in virtually any format and archivists can help with conversion
  - Common formats: CSV, XLSX, TXT, JPG, PDF or PDF/a

How to prepare files for the FS-RDA

Step 3: Develop metadata

Data documentation (metadata) is required with all submissions. This document provides the user with the information needed to completely understand the data, why it was collected, how it was collected, the quality of the data, and who to contact if they have questions.

- Understand metadata standards
  - CSDGM
    - Federal Geographic Data Committee (FGDC): Content Standard for Digital Geospatial Metadata
    - Designed for geospatial data
  - BDP
    - Biological Data Profile: formally approved by FGDC as a superset of CSDGM
    - Additional elements: Taxonomy, Methodology, Analytical tools
    - Works for nearly all geospatial / non-geospatial data

How to prepare files for the FS-RDA

- Understand metadata contents
  1. Identification

     What data were collected, why collected, where collected, tools need to work with data
  2. Data Quality

     How data were collected, reliability of data, data omissions
  3. Spatial Data Organization
  4. Spatial Reference
  5. Entity and Attribute

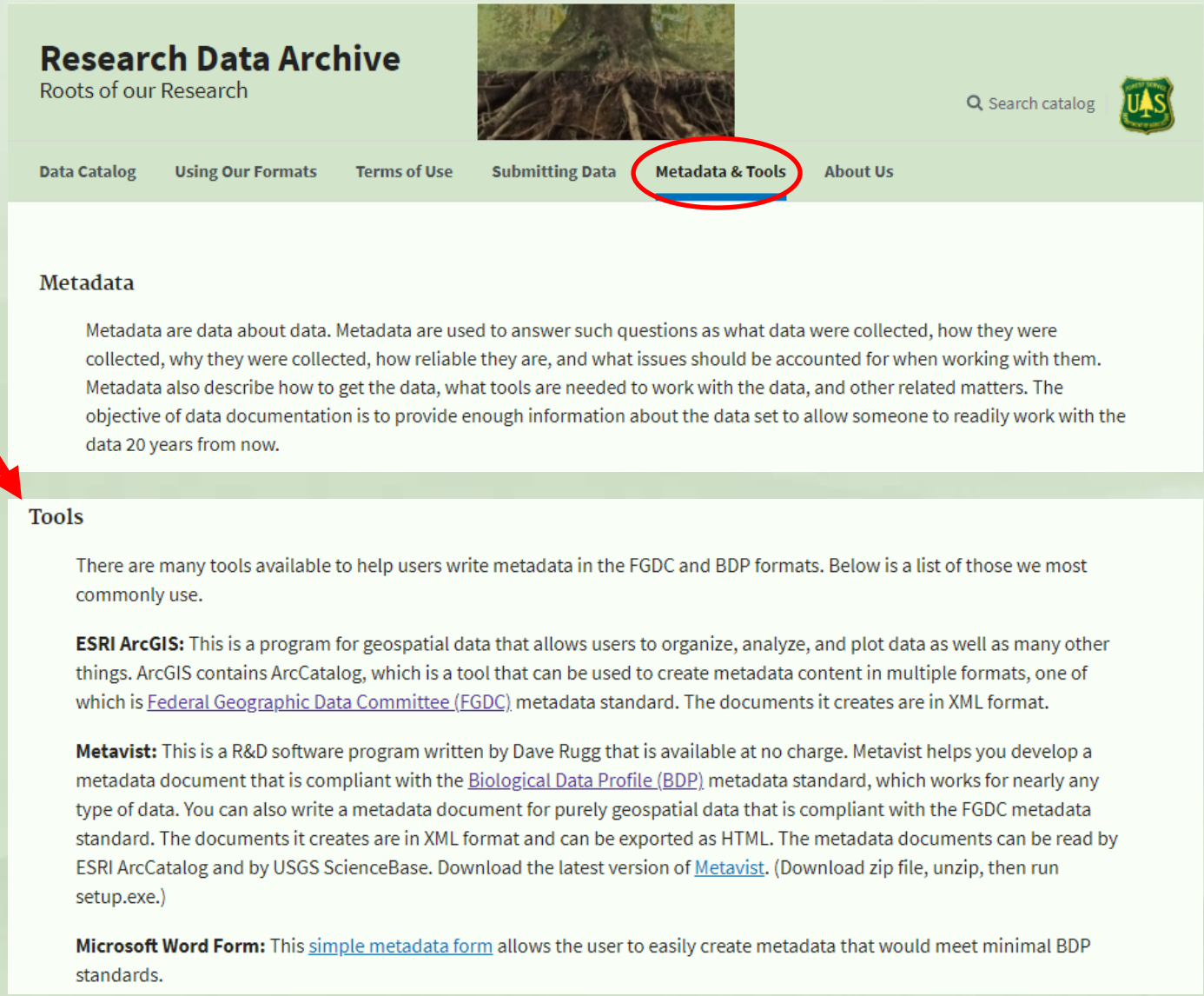
     Description of all files, list and description of all variables within each file
  6. Distribution

     How to get data, data formats
  7. Metadata Reference

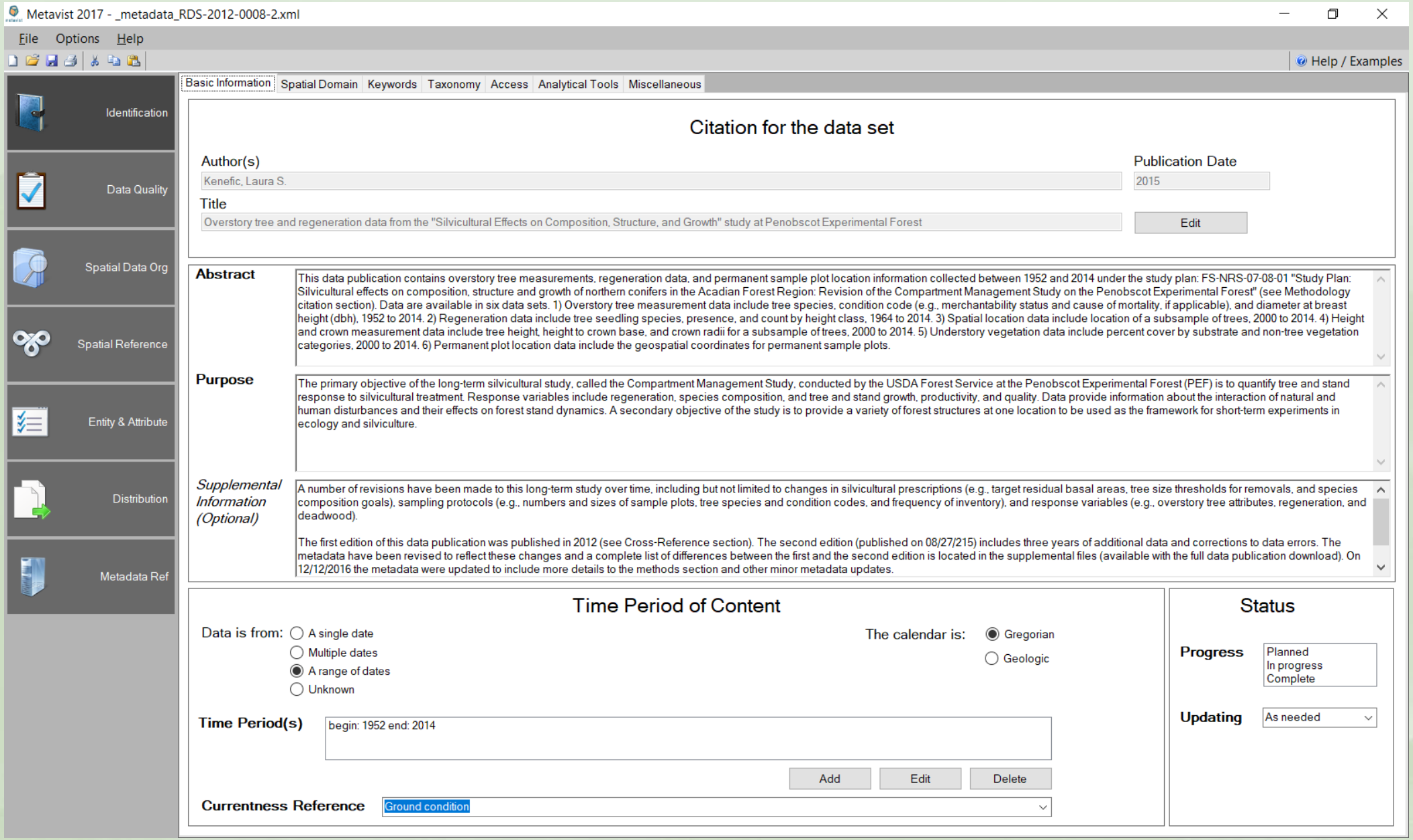
     Metadata currentness, responsible party

How to prepare files for the FS-RDA

- Use tools to generate metadata
  - ESRI ArcGIS
    - For geospatial data only – doesn't understand BDP
    - May not be complete form of metadata
    - Default standard is ISO 19115, but knows CSDGM
  - Metavist software (Dave Rugg)
    - Free! User friendly!
    - Requires some knowledge of FGDC standards
    - Works for geospatial and non-geospatial data
    - Works for CSDGM or BDP metadata
    - Generates XML file, can export as HTML
  - Microsoft Word form
    - Easy to fill out
    - Requires no prior knowledge of FGDC standards
    - Works for all data (geospatial data will require additional info)
    - Works for CSDGM (except spatial sections) or BDP metadata



Metavist software



Microsoft Word form

METADATA DOCUMENT

1. IDENTIFICATION INFORMATION

Citation for Data Publication

Originators (author names, please include middle initial):

Title:

Data Presentation Form (tabular digital data, raster digital, database, document…):

Publication Place: Fort Collins, CO

Publisher: Forest Service Research Data Archive

Description of Data Publication

Abstract (narrative summary of data):

Purpose (why data were collected):

Supplemental Information (other important info):

Time Period of Content

Beginning Date:

Ending Date:

Other:

Status

Progress (in progress, complete): Complete

Maintenance and Update Frequency (as needed, none planned, annually…): As Needed

Description of Geographic Extent (description of where data were collected):

Bounding Coordinates

West Bounding Coordinate:

East Bounding Coordinate:

North Bounding Coordinate:

South Bounding Coordinate:

Coordinates Unit: Longitude and Latitude in decimal degrees

Bounding Altitudes

Minimum Altitude:

Maximum Altitude:

Altitude Distance Units (feet, meters):

Theme Keywords
(for more info see: https://www.fs.usda.gov/rds/archive/submitdata/Keywords_for_FS-RDA_archive.pdf)

Author's choice Keywords:

ISO 19115 Keywords:

R&D Taxonomic Keywords:

Place Keywords (include state(s) if applicable):

Use Constraints (any constraints with sharing these data?):

Point of Contact (for data)

Contact Organization:

Contact Person:

Contact Position:

Contact Address:

Contact Voice Telephone(s):

Contact Email Address:

Data Set Credit (who funded this work?):

Native Data Set Environment (software, operating system, etc. - if important):

Cross-References (citations for publications that USE or are related to Data Publication, please include DOI/URL)

Complete Citation(s):

2. DATA QUALITY INFORMATION

Attribute Accuracy

Attribute Accuracy Report (assessment of how "true" attributes values are):

Logical Consistency Report (methods used to check for inconsistencies):

Completeness Report (info about omissions, selection criteria …):

Lineage- Methodology (how data were collected or obtained, steps in field or laboratory work…)

Methodology Keywords:

Methodology Description:

Methodology Citations (publications that describe methods or are referenced in methods, please include DOI/URL)

Complete Citation(s):

Source Citations (if any data were obtained from another source please provide: source citation, description of data obtained, and where data were obtained)

Complete Citation(s) and Data Obtained:

Lineage- Process Steps (steps or data manipulations applied after data collection, or modifications made to source data)

Process Descriptions (include dates):

3. ENTITY AND ATTRIBUTE INFORMATION

Overview description of variables in each data set (literally need a list and description of variables in each file and be sure to include units - this can also be done in a spreadsheet):

Citation(s) that contain data summary or details about these variables:

4. DISTRIBUTION INFORMATION

Data type (need a list and description of all file formats used)

(Example: CSV = comma-delimited ASCII text file)

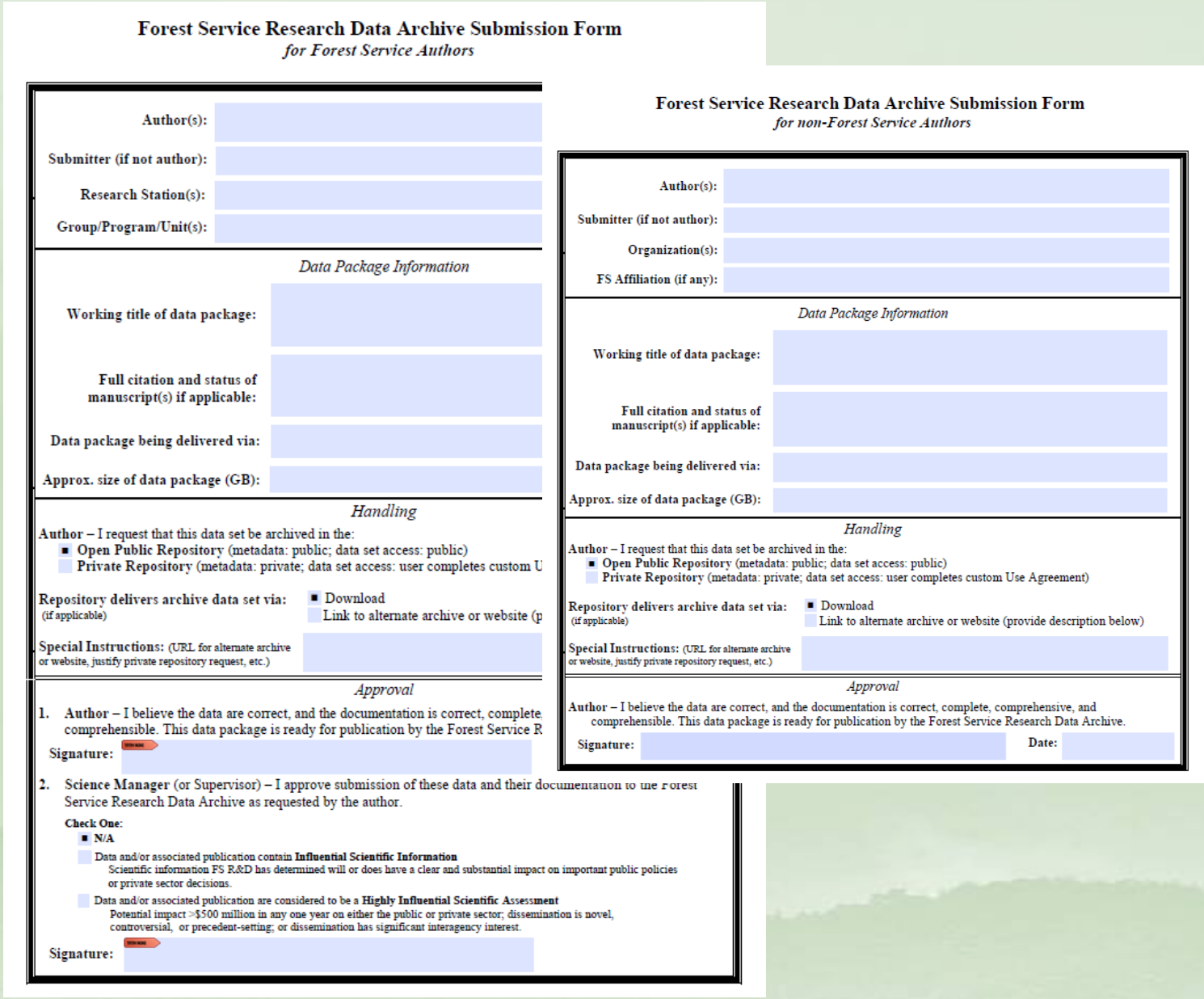
How to prepare files for the FS-RDA

Step 4: Sign submission forms (required to publish in FS-RDA)

- First author **must** sign form
  - There is a form for Forest Service (FS) authors and another for non-FS authors.
  - FS submission forms also require the signature of a supervisor.
- If first author is not a FS author, then we **also** need the first FS author to sign a submission form.

Important Notes:

- Electronic signatures are acceptable, please include the email showing the form being “signed” and forwarded.



Forest Service Research Data Archive Submission Form
for Forest Service Authors

Author(s):
Submitter (if not author):
Research Station(s):
Group/Program/Unit(s):

Data Package Information

Working title of data package:
Full citation and status of manuscript(s) if applicable:
Data package being delivered via:
Approx. size of data package (GB):

Handling

Author – I request that this data set be archived in the:
- ■ **Open Public Repository** (metadata: public; data set access: public)
- **Private Repository** (metadata: private; data set access: user completes custom U

Repository delivers archive data set via: (if applicable)
- ■ Download
- Link to alternate archive or website (p

Special Instructions: (URL for alternate archive or website, justify private repository request, etc.)

Approval

1. **Author** – I believe the data are correct, and the documentation is correct, complete, comprehensible. This data package is ready for publication by the Forest Service R

Signature:

2. **Science Manager** (or Supervisor) – I approve submission of these data and their documentation to the Forest Service Research Data Archive as requested by the author.

Check One:
- ■ **N/A**
- Data and/or associated publication contain **Influential Scientific Information**
  Scientific information FS R&D has determined will or does have a clear and substantial impact on important public policies or private sector decisions.
- Data and/or associated publication are considered to be a **Highly Influential Scientific Assessment**
  Potential impact >$500 million in any one year on either the public or private sector; dissemination is novel, controversial, or precedent-setting; or dissemination has significant interagency interest.

Signature:

Forest Service Research Data Archive Submission Form
for non-Forest Service Authors

Author(s):
Submitter (if not author):
Organization(s):
FS Affiliation (if any):

Data Package Information

Working title of data package:
Full citation and status of manuscript(s) if applicable:
Data package being delivered via:
Approx. size of data package (GB):

Handling

Author – I request that this data set be archived in the:
- ■ **Open Public Repository** (metadata: public; data set access: public)
- **Private Repository** (metadata: private; data set access: user completes custom Use Agreement)

Repository delivers archive data set via: (if applicable)
- ■ Download
- Link to alternate archive or website (provide description below)

Special Instructions: (URL for alternate archive or website, justify private repository request, etc.)

Approval

Author – I believe the data are correct, and the documentation is correct, complete, comprehensive, and comprehensible. This data package is ready for publication by the Forest Service Research Data Archive.

Signature: Date:

How to prepare files for the FS-RDA

Step 5: Compile submission package

- Gather all files
  - Data set(s)
  - Metadata
  - Supplemental files
- Use directory structure to help organize files, this is structure we will use
  - “Data” – all data files will go in this folder, subfolders allowed
  - “Supplements” – all supplemental files will go in this folder, subfolders allowed
- Create a file index
  - List files in submission package and short description of their format and content
  - This can be submitted in any format (Excel, Word, text file, email, etc.)

You are now ready to submit package to the Archive Team!

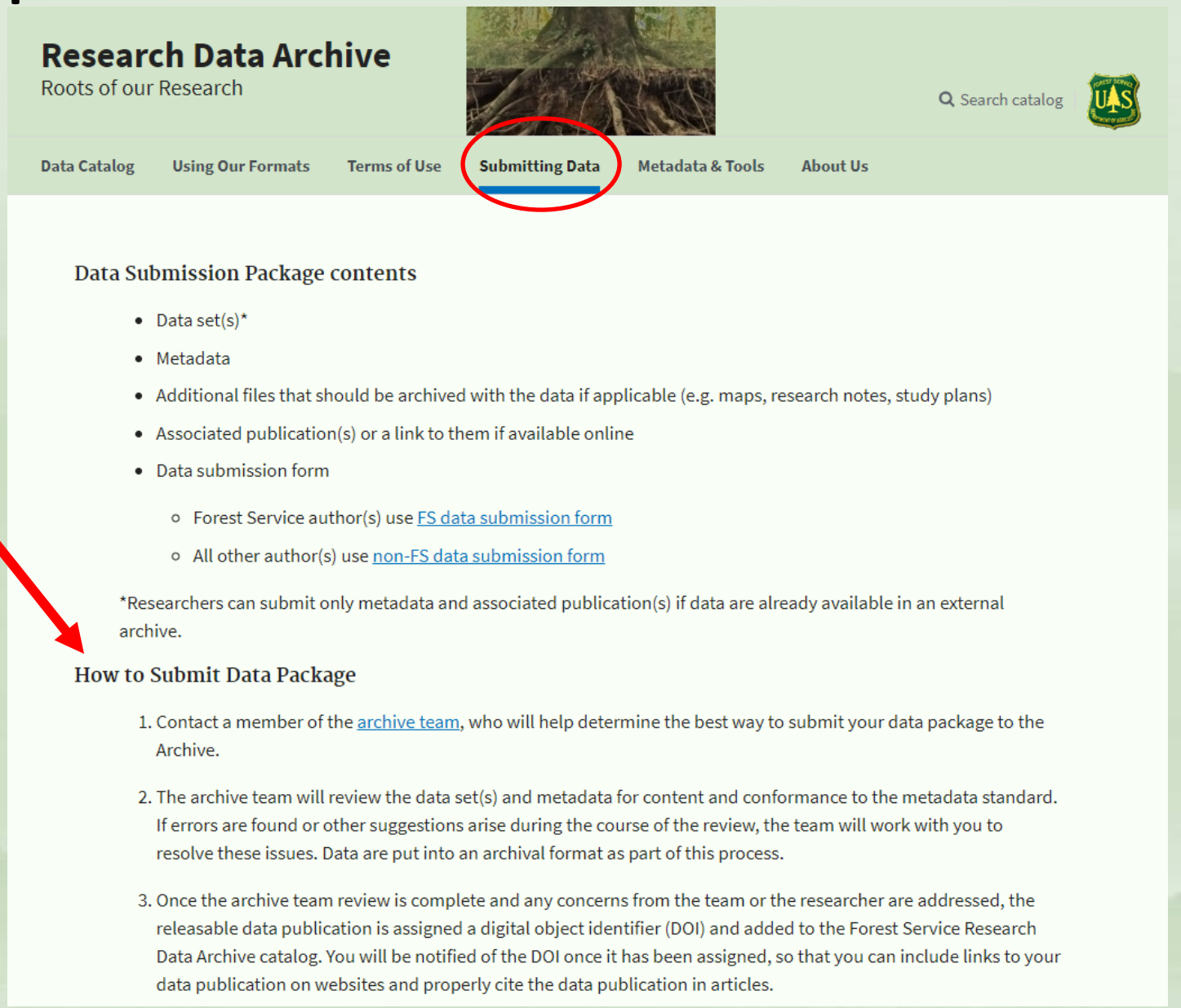
How to submit and publish data in the FS-RDA

Step 1: Contact a member of the Archive Team and submit package for **thorough** review

Step 2: Archive Team reviews submission and sends authors questions and comments

Step 3: Archive Team finalizes package, assigns DOI, and data are published!

Reviews help ensure data are usable…



Research Data Archive
Roots of our Research

Search catalog

Data Catalog | Using Our Formats | Terms of Use | **Submitting Data** | Metadata & Tools | About Us

Data Submission Package contents

- Data set(s)*
- Metadata
- Additional files that should be archived with the data if applicable (e.g. maps, research notes, study plans)
- Associated publication(s) or a link to them if available online
- Data submission form
  - Forest Service author(s) use FS data submission form
  - All other author(s) use non-FS data submission form

*Researchers can submit only metadata and associated publication(s) if data are already available in an external archive.

How to Submit Data Package

1. Contact a member of the archive team, who will help determine the best way to submit your data package to the Archive.
2. The archive team will review the data set(s) and metadata for content and conformance to the metadata standard. If errors are found or other suggestions arise during the course of the review, the team will work with you to resolve these issues. Data are put into an archival format as part of this process.
3. Once the archive team review is complete and any concerns from the team or the researcher are addressed, the releasable data publication is assigned a digital object identifier (DOI) and added to the Forest Service Research Data Archive catalog. You will be notified of the DOI once it has been assigned, so that you can include links to your data publication on websites and properly cite the data publication in articles.

Additional Info

Need a DOI early for journal article?

- What is required
  - Signed submission form
  - Draft (or final) version of data
  - Draft (or final) version of metadata
- How it works
  - Submit submission form, data, metadata to Archive Team and request early DOI
  - DOI assigned early, will point to temporary out-of-stock page
  - Get final files to Archive Team, so they can begin review
  - Work with Archive Team to ensure data are published before journal article goes live

Benefits of publishing in FS-RDA

- FS RGEG direction says FS-RDA publications are refereed!
- Broad audience
  - ≈35,000 global customer visits in FY2020
  - 7,925+ downloads in FY2020 (>25% growth)
  - Domestic customer base composed of government agencies, academic institutions, K-12, variety of businesses
- Other repositories are providing access to FS-RDA
  - Data.gov: catalog for U.S. Government data
  - Ag Data Commons (USDA Nat. Ag. Library): catalog for all USDA scientific data
  - Science.gov: https://www.science.gov/ (+ Spanish: https://ciencia.science.gov/)
  - Data Citation Index: https://clarivate.com/webofsciencegroup/solutions/webofscience-data-citation-index/

Questions?