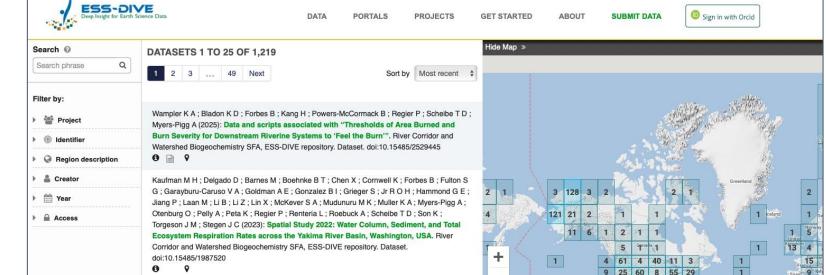
2025 Environmental ESS-DIVE: Advancing DOE ESS Data Management, Systems Sciences PI Discovery, and Use

Shreyas Cholia¹, Joan Damerow², Deb Agarwal¹, Madison Burrus², Hesham Elbashandy¹, Valerie Hendrix¹, Matthew B. Jones³, Emily Nagamoto², Rushiraj Nenuji³, Fianna O'Brien¹, Dylan O'Ryan², Shalki Shrivastava¹, Jing Tao³, Karen Whitenack¹, Charuleka Varadharajan²

¹Scientific Data Division, Lawrence Berkeley National Laboratory; ²Earth & Environmental Sciences Area, Lawrence Berkeley National Laboratory; ³National Center for Ecological Research and Synthesis

About ESS-DIVE

ESS-DIVE is a **CoreTrustSeal certified data repository** that enables data management, discovery, and use of a variety of DOE's Environmental Systems Science (ESS) data.



Project Data Management

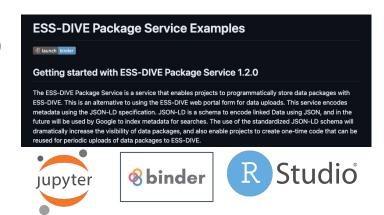
ESS-DIVE supports end-to-end data management lifecycle, and offers project-specific features that allow researchers to collaborate, share, and manage data within their teams.



Using & Citing ESS-DIVE Data

ESS-DIVE provides many features to **access and use data**.

Dataset API (api.ess-dive.lbl.gov) *Package service API* enables programmatic submission, management, search and download of datasets



meeting

• Find datasets by project, DOI, author or other search terms

• Search & download data files or metadata in bulk

FusionDB - Deep Dive API (fusion.ess-dive.lbl.gov)

ESS-DIVE Deep Dive API makes standardized data searchable



dman A E ; Grieger S ; Hall R O ; Kaufman M H ; Lin X ; McCann E ; McKever S A ; Mye ag A : Otenburg O : Pellv A : Ren H : Renteria L : Scheibe T D : Son K : Tagestad J D rnett A ; Elv K ; Davidson K ; Serbin S ; Rogers A (2019) vlation Capacity, Utgiagyik (Barrow), Alaska and Upton, I York, 2018, Next-Generation Ecosystem Experiments (NGEE) Arctic, ESS-DIVE repository Dataset, doi:10.5440/150696

1 1 atellite Terrair

ESS-DIVE stores a variety of data types from ESS-sponsored research, which includes:

- Data from a wide range of natural and urban systems
- Data from field, lab experiments, modeling, remote sensing data



Add files to start your dataset

Website: https://ess-dive.lbl.gov Data Access: https://data.ess-dive.lbl.gov Features: https://ess-dive.lbl.gov/our-features-and-services

egistered users	100 Contributing projects	278 Events
215	283	13.6 TB
ublic datasets	Private datasets	Total file size
94K	1M	16
ile downloads	Data views	Public portals
	egistered users 215 ublic datasets 94K	egistered users Contributing projects 215 ublic datasets Private datasets 94K 1M

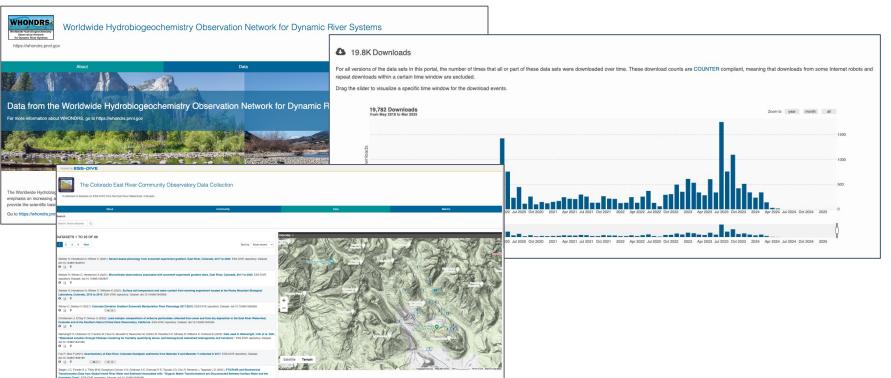
Data Upload & Review

NEW: Revamped publication interface allow for **reservation of DOIs** before publication, clear **dataset** and DOI statuses, and intuitive dataset publication

	•					-		
	Deep Inight for Earth Science Data	DATA	PORTALS	PROJECTS	GET STARTE	ED ABOUT	SUBMIT DATA	å v MADI
	Home / Search / Metadata							
	DATASET ess-dive-17a238a24fed3ac-20240703T223219294							OI Status No DOI Added
	Data from: "Enabling FAIR data in Ea	rth and e	environn	nental sci	ence wi	th commu	unity-	Dataset Status
nage Dataset	l			dison Burrus, Shre anna O'Brien, Dyla				
DOI Status	Dataset Status			dison Burrus, Shre anna O'Brien, Dylar				
							and Deb	Manage Publication
DOI Status						anie C Pennington,	and Deb	Manage Publication
DOI Status S No DOI Added	Dataset Status	Kakalia, I	Kayla Mathes, F		n O'Ryan, Steph	anie C Pennington,	and Deb	Manage Publication
DOI Status No DOI Added art the publication process to m	Dataset Status	Kakalia, I	Kayla Mathes, F	anna O'Brien, Dylar	n O'Ryan, Steph: 07031223219287	anie C Pennington,	and Deb	Manage Publication
DOI Status No DOI Added art the publication process to m reserve e dataset will be published with	Dataset Status Drafting nake the dataset publicly available for search and download or	Kakalia, I	Kayla Mathes, F	anna O'Brien, Dylar	n O'Ryan, Steph 0703T223219287	anie C Pennington, 연 Cite this	and Deb	
DOI Status No DOI Added art the publication process to m reserve e dataset will be published with	Dataset Status Drafting nake the dataset publicly available for search and download or a DOI and publish the dataset later. h a new DOI issued by ESS-DIVE or with an existing DOI, if you	Kakalia, I	Kayla Mathes, F	anna O'Brien, Dylar	n O'Ryan, Steph.	anie C Pennington, 안 Cite this File type	and Deb dataset Edit 🖌 Size	Download All
DOI Status No DOI Added art the publication process to m reserve the dataset will be published with supp	Dataset Status Drafting nake the dataset publicly available for search and download or a DOI and publish the dataset later. h a new DOI issued by ESS-DIVE or with an existing DOI, if you	Kakalia, I	Kayla Mathes, F	anna O'Brien, Dylar 11046510450e99-2024	n O'Ryan, Steph 07631223219287 1fo	anie C Pennington, 안 Cite this File type EML v2.2.0	and Deb dataset Edit ? Size 22 KB	Download All
DOI Status No DOI Added art the publication process to m reserve the dataset will be published with supp	Dataset Status Drafting make the dataset publicly available for search and download or a DOI and publish the dataset later. h a new DOI issued by ESS-DIVE or with an existing DOI, if you oly one in the "Existing DOI" field.	Kakalia, I	Kayla Mathes, F	anna O'Brien, Dylar 3154c515450e39-2024 More ir	n O'Ryan, Steph 0/031223219287 nfo	anie C Pennington,	and Deb dataset Edit 2 Size 22 KB 4 KB	Download All

Features for **collaborative project data curation**

- Dataset sharing within project teams to promote collaborative editing and curation of data packages
- Project level team management and access control
- Data search within a project
- Custom project-centric data portals curated collections of project data or other views (e.g. field site, campaign)
- Project data citations and metrics

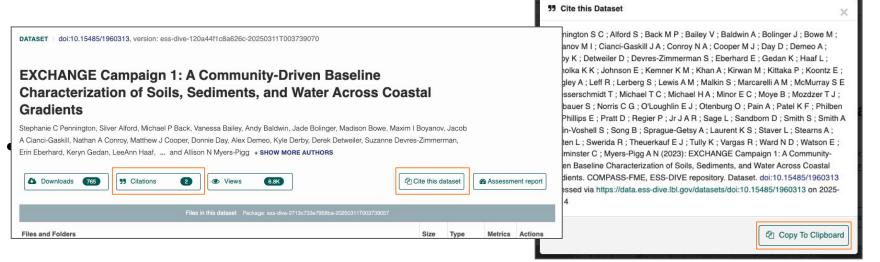


• Search within data files and find specific variables

relevant to your scientific research

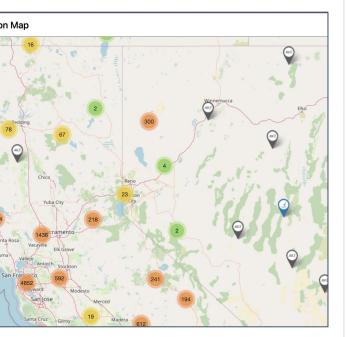
Citing ESS-DIVE Datasets

• Include ESS-DIVE datasets in the *data availability statement* and as a *reference* in your papers



BER Data Integration

BER Bio-Eco Data Integration project (BERTron) to harmonize and integrate data across ESS-DIVE, NMDC, KBase, EMSL, and JGI



- Enabling Unified Search
- Standardizing on schema terms
- Code-a-thons
- User Interviews

BER Related Data Use Cases

20+ use cases completed to connect interdisciplinary ESS-DIVE datasets to related research outputs, such as sites and samples, associated

Common ways data are connected:

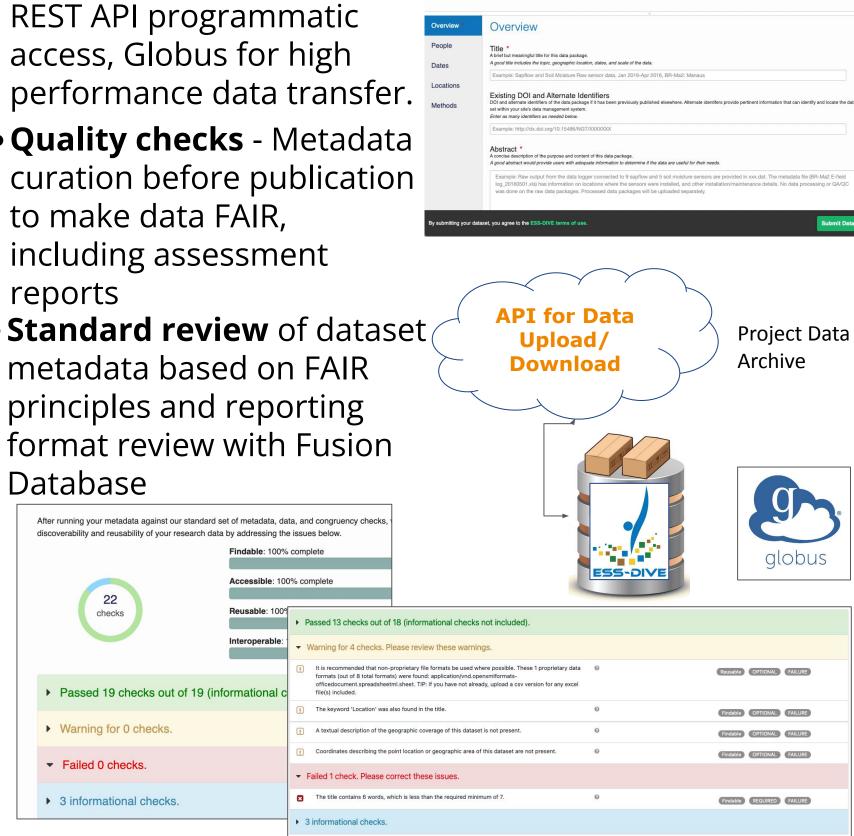
- Project, Sites, Samples
- Associated Journal Article Paper dataset created for (supplement)
- References related datasets, workflows, journal articles, code
- Data derived from this dataset child datasets
- **Source data** original source data used in dataset (e.g. EMSL), datasets included in a collection

• Web portal - Web form to upload of files & metadata.

• Large dataset support -Secondary (Tier-2) storage layer for large datasets including direct file access and hierarchical data

• Advanced Access -

REST API programmatic access, Globus for high performance data transfer. • Quality checks - Metadata curation before publication to make data FAIR, including assessment reports • Standard review of dataset metadata based on FAIR principles and reporting



Link related resources on ESS-DIVE and elsewhere

- Use the external linking feature to connect data
- Provide input on linking related resources for scientific use, and complex data citations

External Links to Data or Metadata URL Description Relationship Github link to the code in code_datasets_catchments_similarity.zip for [has part] Data that is part of this https://github.com/iNAIADS/catchmentssimilarity/tree/v1.0.1 Adopt data and metadata A) Use high-level reporting B) Next, choose data type specific formats that apply to a data reporting formats **reporting formats** in your wide-range of data types Model Data project's data collection and CSV File Structure Water-Soil-Sediment Chemistry publication workflows Sample Identifiers Leaf-Level Gas Exchange Data nd Metadata • 12 data and metadata Amplicon Data Locations Metadata reporting formats for Hydrologic Monitoring Data environmental data Soil Respiration Data

• See poster: "ESS-DIVE Partner Projects" for more details

Crystal-Ornelas, R., Varadharajan, C.*, O'Ryan, D. et al. Enabling FAIR data in Earth and environmental science with community-centric (meta)data reporting formats. Sci Data 9, 700 (2022). https://doi.org/10.1038/s41597-022-01606-w

Jnoccupied Aerial System (UAS)

C) Provide File-Level metadata: Describe each file uploaded

D) Submit dataset to ESS-DIVE: Using Package-Level Metadata

journal articles, references, derived and source data.

Help track provenance and citations

Interested in adding related works to your ESS-DIVE dataset? Contact us at ess-dive-support@lbl.gov

Learn More

Connect with us in various ways:

- Helpdesk, tutorials, webinars, annual workshop
- User interviews to solicit feedback on ESS-DIVE features
- PI meeting tutorials, participation in ESS Cyberinfrastructure Working Groups
- ESS-DIVE Archive Partnership Board consisting of leads of major ESS projects provides input into ESS-DIVE features and activities
- Attend the "ESS-DIVE Tutorial for Using Data" and "ESS-DIVE Tutorial for PIs and Data Managers"

Questions? <a>ess-dive-support@lbl.gov ESS-DIVE Documentation: https://docs.ess-dive.lbl.gov/ Webinars: https://ess-dive.lbl.gov/webinars/ Tutorials: <u>https://ess-dive.lbl.gov/video-tutorials/</u>

Acknowledgements

This research is supported as part of the ESS-DIVE repository and funded by the U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research under Award no. DE-AC02-05CH11231. This research used resources of the National Energy Research Scientific Computing Center (NERSC), a U.S. Department of Energy Office of Science User Facility operated under Contract No. DE-AC02-05CH11231.

