IN53E-0656: HydroShare tools and recommended practices for sharing and publishing data and models in support of collaborative reproducible research

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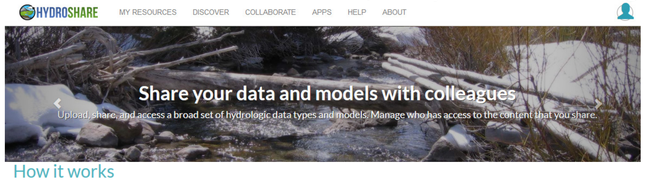
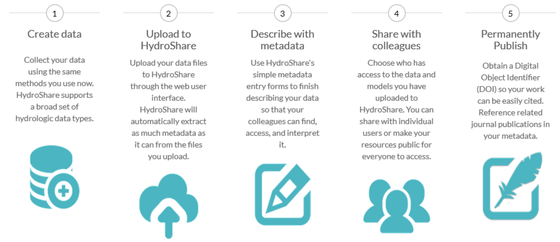
What is HydroShare ?

An online hydrologic information system for sharing data, models and code to enable more rapid advances in hydrologic understanding through collaborative research, analysis and modeling.



How it works



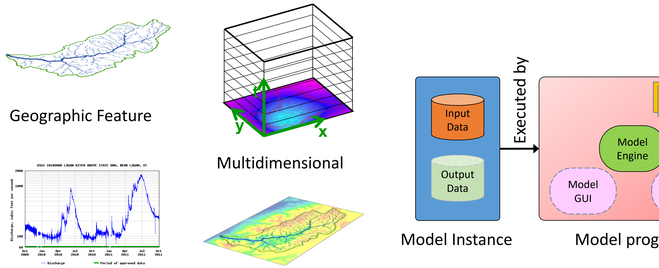
What you can do with HydroShare

- Share your data and models with colleagues
- Manage who has access to the content that you share
- Share, access, visualize and manipulate a broad set of hydrologic data types and models
- Use the web services API to program automated and client access
- Publish data and models to meet the requirements of your data management plan
- Discover and access data and models published by others
- Use web apps to visualize, analyze and run models on data in HydroShare

www.hydroshare.org

What can you store in HydroShare ?

1. In HydroShare, data and model files are stored as **resources**.
2. HydroShare supports any file, including several specific data formats.
3. Content "aggregations" hold data formats common in hydrology and support description with additional content specific metadata. Apps can act on specific content types.
4. Collections group together multiple resources related to a project or study.
5. Model Programs and Model Instances hold specific hydrologic models and associated data for application at a location.



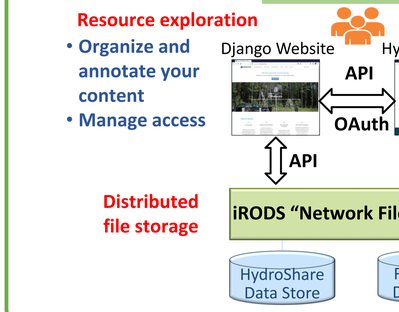
Why HydroShare ?

Collaboration: Share your data and model files; integrate information from multiple sources; organize individual, team, and group work.
Reproducibility, transparency and trust: Publish your work in any format, including data and models with a citable digital object identifier (DOI).
Do Science: Run Apps and models from a browser without installing software; access computational services for your big data and model analysis.
Learning: Use a platform where all students have access to the same functionality regardless of their computer.

HydroShare is a system to advance hydrologic science by enabling the community to more easily and freely share products resulting from their research, not just the scientific publication summarizing a study, but also the data and models used to create the scientific publication.

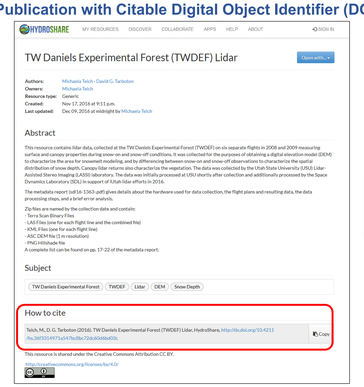
- **F**indable
- **A**ccessible
- **I**nteroperable
- **R**eusable

Design

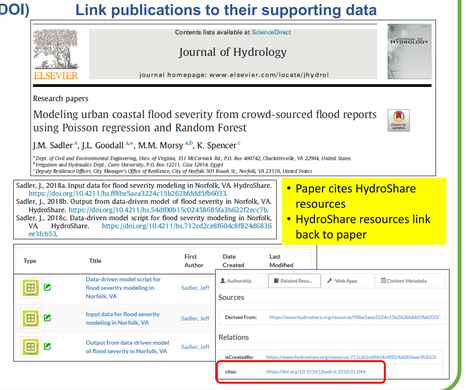


Publishing data and models

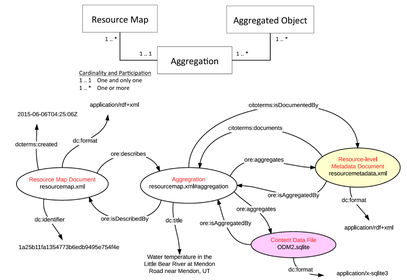
Publication with Citable Digital Object Identifier (DOI)



Link publications to their supporting data



OAI-ORE standard based Resource Data Model



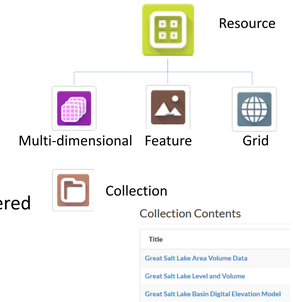
Dublin Core machine readable metadata and data model to make data in HydroShare, Findable, Accessible, Interoperable, Reusable

Resources, comprised of data and models, are framed as social objects, the basis for collaboration and interaction

Horsburgh, J. S., et al., (2016), "Hydroshare: Sharing Diverse Environmental Data Types and Models as Social Objects with Application to the Hydrology Domain," JAWRA, http://dx.doi.org/10.1111/1752-1688.12363.

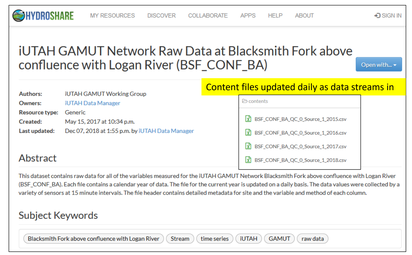
Resource Organization

- A resource can hold multiple aggregations
  - Each being a different type of data with its own set of metadata
  - Managed as one discoverable resource
  - One set of access controls (Owners, Editors etc.)
  - One unique identifier
  - One set of resource level metadata
- A collection can hold multiple resources
- Collections and their members may each be discovered separately
- Unique keyword tags form informal collections (e.g. "AGU2018")

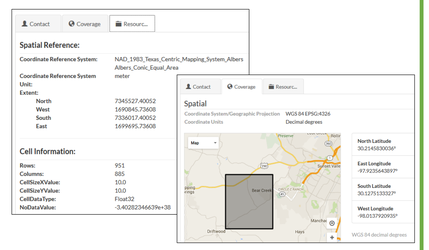


Key Functionality

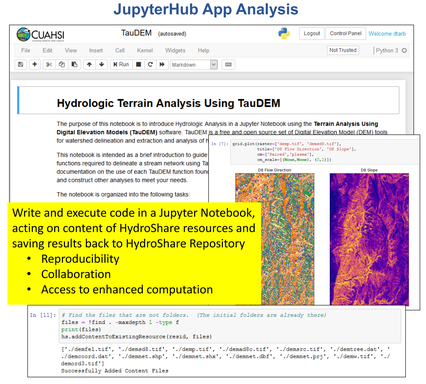
Data streamed into HydroShare as soon as it is collected



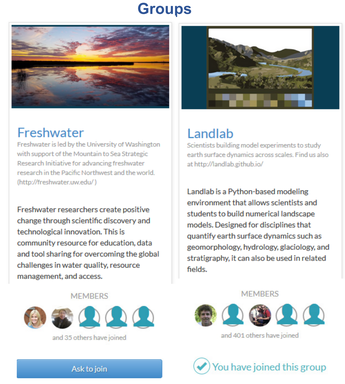
Metadata harvested automatically or captured via simple web page editing



JupyterHub App Analysis



Groups



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HydroShare is operated by CUAHSI with ongoing development through a collaborative project among Utah State University, RENCI University of North Carolina, Brigham Young University, CyberGIS Center University of Illinois, Tufts, University of Virginia, NCAR, and University of Washington.