**Template**

**Data Management Plan for Researchers with Dendroecological Data**

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*[for users: edit the text in brackets that is embedded in this data management template according to your proposal and data type. If you do submit a proposal (funded or not) that specifies the FEMC for data management, we (and our funders) would love to know about it - just shoot us an e-mail at femc@uvm.edu]*

*Data storage and organization*

Data from this proposed project will be archived and organized into previously established cyberinfrastructure currently maintained by the Forest Ecosystem Monitoring Cooperative (FEMC) and hosted by the University of Vermont (UVM; Burlington, Vermont).

The DendroEcological Network (DEN), which is housed with the FEMC data archive and accessible via the associated website ([https://www.uvm.edu/femc/](https://www.uvm.edu/vmc/)dendro), provides searchable and linked information for dendroecology related research projects, including document archive, data display and visualization, search and download features, and metadata summaries (e.g., procedural methods, attribute information, related documents and citation and access specifications). The website allows users to browse and search, and information about projects, datasets and associated publications are indexed by search engines such as Google.

To contribute data*, [I/we]* will upload data from this project to the DendroEcological Network via the web portal by the end of this proposed project. This will include *[brief description of dendroecological data that will be uploaded to the DEN]*. Uploaded data will contain detailed metadata, including information on quality assurance, and will be georeferenced. A web server running the Linux-Apache-MySQL-PHP stack will provide the needed cyberinfrastructure to input and store tabular data, spatial data, electronic files and associated metadata in a relational database and file system. MySQL is an open-source and well-supported relational database management system in use across the world. Data and metadata stored in this format can be accessed with a range of free and proprietary software, limiting the risks of data loss to future changes in technology.

# *Metadata*

Because of the flexible metadata format used within the FEMC repository and the high quality of documentation in place for these existing data, future integration with other datasets will require much less work than if the data were dispersed in more traditional and isolated data storage systems. The FEMC has extended the Ecological Metadata Language (EML) standard (<https://knb.ecoinformatics.org/#external//emlparser/docs/index.html>) to document data in its system. This standard provides an extremely flexible set of modules for documenting and sharing metadata, and because of the wide-ranging and diverse data associated with ecological investigations, this flexibility is its biggest asset. For this reason, EML is the preferred standard for the Long-Term Ecological Research Network and data in EML is easily federated to other data cataloging systems through the work of DataOne (<http://dataone.org/>), in which FEMC is a member node).

In addition to EML, the FEMC uses the Integrated Taxonomic Information System (<http://www.itis.gov/>) for documenting species information. This system, developed and maintained by a partnership of United States, Canadian and Mexican agencies, provides unique identifiers for taxa and maintains relationships between ‘accepted’ and ‘not accepted’ variants for that taxon. This allows identification of species taxa at the time of collection while permitting taxonomic definitions to change in the future without losing the original identification in a given dataset. Finally, the Ecological Metadata Language and the FEMC implementation of spatial data is compliant with standards established by the Open Geospatial Consortium, utilizing open-source data formats.

# *Storage and Backup*

The FEMC repository utilizes the UVM cyberinfrastructure for its basic hosting and replication needs. In addition to the stock services offered by UVM’s Enterprise Technology Services, the repository data will be exported to external media on a monthly basis, with these backups kept for six months. Yearly snapshots of the repository will be saved to external media, such as an external solid-state hard-drive or a series of DVDs, and preserved indefinitely in an offsite location.

# *Access and Sharing*

The data held in the repository will be available for exploration and download, with access constraints determined in accordance with the site policy. Access constraints for data follow the Creative Commons (<https://creativecommons.org/>) licensing scheme. By default, the data added to the repository will be made immediately accessible. However, it allows researchers to embargo data for up to two years for the purposes of publishing research based on the data. This embargo period conforms with recommendations made by *[name(s) of granting agency]*.

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