

# **Guidelines for LTER Information Management Systems**

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## **INTRODUCTION**

This document (Version 2.1) was created by the LTER Information Managers Committee and approved by the LTER Executive Board on 20 December, 2017, and builds on a previous version [1]. This document defines best practices for LTER site information management systems.

The goal of an Information Management System is to support site, network and overall ecological science by (1) facilitating access to data and metadata by LTER scientists, the scientific community, and the public, in order to enable new scientific discoveries and their applications; (2) ensuring the integrity, security, and usability of those data and metadata for future generations through replication in repositories that provide immutability, versioning and public access; and (3) increasing the efficiency of operations within an LTER site. LTER information management systems provide important linkages between scientists and the general public by providing a complex mix of information resources (e.g., photos, data, research summaries, publications).

A successful Information Management System at an LTER site is created and maintained through the coordinated efforts of the Information Manager, other information technology staff, field and laboratory technicians, researchers, and site management. Such a system is comprised of hardware, software, and people and used to store and deliver scientific information. It is an integral part of the overall LTER science program at a site.

The guidelines below focus on functionality rather than implementation. In this document, essential features are designated by “should” and desirable features by “is encouraged.”

## **GUIDELINES**

### **A. Information Management System design and implementation**

#### **1. Scope**

- a. Data and metadata should be made available online within two years of data collection, as specified and prioritized in the LTER Network Data Access Policy [2].
- b. In cases where data cannot be directly downloaded for practical reasons (e.g., non-digital assets or digital files too large to allow direct network downloads like GIS, remote sensing, or modeling datasets), sites should have an alternate

- procedure for making data discoverable and accessible to the scientific community.
- c. The Information Management System should include an up-to-date list of publications supported by the site LTER program.
  - d. Inclusion of catalogs of non-electronic materials managed in support of LTER research (samples, specimens, documents, photographs, etc.) is encouraged.
  - e. Sites are encouraged to collect evidence of data use, within the limitations of anonymous access metrics provided by data repositories.

## 2. Design

- a. The Information Management System should include critical design features such as data and metadata encoding, short-term backup, long-term media and format migration, system administration, security, and scalability.
- b. Site data and metadata should be backed up regularly and copies stored offsite to protect against disaster.
- c. Sensitive data (such as personal information or location of endangered species) should be protected against misappropriation and misuse.
- d. Sites should provide mechanisms by which site data can be discovered (site catalog, links to external search resources such as the LTER Data Portal (<https://portal.lternet.edu>) [3] or DataONE (<https://www.dataone.org/> [4])).
- e. Sites should submit data to repositories that provide digital identifiers, immutability, versioning, data security, and public access.
- f. Sites are encouraged to develop systems to ensure timely public data release, per the LTER Data Policy.

## 3. Site Information Portal<sup>1</sup>

- a. Data, metadata, and other information management resources, such as publication lists and personnel lists, should be well organized, readily located, and easily accessed from the site information portal.
- b. Site information portal should conform to pertinent guidelines for LTER web site design and content.
- c. Site information portal should contain a list of site data sets with links to access the data.
- d. Innovations in site information portal design and Information Management System interface, especially where suitable for use by other sites, are encouraged.

## 4. Documentation

- a. Information Management System architecture, procedures, and protocols should be clearly documented and documentation should be sufficient to maintain continuity if there is a turnover of personnel.
- b. Sites should have a management plan for the Information Management

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<sup>1</sup> Portal refers to any mechanism that allows users to locate and retrieve information, including webpages and apps

System indicating how critical tasks are accomplished by site personnel.

## **B. Information Management System support for site, network, and community science**

### 1. Integration with site science

- a. All stages of research design and development, from initial project design to final archiving of data and metadata, should be integrated into the Information Management System.
- b. Meetings between the information manager and researchers are encouraged.
- c. Periodic internal review of the Information Management System is encouraged.

### 2. Policies

- a. Site data release, access, and use policies should comply with LTER Network policies [2].
- b. Site policies should be clearly stated on the site information portal.

### 3. Metadata

- a. Metadata should be of sufficient quality and completeness to ensure long-term (> 20 years) usability of data [5].
- b. Metadata should conform to current best practices and repository requirements [6].

### 4. Data

- a. Data integrity should be protected by appropriate quality control procedures (i.e., range checks, duplicate detection, enumeration checks [e.g., codes, sites, taxonomic]).
- b. Data should comply with quality measures appropriate to the repository where they are archived.

### 5. Contribution to LTER Network and community activities

- a. Site should contribute relevant data and metadata to network information resources approved by the LTER Science Council (e.g., LTER Data Portal or other active cross-site databases).
- b. Participation by the Information Manager in other LTER activities such as committees, workshops, and tool development; in community activities such as review teams, panels, training, and collaborations with informatics partners; and in related research activities such as developing proposals and publications, is encouraged.

## REFERENCES

- [1] Review Criteria for LTER Information Management Version 1.1. 2009.  
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