**Guidelines for LTER Information Management Systems**

Version 2.0 XX Month, 2017

INTRODUCTION

This document was created by the LTER Information Managers Committee and originally approved by the LTER Science Council on XX Month XXXX. Version 2.0 of this document was approved by the LTER Science Council on XX Month 2017. The document is intended to serve as a reference for formal reviews of LTER sites as well as for informal self-assessment and planning.

The Information Management System at an LTER site encompasses hardware, software, and people to store and deliver scientific information (data and metadata, where data may include both tabular and spatial representations). The goal of an Information Management System is to support site and network science by (1) facilitating access to data and metadata by LTER scientists, the scientific community, and the public, and (2) by ensuring the integrity, security, and usability of those data and metadata for future generations.

A successful Information Management System is created and maintained through the coordinated efforts of the Information Manager, other information technology staff, field and laboratory technicians, researchers, and site management. The Information Management System should be evaluated as an integral part of the overall LTER science program at a site.

The review criteria below focus on functionality rather than specific implementation. An IMS may bring together both local and remotely stored information. While technology may change in the future, the functionality of an LTER IMS is expected to remain the same.

LTER sites are expected to show measurable progress toward meeting criteria designated as ‘should’. Other criteria are ‘encouraged’, but are not considered essential. Reviewers should realize that the bar has been set high in this document to encourage excellence. Sites are not expected to score perfectly in all areas but should demonstrate steady progress toward network goals as outlined and prioritized below.

REVIEW CRITERIA

1. **Information Management System design and implementation** 
   1. Scope
      1. Data and metadata should be made available online as specified and prioritized in the LTER Network Data Access Policy [1].
      2. Sites should have a procedure for making data stored offline (e.g., large GIS, remote sensing, or modeling datasets) accessible to the scientific community.
      3. The Information Management System should include an up-to-date list of publications supported by the site LTER program.
      4. Inclusion of catalogs of non-electronic materials managed in support of LTER research (samples, specimens, documents, photographs, etc.) is encouraged.
      5. Sites should be able to provide evidence of data use (e.g., by tracking citations that use site data or tracking data downloads).
   2. Design
      1. The Information Management System should conform to current best practices for critical design features such as data and metadata encoding, short-term backup, long-term media and format migration, system administration, security, and scalability.
      2. Site data and metadata should be backed up regularly and copies stored offsite to protect against disaster.
      3. Sensitive data (such as personal information or location of endangered species) should be protected against misappropriation and misuse.
      4. Sites should provide a mechanism by which site data can be discovered.
      5. Innovations in design or methods, especially where suitable for use by other sites, are encouraged.
   3. Site Information Portal
      1. Data, metadata, and publication list should be well organized, readily located, and easily accessed from the site information portal.
      2. Site information portal should conform to the Guidelines for LTER Web Site Design and Content [2].
      3. Site information portal should contain a list of site data sets with a pointer for each to the repository where it is housed (e.g., PASTA, Arctic Data Center, GenBank)
      4. Innovations in site information portal design and Information Management System interface, especially where suitable for use by other sites, are encouraged.
   4. Documentation
      1. 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.
      2. Inclusion of an up-to-date list of current and completed LTER-related research projects in the Information Management System is encouraged
      3. Online datasets should reflect past and current research at the site. (e.g., the relationship between site products and data sets should be identifiable).
      4. Sites should have a management plan for the Information Management System indicating how critical tasks are accomplished by site personnel.
   5. Review
      1. Site management should conduct internal reviews of the site Information Management System.
2. **Information Management System support for site, network, and community science** 
   1. Integration with site science
      1. 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.
      2. Meetings between the information manager and researchers are encouraged.
      3. Data sets and other information products should be easy to search, find, and download by site researchers.
   2. Policies
      1. Site data release, access, and use policies should comply with LTER Network policies [1].
   3. Site policies should be clearly stated on the site web page.
3. Metadata
   1. Metadata should be of sufficient quality and completeness to ensure long-term (> 20 years) usability of data [3].
   2. Data must comply with quality measures appropriate to the repository where they are archived.
   3. Data sets archived in the LTER NIS must pass the quality control checks implemented in that system. (potentially replacing “Site EML should comply with LTER best practices”?) [4].
4. Data
   1. Data integrity should be protected by appropriate quality control procedures.
5. Contribution to LTER Network and community activities
   1. Site should contribute relevant data and metadata to Network Information System modules approved by the LTER Science Council (ClimDB, SiteDB, etc).
   2. Participation by the Information Manager in other LTER activities such as committees, workshops, and tool development; in community activities such as review teams, panels, and collaborations with informatics partners; and in related research activities such as developing proposals and publications, is encouraged.

REFERENCES

[1] LTER Network Data Access Policy & LTER Network Data Use Agreement.

See LTER Intranet (https://lternet.edu/policies/data-access) for current version.

[2] Guidelines for LTER Web Site Design and Content.

See LTER Intranet (<http://im.lternet.edu/sites/im.lternet.edu/files/LTER_Web_Site_Design_and_Content_Guidelines_V1.1_0.pdf>) for current version.

1. Michener, W. K., J. W. Brunt, J. J. Helly, T. B. Kirchner, and S. G. Stafford. 1997. Nongeospatial metadata for the ecological sciences. Ecological Applications 7:330-342.
2. EML Best Practices for LTER Sites.

See LTER Intranet (<http://im.lternet.edu/sites/im.lternet.edu/files/emlbestpractices-2.0-FINAL-20110801_0.pdf>) for current version.