USGS
science for a changing world

Central Energy Resources Team
Data Management

A Data Management Life-Cycle

Introduction

Documented, reliable, and accessible data and information are essential building blocks supporting scientific research and applications that enhance society's knowledge base (fig. 1). The U.S. Geological Survey (USGS), a leading provider of science data, information, and knowledge, is uniquely positioned to integrate science and natural resource information to address societal needs. The USGS Central Energy Resources Team (USGS-CERT) provides critical information and knowledge on the quantity, quality, and distribution of the Nation's and the world's oil, gas, and coal resources.

By using a life-cycle model, the USGS-CERT Data Management Project is developing an integrated data management system to (1) promote access to energy data and information, (2) increase data documentation, and (3) streamline product delivery to the public, scientists, and decision makers. The project incorporates web-based technology, data cataloging systems, data processing routines, and metadata documentation tools to improve data access, enhance data consistency, and increase office efficiency.

Implementation

In a life-cycle model, data and information are transformed into tangible products and knowledge by a continuous flow in which the output of one process becomes the input of others (fig. 2). Our task-oriented "Find, Get, Use, Deliver, and Maintain" strategy incorporates life-cycle concepts and directs USGS-CERT data management tasks and implementation.

Strategy Components:

Find	Collect, identify, and inventory data assets from project research and other internal and external sources.
Get	Assemble, organize, and document data and products.
Use	Develop and advocate tools, guides, and templates to support projects.
Deliver	Transfer data to users and assist authors in creating paper publications and digital (CD-ROM and World Wide Web) products.
Maintain	Archive, document, and upgrade data, software, and hardware on a continuing basis.

This strategy has resulted in the development and use of numerous tools, techniques, and applications designed to manage information within CERT. These products facilitate data flow within the life-cycle model.

Figure 1. *Access to organized and documented data and information increases knowledge.*

Summary and Future Directions

The Data Management Project addresses USGS science goals and affects how the Central Energy Resources Team manages data and carries out its programs. The tools and processes developed are based on the life-cycle approach and our "Find, Get, Use, Deliver, and Maintain" strategy. Implementing this strategy is improving data organization and access, enhancing project efficiency, and expediting product delivery. The tools are currently being utilized within CERT, and with continued documentation, adaptation, and development, they have application beyond Team and organizational boundaries.

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Data Management Components, Tools, and Utilities

Find/Get

Team Data Library

Documented spatial data repository. Data accessed by projects via dynamic internet map serving and Inventory Database applications.

Archive Library

Long-term storage and maintenance of data and publications. Offline data storage connected to Inventory Database.

Inventory Database

Database of Team Data and Archive Libraries. Users can browse holdings by project, theme, or custom searches.

Use

Metadata Utilities

Web-based metadata creation tools designed for non-technical users. Tools provide online help, examples, and links to Federal standards.

Data Processing Utilities

Web-based resource providing computer system tutorials, data conversion FAQ's, processing routines, and automation scripts.

Project Design

Project-level data management guidelines promoting stewardship, archiving, and scalable data organization.

Intranet Resources

Web-based resource providing CERT and USGS access to data resources, World Wide Web links, system support, and other shared resources.

Deliver

CD-ROM Templates

Development of innovative guides, techniques, and assistance for rapid and consistent digital data publication.

Hypermedia Publications

Easy-to-use internet documents designed to serve the public as well as USGS users.

Maintain

Continual Maintenance

Maintain and upgrade system components as needed. Incorporates user feedback.

Data Management Documentation

Technical documents, guides, and instructions for data management applications, policies, and activities.

Figure 2. *The "Find, Get, Use, Deliver, and Maintain" components and data management utilities.*