Ecosystem Characterization and Monitoring Initiative

Rose Kress
US Army Engineer Research & Development Center

SERDP In Progress Review
27 April 2000

ECMI Phases

PHASE I 1999 - 2001 **DESIGN**	PHASE II 2002 - 2005 **ADAPT**	PHASE III 2006 - **MAINTAIN**
Extended design, implementation and documentation	Adaptation based on: a) initial monitoring results b) SEMP research results c) land management experience	Long-term maintenance and technology upgrades

Monitoring Design Team

- **ECMI Design Team**
- Dr. Rose Kress, Physical Scientist, ERDC
- Dr. Jean O'Neil, Ecologist,ERDC
- Dr. Dave Price, Ecologist, ERDC
- Dr. Dave Tazik, Ecologist, ERDC
- Dr. George Gertner, Biometrician, Univ. of Illinois
- **Coordination & Review**
- Peer Review Group
- SEMP TAC/SAB
- SEMP Researchers
- Fort Benning Staff
- **Consultants**
- Dr. Jim Gosz, LTER Program Coordinator, University of New Mexico
- Dr. Dave Coleman, LTER Site Coordinator, Coweeta Hydrologic Laboratory
- Dr. Dale Magoun, Statistician, University of Louisiana
- Dr. Tony Krzysik, Ecologist, ERDC, CERL

Monitoring Objective

- Characterize the long-term spatial and temporal dynamics of key ecosystem properties and processes
  - conduct baseline ecosystem monitoring in support of SEMP research
  - contribute to host site integrated monitoring plan at the ecosystem level
  - develop long-term ecological data set

Key Properties and Processes

- Those for which fundamental understanding is required to ensure goals of sustainability can be met
  - Hydrologic flux and storage
  - Biological productivity
  - Biogeochemical cycling and storage
  - Decomposition
  - Maintenance of biological diversity

(Christensen, N.L. et. al. 1996. The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. Ecological Applications 6(3):665-691.)

Ecosystem Processes and Properties	ECMI Thematic Monitoring Components	Component Description
Hydrologic flux and storage	Meteorology	Permanent, automated, full feature weather stations
	Surface water flow	Automated recorders; depth and velocity measured, stage-discharge calibrated
	Groundwater	Automated recording shallow wells; level only
Biological productivity	Net primary productivity	Regional images produced by NASA
	Aquatic productivity	Field measurements of periphyton primary productivity rate and algal food quality index
	Woody productivity	Field measured; rate calculated from dbh, height, crown, species relationships; co-located with erosion/deposition transects
	Vegetation density	Standard vegetation density indices derived from Landsat Thematic Mapper imagery
Biogeochemical cycling and storage	Surface water quality	Automated recorders; temperature, pH, nitrate, turbidity, dissolved oxygen, specific conductivity
	Soil Erosion / deposition	Field measured erosion/deposition rates along permanent transects; co-located with woody productivity plots
Decomposition	Aquatic decomposition	Field measurements of weight loss of submersed litter bags; decomposition rate, litter food quality , litter fragmentation rate
Maintenance of biological diversity	Aquatic macroinvertebrates	EPA standard Rapid Bioassessment Protocol (RBP) for benthic macroinvertebrates
	Land cover type	National Vegetation Classification System formation level land cover map derived from Landsat Thematic Mapper imagery
	Land cover pattern	Fragmentation/spatial pattern metrics calculated from land cover map

Terrestrial and Aquatic Monitoring

- **Terrestrial**
  - Land cover type
  - Land cover pattern
  - Vegetation density
  - Net primary productivity
  - Erosion/ deposition
  - Woody productivity

- **Aquatic**
  - Meteorology
  - Surface water flow
  - Surface water quality
  - Aquatic macroinvertebrates
  - Aquatic productivity
  - Aquatic decomposition
  - Groundwater level

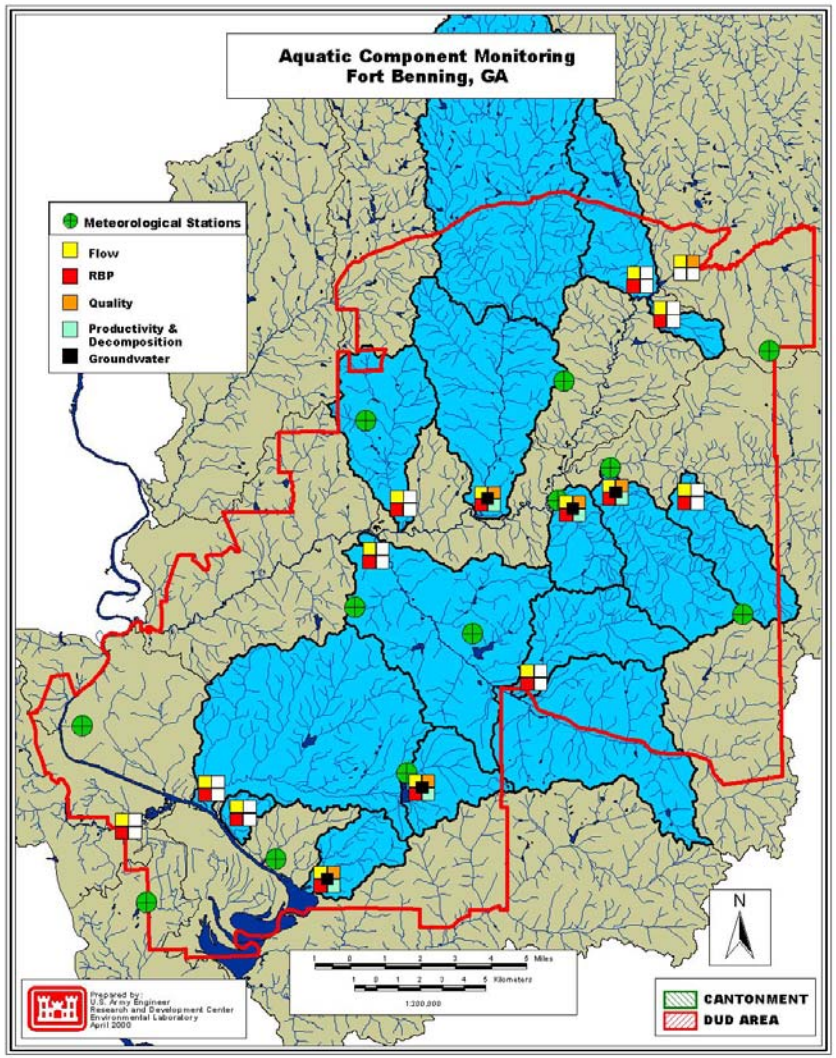
Aquatic

Component	sites	%	note
Meteorology	10	100	
Surface water flow	15	42	13 wshed+Upatoi+Uchee
Surface water quality	6	14	5 wshed +Upatoi
Aquatic macros	14	42	13 wshed +Uchee
Aquatic productivity	5	14	5 wshed
Aquatic decomposition	5	14	5 wshed
Groundwater level	5	14	5 wshed

Terrestrial

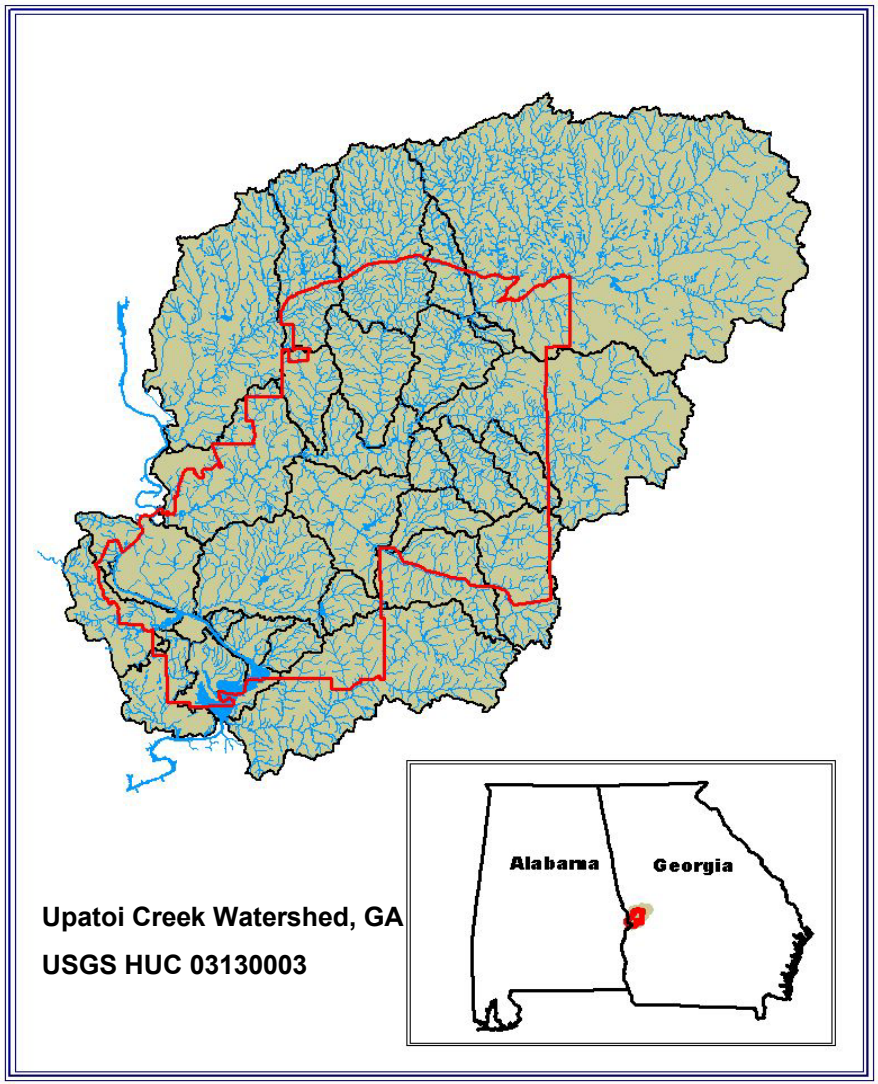
Component	sites	% installation	note
– Land cover type		100	
– Land cover pattern		100	
– Vegetation density		100	
– Net primary productivity		100	
– Erosion/ deposition	90	3	2 wshed +30 LCTA
– Woody productivity	90	3	2 wshed +30 LCTA

Aquatic Component Status



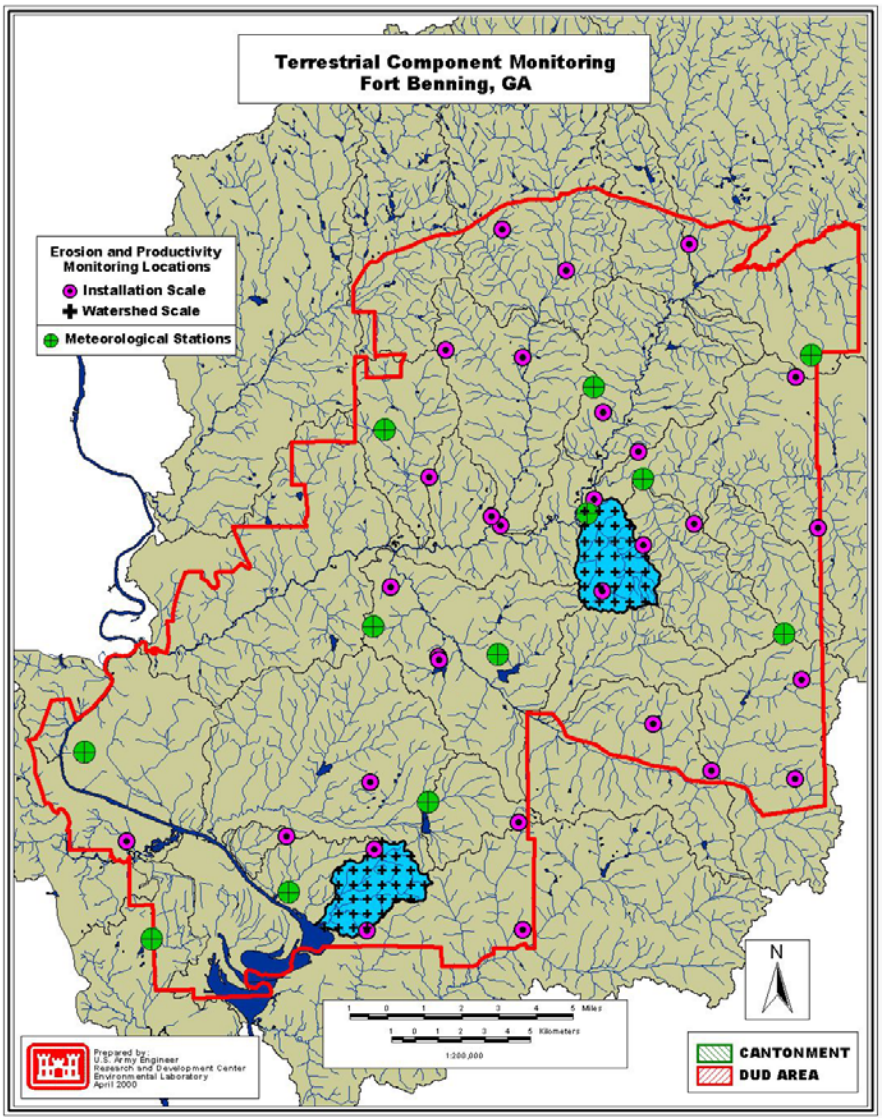
- **Meteorology**
  - ***-Status:*** 10 stations operational
- **Surface flow/quality**
  - ***-Status:*** 2 stations operational; additional sites selected
- **Aquatic macros**
  - ***-Status:*** method, sites selected
- **Aquatic prod/decomp**
  - ***-Status:*** method, sites selected
- **Ground water**
  - ***-Status:*** methods, sites selected

Terrestrial - Remote



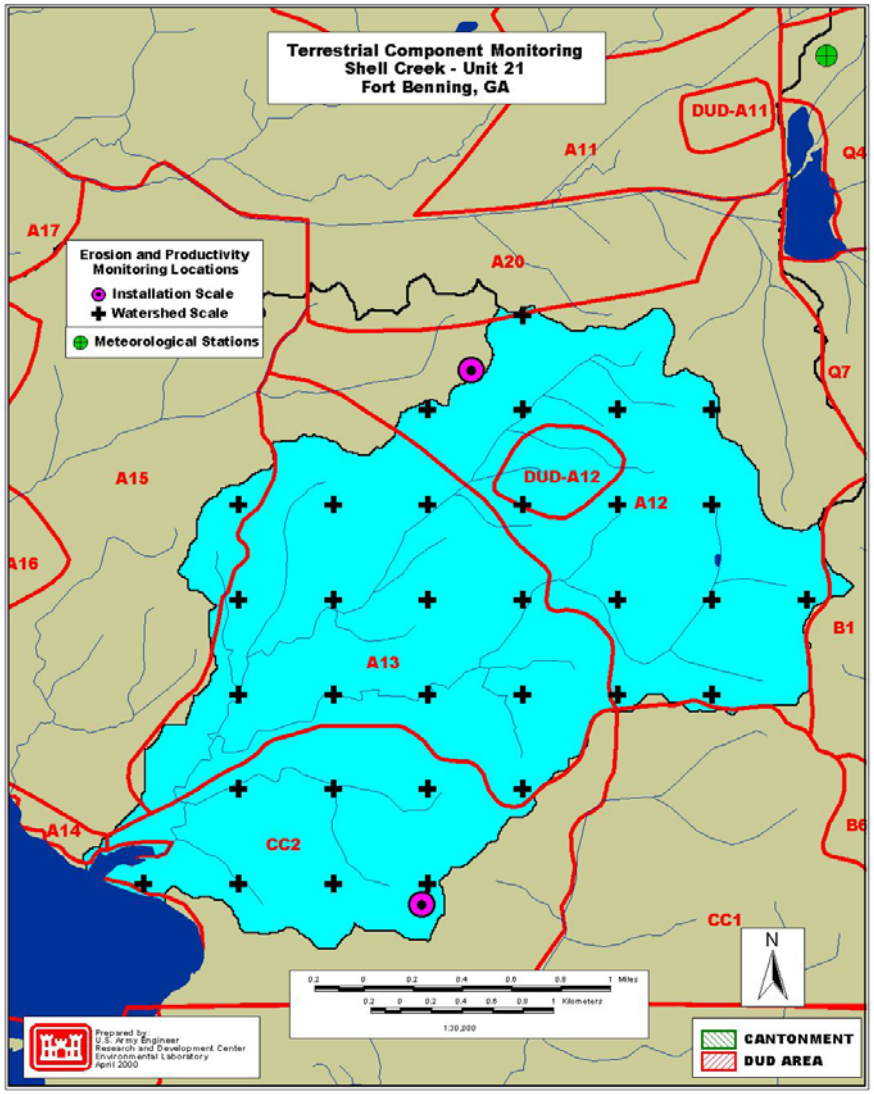
- **NPP** Net primary productivity
  - –***Status:*** MODIS data streaming; /calibration by NASA ongoing; product dates TBA
- **LAND COVER** type/pattern/density
  - –***Status:*** ETM +15 acquired; analysis scheduled

Terrestrial - Ground



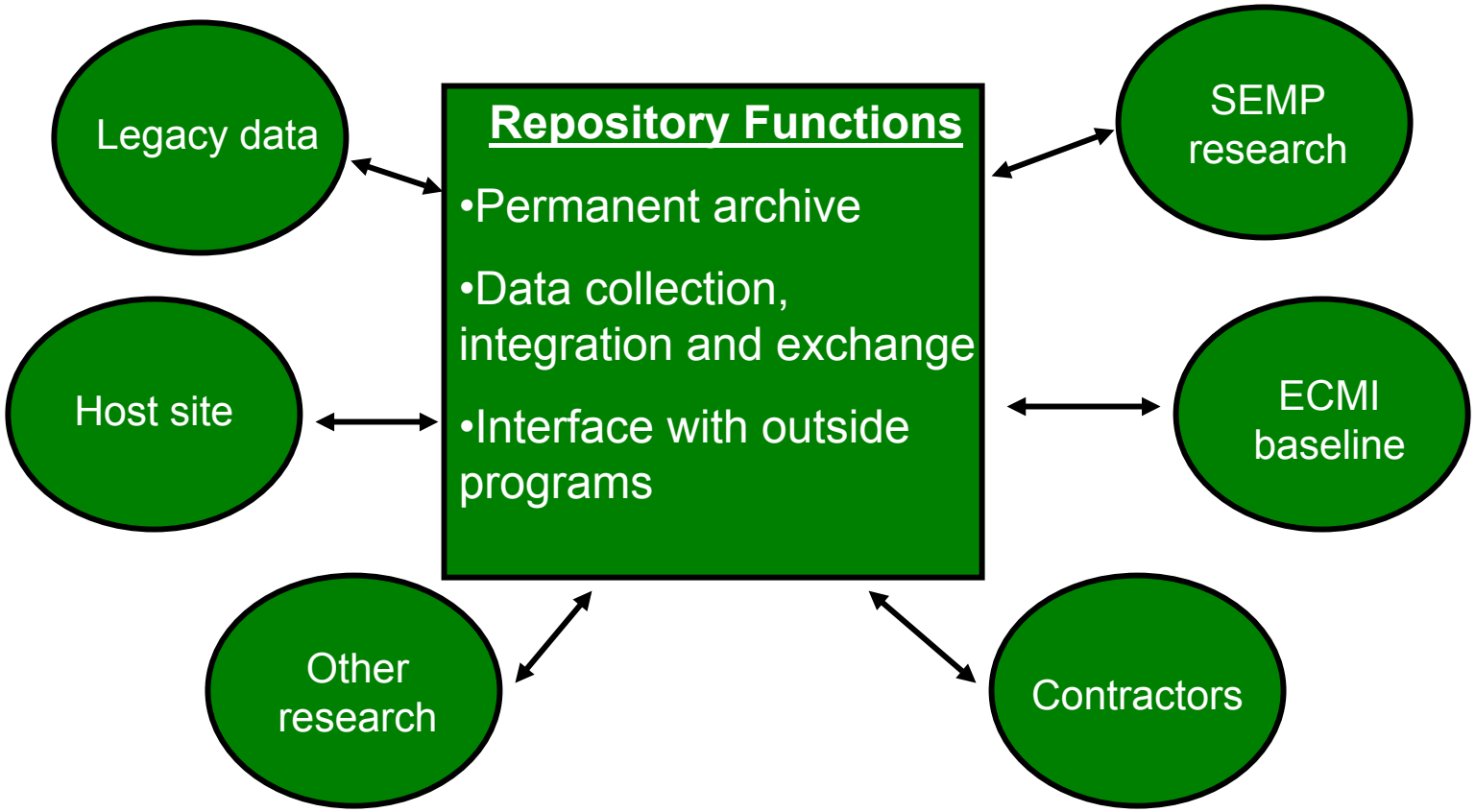
- Erosion/deposition
- Woody productivity
  - –***Status:*** Method and sampling design complete; sites selected

Shell Creek



- Erosion/deposition
- Woody productivity
  - co-located sampling
  - systematic sample from random starting point
  - 30 points per watershed
  - also 30 random LCTA plots from those with woody veg

Data Management



Repository Status

- Prototype functional 11/99
- Operational demo 02/00
- Secure logon SEMP access test 03/00
- Operational 04/00
  - limited, secure access
  - existing data populated (ongoing)
  - user guide available (draft)
- Second generation 04/01

Repository Characteristics

- File-based system; indexed content
- Secure access - migrate to open/secure portions
- Central database - migrate to distributed
- Multiple file formats accepted
- Submit, search, extract functions
- Data indexed upon submission
- Browse, search based on index items (keyword, contributor etc.), read metadata
- Metadata required for submission
- Web-based access; NT server; COTS

Information Infrastructures

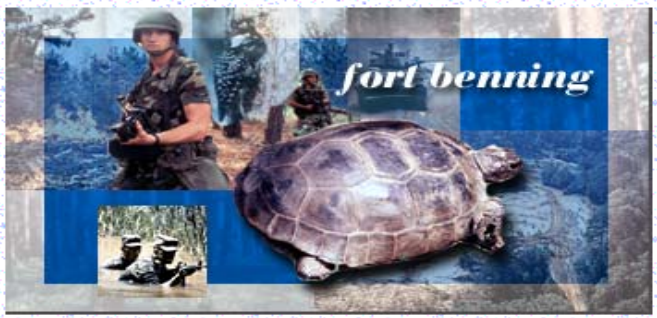
- **SEMP GOAL**: be compatible with and contribute to where reasonable; use lessons learned
- National Biological Information Infrastructure (USGS)
- National Spatial Data Infrastructure (FGDC)
- Fish and Wildlife Information Exchange (USGS)
- Master Environmental Library (DOD)
- State Heritage Program Network (TNC)
- National Geospatial Data Clearinghouse (USGS)
- LTER Data Exchange Network (NSF)
- EIMS Environmental Info Management Sys (EPA)

DoD EPA DOE SERDP
Strategic Environmental Research and Development Program
Improving Mission Readiness Through Environmental Research

US Army Corps of Engineers®

SERDP Ecosystem Management Project (SEMP) - Ecosystem Characterization and Monitoring Initiative Data Repository

(Please use Microsoft Internet Explorer to visit this site. If Netscape is used, some plug-in components from Microsoft needs to be installed)



Home | User ID Request | User Login

Welcome to the SEMP - ECMI Data Repository site. This is a U.S. Government site to support scientists in their research efforts within the DoD, EPA, and DOE. Until further notice, the repository is restricted to those involved with the SEMP project. To participate in the repository, please submit a request for a user-id.

SERDP

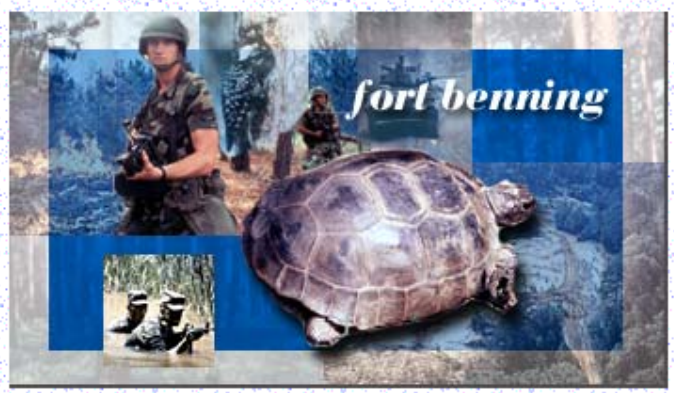
Strategic Environmental Research and Development Program

Improving Mission Readiness Through Environmental Research

US Army Corps of Engineers®

Home | File Format | Member_Listing | DataCatalog | SearchByCategory

SearchByKeyword | Download Data | Data Submission



Supported Data File Formats

File Format | Member_Listing | DataCatalog | SearchByCategory | SearchByKeyword | Download Data | Data Submission

File Type		Description	Examples of Software Needed
GIS	*.e00	This file is an ARC/Info export file; to get a free GIS program called ArcExplorer (which can read these exports), visit Environmental Systems Research Institute, Inc. To import *.e00 files for use into ArcView or ArcExplorer, you will need a copy of Import 71. This program comes w/ ArcView, but must be downloaded separately with ArcExplorer.	GIS software such as ARCView , MapInfo, ER Mapper Import 71
	*.dgn	This file is an Intergraph (Microstation/MGE) Design file. You will need the Microstation software to view or work with these files.	Microstation/MGE
	*.dxf	This file is a Drawing Interchange File. This file format will allow you to import these files into many CAD software applications.	Most CAD and GIS programs support this file format.
Compression	*.zip, *.gz, *.tar	This file was compressed using a PC zip utility, gnu utilities, or Unix/MKS tar utilities.	PKZIP, WinZIP,gzip,tar
Documents	*.doc *.ppt *.txt / *.asc	Microsoft Word Document Microsoft PowerPoint Document General Text or ASCII data	
Tabular	*.xls	Microsoft Excel Spreadsheet	

DATA CATALOG

To download and save a local copy of a particular file, right click on the file link and select "save target as". To display a particular file, left-click on the file link. For proper display of the selected data,, a software package may be needed. Otherwise, the data will be displayed in text or ASCII format using best available method.

Category:	Boundary
Type:	Spatial
Abstract:	
Title:	
Date:	
File Name:	http://206.166.205.170/projects/ECMI/data/boundary/burnunit.e00
MetaDataFileName:	http://206.166.205.170/projects/ECMI/metadata/boundary/boundary001.pdf

Category:	Boundary
Type:	Spatial
Abstract:	
Title:	
Date:	
File Name:	http://206.166.205.170/projects/ECMI/data/boundary/burn9396.e00
MetaDataFileName:	http://206.166.205.170/projects/ECMI/metadata/boundary/burn9399.pdf

Category:	Boundary
Type:	Spatial
Abstract:	
Title:	
Date:	
File Name:	http://206.166.205.170/projects/ECMI/data/boundary/boundary001.e00
MetaDataFileName:	http://206.166.205.170/projects/ECMI/metadata/boundary/boundary001.pdf

SERDP

Home

SEARCH BY KEYWORDS

KeyWord boundary Exact Keywords

Submit Query | Reset

Title	Abstract	Date	Type	Category	City	State	File Name	MetaDataFileName
			Spatial	Boundary	Fort Benning	GA	http://206.166.205.170/projects/ECMI/data/boundary/boundary001.e00	http://206.166.205.170/projects/ECMI/metadata/boundary/boundary001.pdf
			Spatial	Boundary	Fort Benning	GA	http://206.166.205.170/projects/ECMI/data/boundary/burn9396.e00	http://206.166.205.170/projects/ECMI/metadata/boundary/burn9399.pdf
			Spatial	Boundary	Fort Benning	GA	http://206.166.205.170/projects/ECMI/data/boundary/burnunit.e00	http://206.166.205.170/projects/ECMI/metadata/boundary/boundary001.pdf
			Spatial	Boundary	Fort Benning	GA	http://206.166.205.170/projects/ECMI/data/boundary/burn9799.e00	http://206.166.205.170/projects/ECMI/metadata/boundary/boundary001.pdf

SERDP
Strategic Environmental Research and Development Program

US Army Corps of Engineers®

Data Submission

Please provide the following Author's information:

First Name

Last Name

Middle Initial

Title

Organization

E-mail

Please provide information on submitted data:

Report Title

Report Abstract

This report deals with.....

Enter the date of report : – *mm/dd/yy*

Data Category: auditory

Document Type: Spatial/GIS Data

Enter Data Start Date : – *mm/dd/yy*

Enter Data End Date : – *mm/dd/yy*

City/Installation :

State :

Keyword 1:

Keyword 2:

Enter filename:

Enter metadata filename:

Submit Form | Reset Form

Home | Up

User Specified File Upload

Data file to be uploaded for submission to the ECMI Repository

Example: DATAFILENAME.EXTENSION (use appropriate file name extension)

Browse...

Accompanying meta data file to be uploaded for submission to the ECMI Repository

Example: DATAFILENAME.MET (use MET as metadata file name extension)

Browse...

Upload