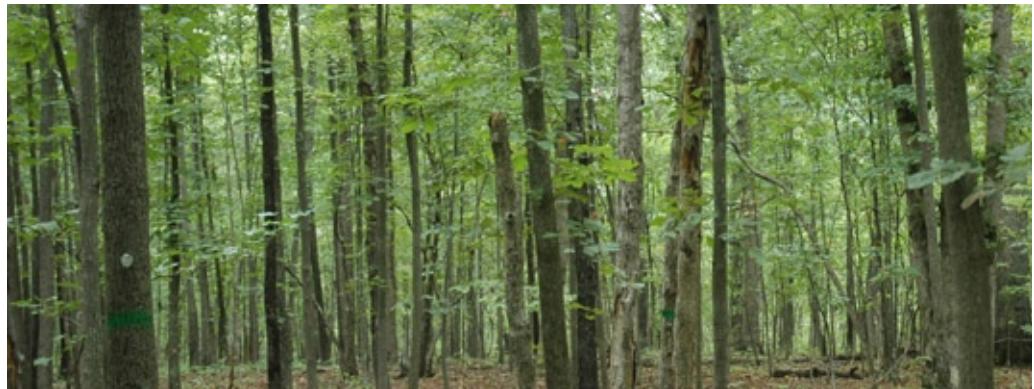




Mid-Atlantic Network

Data Management Plan

Natural Resource Report NPS/MIDN/NRR—2009/077



ON THE COVER

Fall foliage at Valley Forge National Historical Park; silver spotted skipper (*Epargyreus clarus*) on milkweed (*Asclepias spp.*) at Shenandoah National Park; forest at Fredericksburg and Spotsylvania National Military Park

Mid-Atlantic Network

Data Management Plan

Natural Resource Report NPS/MIDN/NRR—2009/077

Kristina K. Callahan and Sarah M. Wakamiya
Mid-Atlantic Network
National Park Service
120 Chatham Lane
Fredericksburg, VA 22405

January 2009

U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

The Natural Resource Publication series addresses Natural Resource topics that are of interest and applicability to a broad readership in the National Park Service and to others in the management of natural resources, including the scientific community, the public, and the NPS conservation and environmental constituencies. Manuscripts are peer reviewed to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and is designed and published in a professional manner.

Natural Resource Reports are the designated medium for disseminating high priority, current Natural Resource management information with managerial application. The series targets a general, diverse audience, and may contain NPS policy considerations or address sensitive issues of management applicability. Examples of the diverse array of reports published in this series include vital signs monitoring plans; "how to" resource management papers; proceedings of resource management workshops or conferences; annual reports of resource programs or divisions of the Natural Resource Program Center; resource action plans; fact sheets; and regularly published newsletters.

Views, statements, findings, conclusions, recommendations and data in this report are solely those of the author(s) and do not necessarily reflect views and policies of the U.S. Department of the Interior, NPS. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the National Park Service.

Printed copies of reports in these series may be produced in a limited quantity and they are only available as long as the supply lasts. This report is also available from the I&M Mid-Atlantic Network Web site (<http://science.nature.nps.gov/im/units/midn/>) and the Natural Resource Publications Management Web site (<http://www.nature.nps.gov/publications/NRPM>) on the Internet, or by sending a request to the address on the back cover.

Please cite this publication as:

Callahan, K.K., and S. M. Wakamiya. 2009. Mid-Atlantic Network data management plan. Natural Resource Report NPS/MIDN/NRR—2009/077. National Park Service, Fort Collins, Colorado.

Change History

Version numbers will be incremented by a whole number (e.g., Version 1.3 to Version 2.0) when a change is made that significantly affects requirements or procedures. Version numbers will be incremented by decimals (e.g., Version 1.6 to Version 1.7) when there are minor modifications that do not affect requirements or procedures included in the plan.

The following revisions have occurred to this plan since January 31, 2009

Original Version #	Date of Revision	Revised By	Changes	Justification

Contents

Executive Summary	xv
Chapter 1: Introduction and Background.....	1
1.1 Inventory and Monitoring Program.....	1
1.2 The Mid-Atlantic Network.....	1
1.3 Data Management Overview.....	1
1.4 MIDN Data Management Goals	2
1.5 National Data Management Plan.....	2
1.6 Intended Audience and Layout of the Data Management Plan.....	3
1.7 Revisions	3
Chapter 2: Infrastructure and Systems Architecture	5
2.1 Introduction	5
2.2 Objectives	5
2.3 Computer Infrastructure	5
2.4 Introducing Bob.....	6
2.5 Local Workstations.....	6
2.6 Data File Folder Structure	6
2.7 MIDN Websites	7
2.8 Standard Operating Procedures.....	7
Chapter 3: Project Management and the Data Life Cycle	9
3.1 Introduction	9
3.2 Objectives	9
3.3 Project Work Flow	9
3.3.1 Planning and approval	9
3.3.2 Design and testing.....	9
3.3.3 Implementation	10
3.3.4 Product integration	11
3.3.5 Evaluation and closure	11
3.4 Project Data Life Cycle	11
3.5 Standard Operating Procedures.....	11
Chapter 4: Data Management Roles and Responsibilities	13
4.1 Introduction	13
4.2 Objectives	13
4.3 National Level Staff and Coordination	13
4.4 Northeast Region Data Management Staff.....	13
4.5 Mid-Atlantic Network Staff	14
4.5.1 Coordinator/Ecologist	14
4.5.2 Data Manager/Biologist	14
4.5.3 Seasonal Biotechnicians	15
4.5.4 North Carolina State University Field Technical Support Center (NCSU FTSC)	15
4.6 Park Level Data Management Staff.....	15
4.7 Data Management Coordination	16
Chapter 5: Databases.....	17
5.1 Introduction	17

5.2 Objectives	17
5.3 Project Database Standards.....	17
5.4 Natural Resource Database Template	17
5.5 Natural Resource Monitoring Protocols Clearinghouse	17
5.6 Standard Operating Procedures.....	17
 Chapter 6: Data Acquisition, Processing and Reporting	19
6.1 Introduction	19
6.2 Objectives	19
6.3 Types of Data	19
6.4 Mid-Atlantic Network Data	19
6.4.1 Inventory Projects	19
6.4.2 Monitoring Data.....	20
6.5 National Park Service Data	20
6.5.1 Data Mining	20
6.6 External Data.....	21
6.7 GIS Data	21
6.8 Standard Operating Procedures.....	21
 Chapter 7: Quality Assurance and Quality Control	23
7.1 Introduction	23
7.2 Objectives	23
7.3 File Naming.....	23
7.4 Standards and Review Procedures.....	23
7.5 Monitoring Protocol Development	24
7.6 Standard Operating Procedures.....	24
 Chapter 8: Documentation	25
8.1 Introduction	25
8.2 Objectives	25
8.3 Network Standards	25
8.4 Spatial Data Documentation	25
8.5 Tabular Database Documentation.....	26
8.6 Vital Signs Protocol Documentation	26
8.7 Standard Operating Procedures.....	26
 Chapter 9: Data Ownership and Sharing	27
9.1 Introduction	27
9.2 Objectives	27
9.3 Data Ownership	27
9.4 Data Sensitivity	27
9.5 Access Restrictions to Sensitive Data.....	28
9.6 Standard Operating Procedures.....	28
 Chapter 10: Data Dissemination	29
10.1 Introduction	29
10.2 Objectives	29
10.3 Data Distribution.....	29
10.3.1 NatureBib	29

10.3.2 NPSpecies	29
10.3.3 NPS Data Store	30
10.3.4 NPS Focus	30
10.3.5 Electronic Technical Information Center (ETIC)	30
10.3.6 Northeast Region (NER) Philadelphia Science Office (PHSO).....	31
10.3.7 U.S. Geological Survey (USGS)-NPS Vegetation Mapping Website.....	31
10.3.8 Mid-Atlantic Network Website	31
10.4 Feedback Mechanisms	31
 Chapter 11: Records Management and Object Curation 33	
11.1 Introduction	33
11.2 Objectives	33
11.3 Digital Data Maintenance.....	33
11.3.1 Short-Term Data Sets.....	34
11.3.2 Long-term Monitoring of Data Sets	34
11.3.3 Spatial Data.....	35
11.4 Storage and Archiving Procedures for Digital Data.....	35
11.4.1 Storage Facilities for Electronic Archives	37
11.4.2 Directory Structure for Electronic Archives.....	37
11.4.3 Backup Procedures for Digital Data	37
11.4.4 Data and Network Security.....	37
11.5 MIDN Storage of Hard-Copy and Digital Reports	38
11.6 Specimens	38
11.7 Photographs	38
11.7.1 Aerial Photographs.....	38
11.8 Role of Curators in Storage and Archiving Procedures	39
11.9 Standard Operating Procedures	39
 Chapter 12: Project Tracking and Documentation 41	
12.1 Introduction	41
12.2 Objectives	41
12.3 Project Tracking	41
 Chapter 13: Implementation 43	
13.1 Introduction	43
13.2 Objectives	43
13.3 Network Implementation	43
 Literature Cited 45	

Tables

Table 1.1. Categories of data products and project deliverables	2
Table 6.1. Examples of park-based natural resource information that is processed or documented by the Network	20
Table 11.1. Digital Data Tracking Database.	35
Table 11.2. Air Photo Tracking Database.....	39

Figures

Figure 1.1. National park units in southeastern Pennsylvania and Virginia that comprise the Mid-Atlantic Inventory and Monitoring Program Network	1
Figure 1.2. Conceptual Layout of the MIDN Data Management Plan.....	3
Figure 2.1. Screen capture of the MIDN data file folder structure.....	6
Figure 2.2. Screen capture of the public Mid-Atlantic Network website.....	7
Figure 2.3. Screen capture of the internal Mid-Atlantic Network website.....	8
Figure 3.1. Project and data workflow with core data management activities in bold	10
Figure 10.1 Screen capture of the NPS Data Store website.	30

Supplemental Documents

- MIDN Directory Structure Guidance Document
- NER Inventory Product Review Work Flow
- NER Vegetation Mapping Project Work Flow
- NER NatureBib Data Management Plan
- NER NatureBib Data Management and Data Entry Standards Manual
- NER NPSpecies Data Management Plan
- NER Species Certifier's Guide
- NER NPSpecies Data Entry Standards
- NER NPSpecies Museum Voucher Fields
- NER NPSpecies Observation Form
- NER GIS Specifications
- NER GPS Metadata Form
- MIDN File Naming Guidelines
- NER I&M Product Specifications
- NER Biological Metadata Tools

Acronyms

ANCS+: Automated Cataloging System	NERO: Northeast Regional Office
APCO: Appomattox Court House National Historical Park	NPS: National Park Service
ASCII: American Standard Code for Information Interchange	NRDT: Natural Resource Database Template
BIL: Band Interleaved by Line	NRPC: Natural Resource Program Center
BOD: Board of Directors	PETE: Petersburg National Battlefield
BOWA: Booker T. Washington National Monument	PHSO: Philadelphia Science Office
CSDGM: Content Standards for Digital Geospatial Metadata	QA: Quality Assurance
DMP: Data Management Plan	QC: Quality Control
EISE: Eisenhower National Historic Site	RICH: Richmond National Battlefield Park
ESRI: Environmental Systems Research Institute	SAC: Science Advisory Committee
FGDC: Federal Geographic Data Committee	SHEN: Shenandoah National Park
FOIA: Freedom of Information Act	SOP: Standard Operating Procedures
FRSP: Fredericksburg and Spotsylvania National Military Park	TAC: Technical Advisory Committee
FTSC: Field Technical Support Center	TIC: Technical Information Center
GETT: Gettysburg National Military Park	TIFF: Tagged Image File Format
GIS: Geographic Information System	USGS: U.S. Geological Survey
GMP: General Management Plan	VAFO: Valley Forge National Historical Park
GPS: Global Positioning System	XML: Extensible Markup Language
HOFU: Hopewell Furnace National Historic Site	
I&M: Inventory and Monitoring	
IMG: Imagine	
IT: Information Technology	
ITD: Information Technology Division	
JPEG: Joint Photographic Experts Group	
LAN: Local Area Network	
MIDN: Mid-Atlantic Network	
Mr. SID: multiresolution seamless image database	
NBII: National Biological Information Infrastructure	
NCSU: North Carolina State University	
NER: Northeast Region	

Executive Summary



The central mission of the National Park Service (NPS) Inventory and Monitoring (I&M) Program is to provide timely and usable scientific information about the status and trends of park resources to park managers. To meet this challenge, a method for data management that can effectively produce, maintain, and distribute the products of scientific investigation conducted in our parks is required.

Good data management provides the means by which a thorough understanding of the value of scientific information about our natural resources can become a part of the National Park Service heritage. Data management refers to the framework by which data are acquired, maintained, and subsequently made available. Data management is not an end unto itself, but a means of maximizing and insuring the quality and utility of our natural resource information. A robust data management system is particularly important for long-term programs where the life span of a data set will span the careers of several scientists. Sound data management is vital to the success of any long-term research program.

The purpose of the Mid-Atlantic Network's data management plan is to provide the I&M Program and park staff with a conceptual framework for a method of data management that will ensure the production and dissemination of scientific information about the status and trends of park resources. The goals of the Mid-Atlantic Network (MIDN) data management program are to make data and information:

- Available - Data are discoverable, accessible, and easily located.
- Usable - Data are stored in a stable, reliable, and interpretable data retrieval system.

- Shareable - Data products are complete, certified for quality assurance, screened for sensitive information, formatted for use, and documented for interpretation by others.
- Integrated - Data products are consistent with data exchange standards, interoperable with related natural resource data sets, and collected and stored in a way that optimizes the tradeoff between meeting local needs and achieving compatibility with other agencies and partners.
- Interpreted - Data have been reviewed, summarized, and transformed into useful information.

This plan is to be used in conjunction with the Data Management Guidelines for Inventory and Monitoring Networks (NPS 2008). These guidelines are referred to as the national-level data management plan (DMP), which describes national policies and overall principles used across all I&M Program networks. The structure of the Data Management Plan for the Mid-Atlantic Network and much of its content is derived from the national DMP. This plan provides details for how data management activities will be conducted within the network and specifically describes how MIDN will:

- Support Inventory and Monitoring Program objectives
- Acquire and process data
- Assure data quality
- Document, analyze, summarize, and disseminate data and information
- Maintain nationally developed data management systems

Great spangled fritillary (*Speyeria cybele*) on milkweed (*Asclepias spp.*)

White-tail deer (*Odocoileus virginianus*) at Valley Forge National Historical Park

