



Data and Information Management Plan

Arctic Network Inventory & Monitoring Program

Natural Resource Report NPS/ARCN/NRR—2008/053



ON THE COVER

(Bull moose in the morning sun, Noatak National Preserve)

Photograph by: Lois Dalle-Molle, NPS

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4175 Geist Road

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August, 2008

U.S. Department of the Interior

National Park Service

Natural Resource Program Center

Fort Collins, Colorado

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Please cite this publication as:

National Park Service. 2008. Data and information management plan: Arctic Network Inventory and Monitoring Program. Natural Resource Report NPS/ARC/NRR—2008/053. 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 August 29, 2008

<i>Version #</i>	<i>Date</i>	<i>Revised by</i>	<i>Changes</i>	<i>Justification</i>

Contents

Figures and Tables	ix
Acknowledgements	x
Chapter 1. Introduction	1
About the Arctic Network.....	1
Purpose and Scope	2
Data Management and the Inventory and Monitoring mission	3
Goals of the Inventory and Monitoring Program.....	3
Data Management Goals.....	4
Data as a Valued Commodity	4
Data Management Expectations	4
Revisions to this Plan.....	5
Chapter 2. Data Management Infrastructure and System Architecture	7
Architecture.....	7
NPS Infrastructure	9
National Applications	10
Alaska Region Infrastructure	11
Park and Network-Level Infrastructure	11
Chapter 3. Data Management Process and Workflow	13
Project Process	13
Planning and Approval	14
Design and Testing	15
Implementation	15
Product Integration.....	15
Evaluation and Closure	15

Chapter 4. Data Management Roles and Responsibilities	17
Roles and Responsibilities	17
Chapter 5. Data Acquisition and Processing.....	21
Network Data	21
National Park Service Data.....	22
External Data	24
Museums and Herbaria	24
National and State Agencies	24
Non-Governmental and Other Organizations	24
GIS Data.....	24
Data Management Process	24
Acquisition of New Spatial Data	25
Maintaining Digital Files	25
Data Discovery.....	26
Chapter 6. Quality Assurance and Quality Control	27
National Park Service Mandate for Quality	27
Data Quality Goals and Objectives.....	28
Quality Assurance and Control Duties	28
QA/QC Process Cycle.....	30
Project Planning and Database Design	31
Database Design - Record-level Tracking	31
Lookup Tables	31
Project SOPs	32
Data Acquisition	32
Data Entry	33

Verification and Validation.....	33
Methods for Data Verification	34
Supplementary Methods	34
Validation.....	35
Methods for Data Validation	35
Data Quality Review and Communication	36
Conformance.....	36
Documenting and Communicating Quality	37
Data and File Management Operations.....	37
File Naming Standards.....	37
Version Control.....	38
Laboratory Data	38
Chapter 7. Data Documentation.....	39
Metadata Profile.....	39
Documentation Roles and Responsibilities	40
Metadata Tools.....	40
Metadata Process	40
Metadata Maintenance	42
Protocol Versions.....	42
Non-Program Data Documentation	42
Derived Data Documentation	42
Legacy Data Documentation.....	42
Chapter 8. Data Analysis and Reporting.....	43
Analysis.....	43
Reporting.....	43

Long-term Trends and Analyses	44
Funding and Timeliness	44
Chapter 9. Data Dissemination	45
Introduction.....	45
Data Distribution Mechanisms	45
Data Ownership	46
National Park Service Policy on Data Ownership	46
Establishing Data Ownership: Cooperative or Interagency Agreements	47
Data Classification: protected vs. public	47
Access Restrictions on Sensitive Data.....	49
Dissemination Mechanisms	50
Arctic Network Primary Server	51
Non-monitoring data.....	51
Alaska Resources Library and Information Services (ARLIS)	51
NPS Focus.....	52
Water Quality Data	52
Data Availability.....	52
Data Release Policy	52
Feedback Mechanisms	53
Data Error Feedback Response Procedures	53
Chapter 10. Data Maintenance, Storage and Archiving	55
Data Maintenance	55
Spatial Data.....	55
Files.....	56
File Backup Plan.....	56

Hardcopy Data and Information - Maintenance	56
Finalized Digital Datasets	56
Physical Material Archival	56
Project Related Items	57
Photographs.....	57
Chapter 11. Implementation.....	59
References.....	61

Figures and Tables

Figure 1. Arctic Network Parks	2
Figure 2. Relationship of the national-level data management plan to network-level data management documents adopted from chapter 1.2 of the Data management guidelines for inventory and monitoring networks (National Park Service 2008).	3
Figure 3. An enterprise client-server database will be the heart of the Arctic Network data management system.	8
Figure 4. Arctic Network generalized workflow showing major data repositories	9
Figure 5. Principle information technology components.....	10
Figure 6. Information technology connectivity between Network, Park and National operations.	12
Figure 7. Project life cycle	14
Figure 8. Some common data management elements affecting degree of need for QA/QC. Planning and training for data collection (QA) and entry is always a premium.....	28
Figure 9. General course of data and associated QA/QC procedures. Quality control with regards to data analysis is specific to each project and addressed in appropriate standard operating procedures.	30
Figure 10. The metadata document contains all information pertaining to project data.	39
Figure 11. Generalized path of data within the Arctic Network. The primary data server is accessed via desktop and web-based applications. Analyzed or derived data products are stored on the primary server, archived and catalogued (integrated) along with certified data.....	41
Figure 12. Water quality data flow.	52
Table 1. The principal Inventory and Monitoring applications and data repositories.	10
Table 2. Data stewardship responsibilities at each phase in the project life cycle.	17
Table 3. Network personnel roles and responsibilities	18
Table 4. Examples of park-based natural resource information that is processed or documented by the network.....	22
Table 5. Data quality roles and responsibilities	29
Table 6. Repositories for Arctic Network Program data and information.....	51

Acknowledgements

We the willing, led by the unknowing, are doing the impossible for the ungrateful. We have done so much, with so little, for so long, we are now qualified to do anything, with nothing.

--The Metro Para pledge

Anyone who does much snowshoeing in Alaska knows that the person out in front breaking trail does all the work for those who follow. I derived, adapted, and at times outright copied much of the material in this plan from a group of visionary trailbreakers to whom I am greatly indebted. I would like to thank the following individuals who said what needed to be said much better than I ever could: Doug Wilder (Central Alaska Network), Dorothy Mortenson (Southwest Alaska Network), Rob Daly (Greater Yellowstone Network), John Boetch (North Coast Cascades Network), Brent Frakes (Rocky Mountain Network) and Margaret Beer, (Inventory and Monitoring Washington Support Office). I am deeply indebted to all the data managers who started ahead of me in our phased implementation. Your efforts have cleared an easy path for those of us who follow.

Chapter 1. Introduction

Capt. Kirk: Spock, give me an update on the dark area ahead.

Spock: No analysis due to insufficient information.

Capt. Kirk: No speculation, no information, nothing? I've asked you three times for information on that thing and you've been unable to supply it. Insufficient information is not sufficient, Mr. Spock! You're the science officer.

You're supposed to have sufficient data all the time.

--"Star Trek" (1966)

No resource management enterprise can make objective, rational decisions to meet its objectives without good data. In the absence of sensed and quantified information decisions can only be based on assumptions, emotion and intuition. The National Park Service's Inventory and Monitoring program was developed to address the growing need among park managers for scientific information on which to make management decisions. The Inventory & Monitoring Program has committed to a building a program of effective ecosystem monitoring using state of the art data management practices to supply park managers with sound scientific information. This plan provides the vision and the roadmap for successfully accomplishing the Arctic Network's data management goals.

About the Arctic Network

The Arctic Network is one of thirty-two networks in the National Park Service's Inventory and Monitoring program and one of four networks in Alaska. The network consists of five public parklands, all of which are located in northwestern Alaska (Figure 1):

- Bering Land Bridge National Preserve
- Cape Krusenstern National Monument
- Noatak National Preserve
- Kobuk Valley National Park
- Gates of the Arctic National Park and Preserve

These parks are among the largest and most remote of all the national park lands and cover myriad arctic and subarctic habitats from the western sea coast to the eastern peaks of the Brooks Range. Administratively, the Arctic Network is integrated with and operates out of the Fairbanks Administrative Center in Fairbanks, Alaska and the Western Arctic Parklands offices in Nome and Kotzebue, Alaska. More information about the Arctic Network can be found on the web at <http://science.nature.nps.gov/im/units/arcn/index.cfm>.



Figure 1. Arctic Network Parks

Purpose and Scope

This document is not intended to address national I&M Program guidelines, Directors Orders, or legislative requirements. These items are addressed in Data management guidelines for inventory and monitoring networks, also referred to as the National Data Management Plan (National Park Service 2008), which provides broad guidance in terms of the National I&M Program, NPS Directives, and other legislative requirements.

This network-level data management plan is intended to act as a supplement to the National Data Management Plan, and function as a guide for establishing and maintaining a system that serves the specific data management needs of the Arctic Network. This plan establishes the general concepts and procedures the Arctic Network, its cooperators, partners, and potentially individual park units will use to ensure the quality, interpretability, security, longevity, and availability of program data and related information. Projects initiated by this program and the personnel involved with those projects must follow the guidance provided in this plan.

This plan will reference stand-alone standard operating procedures and task instructions that provide details on specific network operational procedures (i.e., back-up procedures, document and data documentation, document and data tracking, etc.). Figure 2 shows the relationship of the national-level data management plan to network-level data management documents. Standard operating procedures are available on the Arctic Network website and file server.

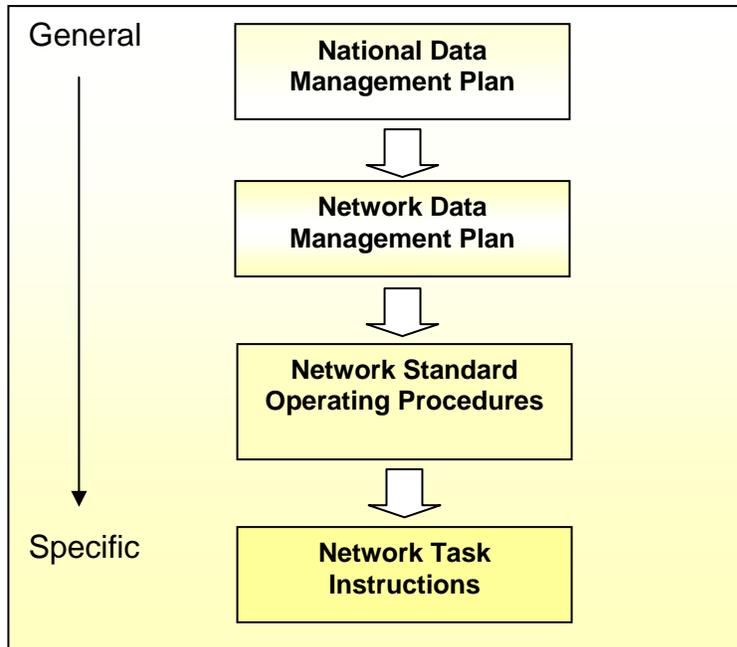


Figure 2. Relationship of the national-level data management plan to network-level data management documents adopted from chapter 1.2 of the Data management guidelines for inventory and monitoring networks (National Park Service 2008).

Data Management and the Inventory and Monitoring mission

Providing sound, quantifiable information to park managers is a laudable goal for the Inventory and Monitoring program. Program directors have acknowledged that while such a goal is worthwhile, it is not easy without technical support. Someone has to keep the hardware spinning and the numbers crunching in order to reliably funnel synthesized information to individuals needing it. Data management fulfills this role by providing expertise in the technical aspects of biological science including client-server databases, application development, metadata generation, web development and geographic information systems. By expressing up-front support for data management the Inventory and Monitoring program is not only publicly committing to a culture of good data management practices but also expressing pride in the program's resulting technical products.

Goals of the Inventory and Monitoring Program

The Inventory and Monitoring program has five broad goals:

1. Inventory the natural resources under National Park Service stewardship to determine their nature and status.
2. Monitor park ecosystems to better understand their dynamic nature and condition and to provide reference points for comparisons with other, altered environments.
3. Establish natural resource inventory and monitoring as a standard practice throughout the National Park system that transcends traditional program, activity, and funding boundaries.
4. Integrate natural resource inventory and monitoring information into National Park Service planning, management, and decision making.

5. Share National Park Service accomplishments and information with other natural resource organizations and form partnerships for attaining common goals and objectives.

Data Management Goals

The Arctic Network's main data management goals are listed below:

- Acquire, store, manage and archive Arctic Network data
- Ensure high data quality
- Document and disseminate data and information
- Ensure the long-term access to and utility of data.

Data as a Valued Commodity

Data is an expensive asset. Data acquisition is time-consuming, arduous, and typically very costly. Despite the recognition of data's value, data management has, historically taken a backseat to higher priority activities such as publishing results and obtaining funding for new research. The causes for this lack of dedication toward good data management are varied but generally include a traditional lack of:

1. User-friendly software
2. Metadata standards
3. Internet data warehouses and data servers
4. Internet in any consistent and reliable form
5. Expertise in database design and data normalization
6. Requirements from funding agencies to publish data along with results
7. Culture of data stewardship
8. Mandates for data management funding

This situation is changing, however. Good data management practices are becoming more commonplace with time. Organizations are realizing the secondary value of data to large-scale synthetic research works as well as landscape modeling efforts that rely on data from many small, on the ground projects. Well documented and preserved data is also valuable for opportunistic research projects, or background information on which to base estimates of trend or for time-series comparisons. Indeed major funding agencies are now requiring that data be published with results. Government agencies are following suit and the Inventory & Monitoring program is leading the charge. The NPS Inventory and Monitoring program has mandated visionary provisions for data management staffing and funding.

Data Management Expectations

- Inventory and Monitoring data will be held to a high standard of quality
- Data management will be a collaborative effort benefitting everyone in the network. Each stakeholder must commit the time and resources required
- Data management will be a forethought, rather than an afterthought
- Data management requires support from our collaborators in establishing and reinforcing a culture of good data management practices

Revisions to this Plan

Success seldom emerges fully fledged on the first try. Success is rather the very public culmination of a hidden, cyclical path of trial, failure, learning and revision. As our program progresses we fully expect to make and learn from mistakes. We also will keep aware of new technologies and potential partnerships and attempt to exploit them for the benefit of the program. Most of all, we will not hesitate to modify this document if it will enhance the probability of achieving our goals.