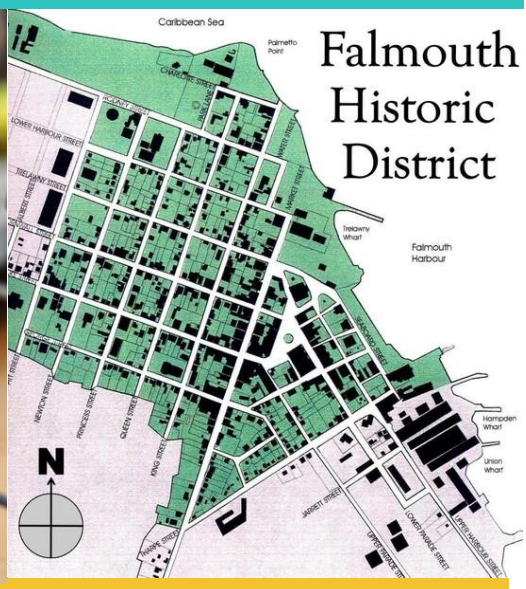
MINISTRY OF ECONOMIC GROWTH
AND JOB CREATION

GEOSPATIAL METADATA HANDBOOK



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1 Mandate of the National Spatial Data Management Division

The National Spatial Data Management Division (NSDMD) is mandated to manage the development and implementation of a national spatial data infrastructure (NSDI), while providing advice on policies, legislations and regulations supported by comprehensive and accurate spatial data. Metadata creation and maintenance is an integral component of a good NSDI development. It is therefore relevant for geospatial technicians familiarize themselves with basic standards and operating procedures, which will influence their data management activities.

1.1 Vision Statement

To provide geospatial data, products and services that are current, available and accessible, to all users to facilitate planning, management and use of the island's resources thereby contributing to sustainable development and economic growth.

1.2 Mission Statement

To coordinate the development, implementation, maintenance and management of a national spatial data infrastructure and to promote the sharing and use of geospatial data so citizens, communities and government can access and use place-based data to make better decisions

The NSDMD believes that good spatial data is at the essential to good decision making. This handbook is designed to prepare technicians at an early stage to begin good habits in metadata collection and maintenance. The importance of spatial data of good quality to research and analysis in academics presents a clear visual area of impact and can facilitate targeted interventions to specifically identified areas.

2 Division Overview

The NSDMD provides national strategic direction, leadership, policy development, and management of the SDI. Its responsibilities make it central to the promotion and growth of Jamaica's geospatial sector and most importantly an enabler for national development.

2.1 Objectives:

1. Develop the policy framework and guidelines for the development and growth of the local geo-informatics sector,
2. Foster the creation and maintenance of a skilled, relevant and innovative geo-informatics workforce,
3. Create the framework which facilitates and provides access to geospatial data among all stakeholders,
4. Create and manage a national geospatial portal/clearinghouse,
5. Adopt/adapt/create and maintain national standards for spatial data collection, management, discovery and exchange,
6. Promote and facilitate the creation and maintenance of digital spatial data sets
7. Provide LICJ members with technical guidance and support.

The NSDMD's team comprises of multidisciplinary and technically sound geospatial technicians with years of experience and expertise in the field of geospatial technology. It is the divisions aim to provide through our interactions with both local and international clients, world class products and services. The NSDMD is also involved in building capacity in geospatial technicians through the many training initiatives undertaken over the years.

2.2 Contact information:

National Spatial Data Management Division
Land Information Council of Jamaica
Ministry of Economic Development & Job Creation
191 Old Hope Road Kingston 6, Jamaica.
Tel: 876 -630-1850-1 Fax: 876 -970-1752

3 Metadata Guidelines[1] for Jamaica

The NSDMD has compiled a basic guideline document that outlines metadata principles as an approved framework in assisting geospatial technicians in creating and managing metadata records. It has adopted the ISO 19115 Metadata Content Standard and established core mandatory metadata elements from the ISO standard to the local geospatial context.

Other Elements of the Guidelines include:

- Common terminologies and definitions
- Preparation of a geo-spatial data inventory
- Identify and make priority data sets for metadata creation
- Capture and maintain metadata for data sets created
- Continuous metadata creation and maintenance in organizations
- Ensure that the approved standard is adhered to by organizations
- Recommended tools are ESRI's ArcGIS ArcCatalog and ArcView Metadata Collector - metadata2.avx extension
- Ensure geospatial data are accompanied by metadata
- Ensure that metadata is made available to users
- Development of a work plan for a National Metadata Clearinghouse
- Participate and host metadata training sessions

3.1 Defining Metadata

Used in the context of digital spatial data, metadata is the background information, which describes the content, quality, condition, source organisations, data format, accuracy and other appropriate characteristics of the data.

Good metadata usually gives the following information:

- Title and description of the data set
- Data set originator or creator, owner and supplier
- How the data was obtained, more information on the data set, how to order, available formats and access constraints
- Date of creation and update cycle if any.
- The geographical extent of data set based on coordinates

3.2 Relevance of Metadata

Maintaining metadata records preserves an organization investment in geospatial resources, it also facilitates ease in data discovery and sharing across geospatial entities.

Metadata serves many important purposes, including:

[1] This guideline provides a quick introduction to metadata, what it is, why its collection and management are important for organizations to maintain their investment in geospatial data and for national GIS development.

- Data discovery
- Data assessment for suitability
- Data access
- Data use,
- Data transfer
- Data management

Metadata is also a key component for national geospatial infrastructure development. The maintenance of good quality metadata records is an initial step to the creation of accurate spatial data inventories, which in turn allows users to select the most appropriate datasets for their needs. Spatial data metadata also helps to protect the longevity of datasets long after the initial technical officers (data creators) have left the organizations. It ensures that they do not leave with critical information, but rather that this information is carefully documented and added to the dataset. Geospatial technicians also use metadata to interpret data received from external entities, therefore metadata is important in environments that data sharing is being promoted and encouraged.

3.3 Roles of Metadata

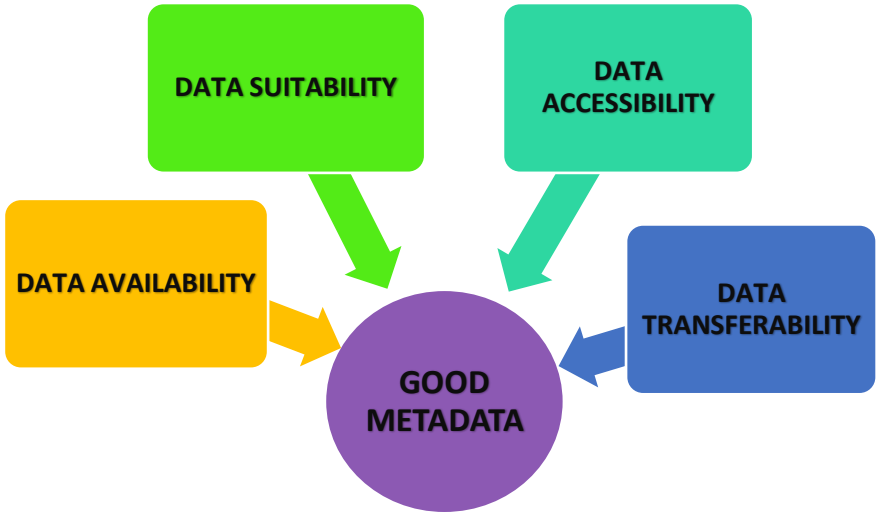

Figure 1. Functions of good metadata

Good metadata provides the user with the ability to select appropriate datasets in formats that are acceptable for a variety of end users (both technical and non-technical professionals) to address their specific needs. The persons requesting the data will be clear on the availability and access restrictions imposed on various datasets.

3.4 Metadata Creation

Metadata is often perceived as being burdensome and tedious but the long term advantage outweighs the initial rigors. It is often times easier for technicians to create metadata for data they were involved in developing. The challenge is when there are existing datasets in house that lack metadata records and the technicians involved in the creation of

these datasets have left organizations. To circumvent this problem, technicians are being admonished to create metadata while the spatial resource is being created and to promote the idea that no dataset can be considered complete without metadata. It is also important that newly trained technicians are educated on the importance of metadata to geospatial resources and that adequate attention allocated in GIS training to metadata creation and maintenance. An important step in ensuring technicians create and maintain metadata records is the recent practice of incorporating metadata creation into the job descriptions of incoming geospatial technician.

3.5 Spatial Data Standards

The use of standards in metadata creation and management act as the guidelines to the production of good quality metadata. The standards outline the rules of collection and maintenance of geospatial data and maintains consistency across industries. It provides clearly defined terms that allow for ease in identification of resources and facilitates collaboration with the various geospatial entities. The metadata standard that is used in Jamaica is the ISO 19115 developed by Technical Committee 211[2] and is useful for cataloguing, clearing house activities and detailed description of geospatial datasets. ISO 19115:2003 outlines the mandatory and conditional metadata requirements, defines the minimum metadata relevant applications and facilitates the application of the standard to specialized datasets.

3.6 Geospatial Resource Clearing House

One application of the standard is the development of the data clearinghouse. The NSDMD has established the [3]National Geoportal for the uploading and publishing of metadata records from the national repository. The aim of the clearing house is to provide a platform that supports the exploration of metadata records of data and to encourage MDA's to participate in expanding the number of records available. This catalogue of datasets not only publicizes the datasets available but can also highlight the work and create revenue generating possibilities for entities.

3.7 Core Metadata Elements

The following table has the lists of core metadata guideline outlined in the LICJ Metadata Guideline:

Table 1. Core metadata elements

CORE META-DATA ELEMENTS CATEGORIES	DEFINITIONS OF DATA ELEMENTS CATEGORIES
1. IDENTIFICATION	Basic information about the data set.
2. DATA QUALITY	An assessment of the quality of the data set
3. SPATIAL DATA ORGANISATION	The mechanism used to represent spatial information in the data set.

[2] Visit the following website for details (www.isotc211.org)

4. SPATIAL REFERENCE	Description of the reference frame for, and means of encoding, coordinates in the data set.
5. ENTITY AND ATTRIBUTE	information about the content of the data set
6. DISTRIBUTION	information about obtaining the data set
7. METADATA REFERENCE	information on the currency of the metadata information and the responsible party

4 Standard Operating Procedure (SOP) for Metadata.

The following are elements of the SOP for Metadata:

4.1 Metadata Creation

The user must understand both the data being describe and the standards established in the process of metadata creation. Geospatial technicians must be aware that no dataset is complete without the necessary metadata attached. Within each organization entities must outline how the metadata is encoded and what information will be included based on the recommendations of the metadata guideline. Normally, technicians will create a single Extensible Markup Language (XML) file for each metadata record, that is, one XML file describes one data set. There must be a designated tool used to enter the metadata information into each XML file so that the format conforms to the standard.

The following steps provide a framework to the processes to be establishing metadata records:

1. Assemble information about the data set from field reconnaissance and key stakeholders.
2. Create a digital file containing the metadata, in the correct format with the basic information outlined in the metadata guideline.
3. Review the content of the metadata, verifying that the information describes the subject dataset completely and correctly.
4. Provide a list of contact personnel to who queries about the dataset can be made.
5. Clearly outline access restrictions and copyright provisions for the dataset.

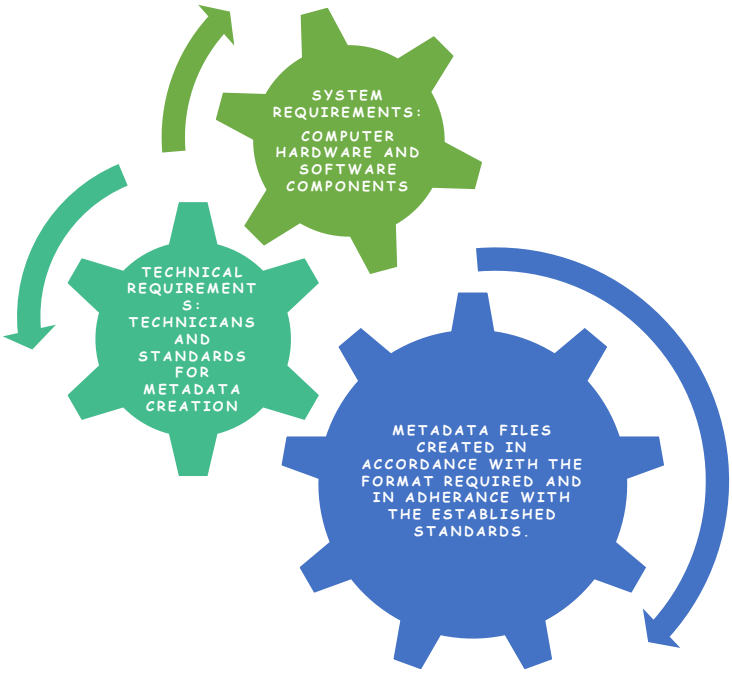

Figure 2. Creation of metadata files

When creating Metadata there are critical equipment needed for GIS operations

- Hardware

• Desktop or laptop with DVD writer, USB ports, and sufficient RAM to run GIS software.

• Appropriate connection cables, hubs, power supplies.

• External portable hard drive.

- Software

• Standard, current versions of commercial and open source GIS software installed and operational on the computer and capable of working with shapefiles.

• Any required and appropriate licensing activated on the local machine for use on an incident

- Appropriate software extensions and tools, including installation media and install privileges/passwords.

4.2 Updates

Periodically metadata records need to be updated based on changes made to the original dataset. Using the software available select the item and view the properties and records of the metadata file. This ensures the metadata is kept current as the dataset changes over time. Metadata records should be updated as the dataset is updated so that none of the important information is misplaced or left out. Currency of metadata maintains the value and usefulness of the dataset. This is important to both the owner of datasets because it protects their initial investments in the dataset and to users since they are able to determine what the potential of the resource is.

4.3 Copyright issues

The protection of intellectual property is relevant issue in the geospatial community where open data concepts are being promoted. The protection of the resources made available to users must be adhered to so that developers can benefit (financially or otherwise) from the use of the data created. The incorporation of

use restriction in metadata and in some cases accompanying licences agreements [4]has been designed to ensure that users are legally bound to act within the parameters outlined in the agreement. Another function of these agreements is to protect the investments made by the owner entities from the unauthorized use and sharing of their datasets.

The government is also required to allow access to datasets and information, one of the ways it retains control over the value of datasets is through the use of licence agreements. The value of geospatial that has grown immensely with the incorporation of GIS and other information technologies into the operations of the public sector. Copyrights protection is even more important as the use of GIS expands there must be a balance between government accountability and the nation's potential economic benefit from publicly held datasets. The concern is that government absorb the costs associated with maintaining datasets and commercial firms may gain free access to public held information, repackage it, and sell it. This has led to the inclusion of data sharing components in accompanying licences agreements so that the government can continuously expand the national repository.

5 FAQ FOR METADATA

- What is metadata?
  Answer: Metadata is a summary document providing content, quality, type, creation, and spatial information about a data set.

- How do I create metadata?
  Answer: Using a commercial or open source GIS and adhering to the established guidelines and standards in metadata creation, record the critical information necessary for a complete metadata file. This must include general information about the dataset, time and dates, procedures and standards to which the dataset conforms.

- What tools are available to create metadata?
  Answer: There are several tools that can be used to create metadata but the NSDMD's recommended collection tools are ESRI's ArcGIS ArcCatalog and ArcView Metadata Collector - metadata2.avx extension. Other metadata tools from FOSGIS software can also be used.

- What is the file format for metadata?

  Answer: Extensible Markup Language. XML file format is used to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere using standard ASCII text.

- How is metadata supported in ArcGIS Online?

[4] A licencing agreement is a written agreement entered into by the contractual owner of a property or activity giving permission to another to use that property or engage in an activity in relation to that property. The property involved in a licencing agreement can be real, personal or intellectual. Almost always, there will be some consideration exchanged between the licensor and the licensee.

Answer: Organizations can create and share metadata on all of the items supported by ArcGIS Online including web maps, web scenes, web apps, layers, uploaded files, and tools.

- Why is Metadata important to GIS?
  Answer: Metadata makes spatial information more useful to all types of users by making it easier to document and locate data sets. The growing availability of data of all kinds from many different sources has helped GIS technology become more useful and widely adopted.

- Why was metadata it created?

  Answer: This metadata maintenance effort will benefit the county and associated agencies not only by providing outside users of our information with a way to assess the quality and availability of our geospatial data, but will also serve the same purpose for county staff in multiple departments and agencies to determine the appropriateness of the data for their needs