

Geospatial Metadata
***North American Profile Development
for ISO 19115 Geospatial Metadata***

An overview of US and Canadian efforts to adapt and implement the International Standardization Organization geospatial metadata standard for use by the North American geospatial community



vers. 20080331



After completing this lesson the participant can:

- ▶ Outline the relationship between the International Organization for Standardization (ISO), American National Standards Institute (ANSI), and the Federal Geographic Data Committee (FGDC)
- ▶ Discuss the general content and application of the ISO 19115 Geospatial Metadata Standard
- ▶ Explain what is meant by an ISO 19115 'Community Profile'
- ▶ Summarize the participants, methods and processes used to develop the North American Profile of ISO 19115



What is the ISO?

The International Organization for Standardization (ISO) is a:

- ▶ network of national standards institutes of 157 countries
 - American National Standards Institute (ANSI) is the US member of ISO
- ▶ non-governmental organization
- ▶ public/private partnership
- ▶ consensus-building body tasked with meeting the standardization requirements of business and society

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The International Organization for Standardization (ISO) is a network of standards institutes in 157 countries; American Institute of Standards, ANSI, is the US member of ISO. It is a non-governmental organization which operates through the efforts of governmental and private concerns building consensus on solutions which meet the requirements of business and the broader society.



ISO Technical Committees:

- ▶ perform the work of standards development
- ▶ are staffed by volunteers from public and private sectors
- ▶ are assigned to specific thematic areas
 - TC 8: **Ships and marine technology**
 - TC 38: **Textiles**
 - TC 92: **Fire safety**
 - TC 147: **Water Quality**
 - TC 211: **Geographic information / Geomatics**
 - TC 234: **Fisheries and Aquaculture**

Technical Committees work on standards issues for ISO. These are volunteers from the public and private sectors. Technical Committee 211, TC211, addresses ISO's geospatial information standards needs..



ISO North American Profile Development

Goal of ISO TC 211

Establish a family of international standards that:

- ▶ support understanding and use of geographic information
- ▶ increase the availability, access, integration and sharing of geographic information
- ▶ enable interoperability of geospatial enabled computer systems
- ▶ ease the establishment of Spatial Data Infrastructures (SDIs) on local, regional and global levels

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From www.fgdc.gov/library/presentations/documents/GSDI7_Tutorial.ppt

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INCITS-L1

US International Committee for Information Technology Standards L1 Technical Committee – GIS

- ▶ charged with adopting or adapting information technology standards and developing digital geographic data standards that are relevant to Geographic Information Systems (GIS)
- ▶ accredited by, and operates under rules approved by, the American National Standards Institute (ANSI)

The InterNational Committee for Information Technology Standards (INCITS) is the forum for information technology developers, producers, and users for the creation and maintenance of formal de jure IT standards.

- Is accredited by, and operates under rules approved by, the American National Standards Institute (ANSI), to ensure that voluntary standards are developed by the consensus of directly and materially affected interests
- is the committee charged with adopting or adapting information technology standards and developing digital geographic data standards that are relevant to Geographic Information Systems (GIS).



FGDC

US Federal Geographic Data Committee

- ▶ develops federal geospatial data standards for implementing the NSDI in consultation and cooperation with State, local, and tribal governments, the private sector and academic community, and, to the extent feasible, the international community
- ▶ member of INCIT-L1 and TC 211 and contributes to international standards development

FGDC

- The Federal Geographic Data Committee (FGDC) develops federal geospatial data standards for implementing the NSDI in consultation and cooperation with State, local, and tribal governments, the private sector and academic community, and, to the extent feasible, the international community. Federal standards are often adopted by other governmental bodies and the private, Tribal, and academic communities.
- member of INCIT-L1 and TC 211 and contributes to international standards development.



CGSB-CoG

Canadian General Standards Board – Committee on Geomatics

- ▶ TC211 delegate of the Standards Council of Canada (SCC)
- ▶ Standards Council of Canada (SCC) tasked to establish national standards and to act as the Canadian voice on international standards bodies such as ISO and ITU

CGSB-CoG

-The Standards Council of Canada (SCC) has the mandate from Parliament to establish national standards and to act as the Canadian voice on international standards bodies such as ISO and ITU

-The Canadian General Standard Board is one of four Standards Development Organizations (SDOs) of the SCC

-The Canadian General Standards Board - Committee on Geomatics (CGSB-CoG) is the Standards Council of Canada (SCC) delegate to TC211



Mexico and the Caribbean

- ▶ Mexico has developed a Draft Profile of ISO 19115
 - INCITS I1 and the NAP editing team are to review the profile
 - US and Canada intend to continue dialog with the Mexican National Institute of Statistics - Geography and Informatics (INEGI) when the NAP is finalized
- ▶ Pan American Institute of Geography and History (PAIGH) is leading the work for a Latin America Metadata Profile, LAMP, for Latin America
- ▶ The Caribbean is working on a Profile
- ▶ South American Countries in the Andes region are developing a metadata profile.

Mexico and the Caribbean

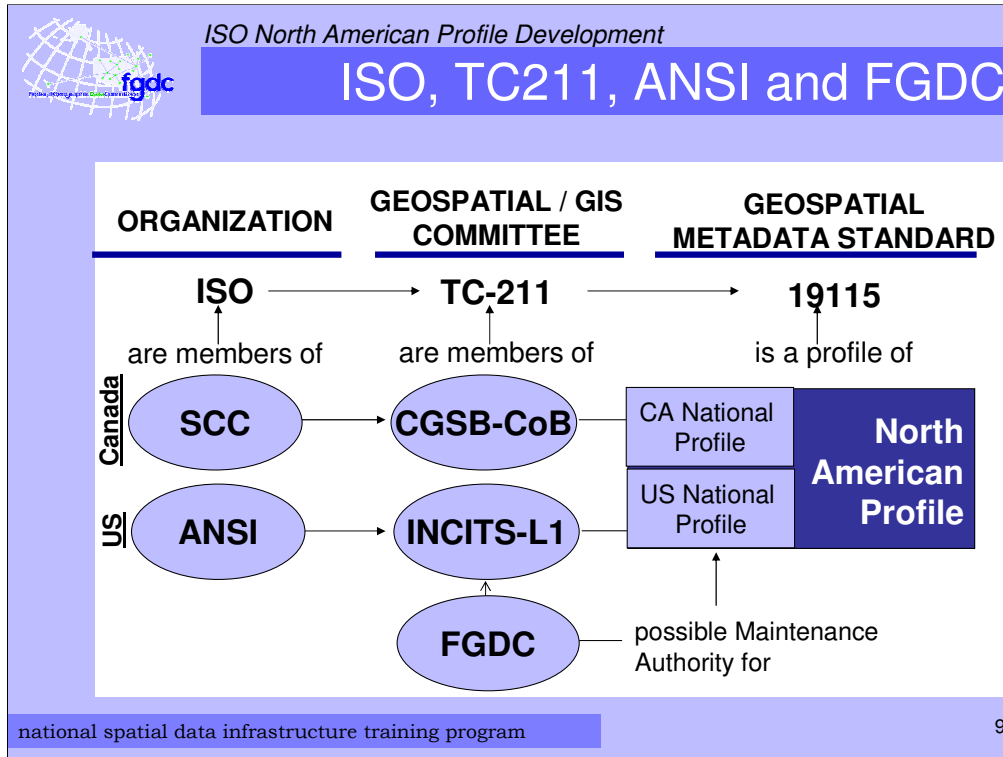
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South American Countries in the Andes region are developing a metadata profile. There has been limited interaction between L1 and this initiative



International Standardization Organization Members:


- The American National Standards Institute (ANSI) is US member
- The Standards Council of Canada (SCC) is the CA member

TC211 is the Geospatial Technical Committee of the ISO. Members include:

- INCITS-L1 is the GIS Technical Advisory Group to ANSI
- The Canada General Standards Board - Committee on Geomatics (CGSB-CoG) is the Standards Council of Canada (SCC) designated delegate to TC211

ISO 19115 is the ISO Geospatial Metadata Standard

- The North American Profile (NAP) is the joint US/Canadian implementation of ISO 19115
- The Federal Geographic Data Committee (FGDC) will be the maintenance authority for the US Profile version of the NAP



ISO North American Profile Development

ISO 1900 Series of Standards

ISO 19000 Series:
Geographic Information / Geomatics
 a series of standards which addresses geographic information including

- ▶ ISO 19110
Geographic Information - Feature Cataloging
- ▶ ISO 19115
Geographic Information - Metadata.
- ▶ ISO 19136
Geographic Information - Geographic Markup Language
- ▶ ISO 19139 Geographic Information – Metadata XML Schema Implementation

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ISO 19000 Series Geographic Information / Geomatics is a series of standards which addresses geographic information.

For example:

- ISO 19110 Geographic Information – Feature Cataloging defines the methodology for cataloguing feature types and specifies how the classification of feature types is organized into a feature catalogue and presented to the users of a set of geographic data. ISO 19110:2005 is applicable to creating catalogues of feature types in previously uncatalogued domains and to revising existing feature catalogues to comply with standard practice. ISO 19110:2005 applies to the cataloguing of feature types that are represented in digital form. Its principles can be extended to the cataloguing of other forms of geographic data.
- ISO 19136 Geographic Information-Geographic Markup Language is an XML encoding in compliance with ISO 19118, Geographic Information – Encoding, for the transport and storage of geographic information modeled in accordance with the conceptual modeling framework used in the 19100 series of ISO standards and included both the spatial and non-spatial properties of geographic features.

ISO TS 19139 is designed to provide a common XML specification for describing, validating and exchanging geographic metadata. It is intended to promote interoperability, and exploit ISO 19115's advantages in a concrete implementation specification.

The implementation specification details the following:

- The XML schemas will be derived directly from the harmonized ISO 19100 UML model to ensure one common schema.
- The transformation of the ISO 19115 and related ISO/TC 211 abstract UML models into XML schema. For informative purposes, scripts for performing the transformation are referenced. This process follows the guidelines defined by ISO 19106.
- Provides dataset implementation and extension examples.
- Provides a conformance test suite.

Although this specification is directly intended to describe geographic metadata for datasets, the nature of the XML schema allows the schemas defined here to be applied to datasets, aggregations of datasets, geographic features, feature attributes, feature types, and feature attribute types, etc.



ISO 19115 Implementation Goals

Establish an international, multilingual framework to:

- ▶ provide appropriate information to **characterize** geographic data properly
- ▶ facilitate the **organization and management** of geographic information
- ▶ enable users to efficiently **apply** geospatial data by knowing the data basic characteristics
- ▶ enable users to **locate, access, evaluate, deliver, and integrate** geographic data

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ISO 19115 Geospatial Metadata

Provides a schema for describing:


- ▶ geospatial web services
- ▶ individual dataset descriptions
- ▶ data catalogs
- ▶ clearinghouse activities

Applies to multiple levels of geographic information:

- ▶ datasets
- ▶ dataset series
- ▶ individual data features
- ▶ individual feature properties (attributes)

ISO 19115 Geospatial Metadata provides a schema for describing: geospatial web services, individual dataset descriptions, data catalogs, clearinghouse activities.

Applies to multiple levels of geographic information: datasets, dataset series, individual data features, and individual feature (attribute) properties

 *ISO North American Profile Development*

ISO 19115 Geospatial Metadata

Provides information about the geographic data or service :

- ▶ identification
- ▶ extent
- ▶ quality
- ▶ spatial schema
- ▶ temporal schema
- ▶ spatial reference
- ▶ distribution

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The content of ISO 19115 strongly resembles the 'sections' of the CSDGM. ISO 19115 provides information about the geographic data or service :

identification

extent

quality

spatial schema

temporal schema

spatial reference

distribution



ISO 19115 Geospatial Metadata

Defines a core set of metadata required to serve the full range of applications:

- ▶ data discovery
- ▶ fitness for use
- ▶ data access
- ▶ data transfer
- ▶ application of data

ISO 19115

- defines the minimum set of metadata required to serve a full range of applications. The metadata allows for the searching of data (discovery), determine the fitness for use, information for data access, information for data transfer, and information on the use of the geospatial digital data
- allows the ability to extend the elements to address specific geospatial information needs.



Establishes:

- ▶ terminology
- ▶ definitions
- ▶ conditionality
 - mandatory
 - conditional
 - optional
- ▶ a method for extending the metadata record to address specialized or custom needs

ISO 19115 Geospatial Metadata establishes:

terminology

definitions

conditionality

 mandatory

 conditional

 optional

a method for extending the metadata record to address specialized or custom needs



Compared to the Content Standard for Digital Geospatial Metadata (CSDGM) ISO 19115:

- ▶ can be applied to a wider range of geographic products
- ▶ provides a greater number of open domains and optional elements to support greater flexibility in describing geographic products
- ▶ utilizes a more complex structure to better address the many facets of geographic products

ISO 19115 is applicable to a broad spectrum and maintains a complexity of geographic products. It contains many optional and undefined or free text fields to accommodate that broad spectrum. While broad and complex it also maintains a generic quality to its content to address those many geographic products.



ISO 19115 Geospatial Metadata

Is organized into:

ISO 19115

- ▶ classes
- ▶ subclasses
- ▶ attributes
- ▶ domains



CSDGM

- ▶ sections
- ▶ compound elements
- ▶ elements
- ▶ domains


ISO 19115

•the information is organized by:

- Classes
- Subclasses
- Attributes
- Domains

You may recognized a slight change from the CSDGM where information is broken down into sections, elements/compound elements, and data elements.

ISO 19115 has a small change from FGDC's Content Standard for Digital Geospatial Metadata. Now instead of mandatory-if-applicable, ISO 19115 uses the term "conditional."



ISO North American Profile Development

ISO 19115 Community Profiles

What is an ISO 19115 Profile?

A custom implementation of ISO 19115 that:

- ▶ adopts the 22 ISO 'core' metadata for geographic datasets
- ▶ removes ISO optional components that do not apply to the community
- ▶ increases the obligation of ISO 'optional' elements of strong significance to the community
- ▶ creates new metadata entities, sections or elements to improve characterization of community geospatial data or services
- ▶ adds to or amends the domain of an existing ISO element to include community specific descriptors

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What is an ISO 19115 Profile?

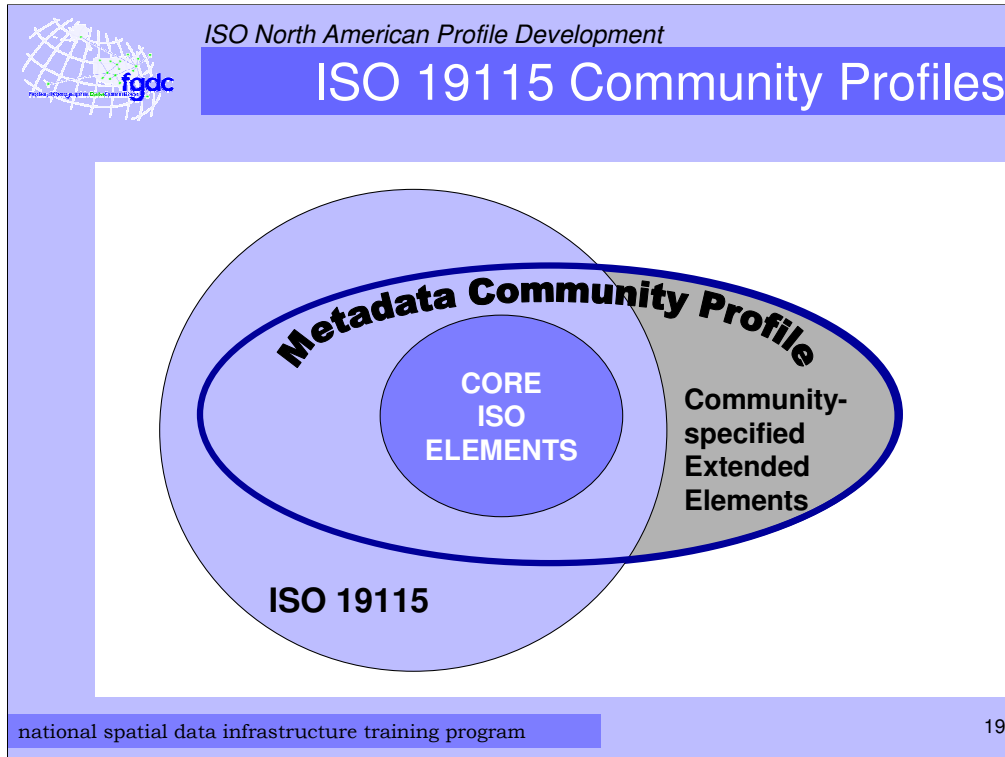
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ISO 19115 contains almost 300 metadata elements, most are listed as optional. To make the standard apply to the uses of each "community", communities are working to develop profiles of the standard to make the content work for them.

The core ISO are:

- Dataset title
- Dataset reference date
- Dataset responsible party
- Geographic location of the dataset (bounding box)
- Dataset language
- Dataset character set
- Dataset topic category
- Spatial resolution of the dataset
- Abstract describing the dataset



Boolean Graphic of a community profile that illustrates how a community profile partially overlaps with the full ISO 19115 standard, completely encapsulates the ISO 19115 Core Elements, and includes additional elements that are external to ISO 19115.



What is a Profile 'Community'?

Any group of individuals or organizations that share a common interest such as:

- ▶ nationality or other administrative unit
- ▶ geography
- ▶ professional disciplinary
- ▶ data theme
- ▶ geospatial application or service

There are no limits to the size or nature of a community. It is simply any group that shares a common interest in a nationality or other administrative unit geography, professional disciplinary, data theme, geospatial application, or service



ISO 19115 Community Profiles

What are the obligations associated with the creation of a community profile?

- ▶ check the ISO 19115 profile registry before creating a new profile to ensure that a suitable profile has not already been created
- ▶ adhere to the rules laid out by ISO
- ▶ do not change the name, definition, or data type of an existing ISO metadata element
- ▶ register their final profile with ISO
- ▶ maintain the profile

What are the obligations associated with the creation of a community profile?

Those developing a community profiles must:

check the ISO 19115 profile registry before creating a new profile to ensure that a suitable profile has not already been created

adhere to the rules laid out by ISO

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The US National Profile

Goal of the US National Profile

Meet the geospatial metadata implementation needs of the US through the development of a Profile guidance document

Objectives of the US National Profile

- ▶ determine the metadata content necessary to fully support the documentation needs of the US geospatial community
- ▶ coordinate content and publication with the Canadian National Profile so that a common, North American Profile, is established

The goal of the US National Profile is to produce a guidance document that will provide the US Metadata Community with clear direction as to the content requirements and methodology for creating geospatial metadata that meets the specific needs of the community and meets the requirements for ISO 19115.

The objectives of the US National Profile are to:

- determine the metadata content (elements and domains) necessary to fully support the documentation needs of the US geospatial community
- coordinate content and publication with the Canadian National Profile so that a common North American Profile is established.



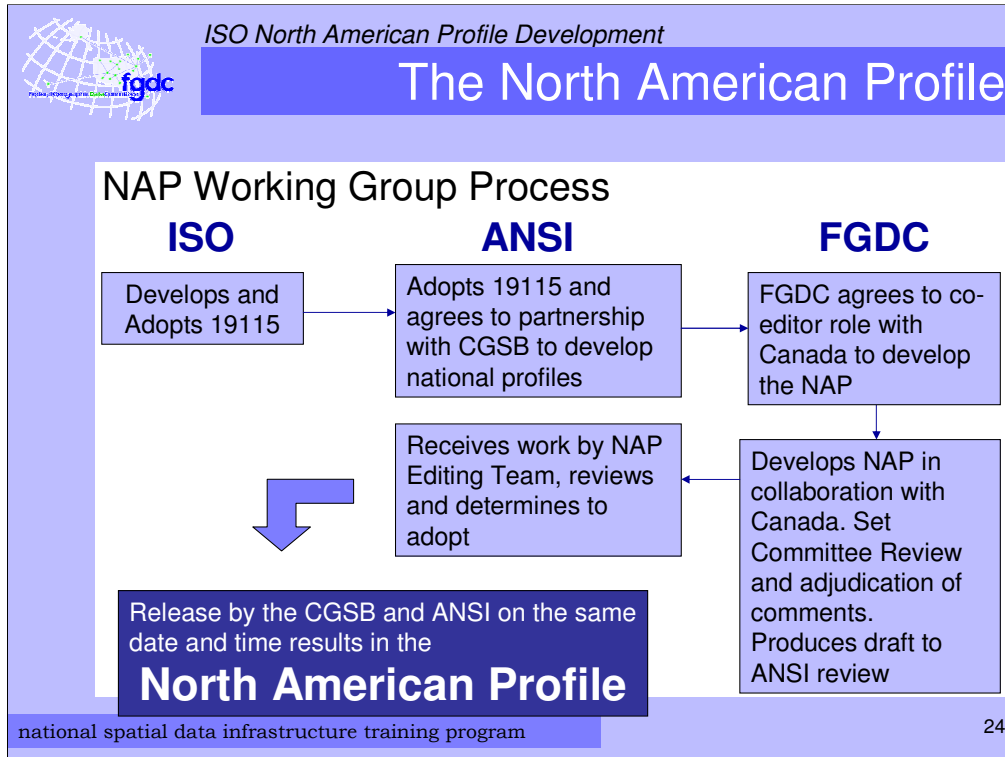
Methods and Approach

Canada and the US agreed to the following:

- ▶ add no new attributes (elements) to the standard
- ▶ increase conditionality for those attributes deemed critical
- ▶ modify codelists (fixed domains) to reflect US/CA geospatial activities and applications
- ▶ create new codelist for free text elements that were relatively standard in the US and Canada
- ▶ modify/simplify UML diagrams
- ▶ establish best practices to guide metadata content for specific attributes

The goal of the North American Profile is to arrive at a ISO 19115 profile which meets the geospatial needs of both the US and Canada. To do so, the NAP team established specific methods and approaches that would guide NAP development. The editing team agreed

- not to create new attributes to ISO19115 but to focus on modifying attribute obligations
- to add new codes and deprecate, permit listing but recommended not to use, others to simplify the Profile's content
- add new code lists to specify vocabulary for a few free text fields
- to respond to the FGDC Metadata Working Group's concerns, and design simplified diagram to depict the Profile's structure
- that the final document would not be a typical profile, but a guidance document complete with "best practices" to guide implementation



This diagram depicts the process in the U.S. It is a process which relies on the cooperation between three major standards bodies: ISO, ANSI, and the FGDC. ISO adopted ISO 19115 in 2003. ANSI adopted ISO 19115 as a national standard in 2004. ANSI and the CSB determined that it is in their best interest to coordinate on the development of a profile. The agreed to develop national profiles that are identical in content. ANSI's INCITS-L1 approached the FGDC to participate in the joint effort with Canada to develop a North American Profile. FGDC and members of the US geospatial community worked with Canadian counterparts through a repetitive process of writing, editing and public review and submission to the respective standards boards. A final edit is expected after adoption by the standards boards. The national profiles are to be released on the same date and time by the standards boards to culminate in the North American Profile.



The North American Profile of ISO 19115

- ▶ represents a cooperative effort between the US and Canada to establish a common geospatial metadata standard that meets the needs of both nations
- ▶ supports the same goal and objectives as the ISO 19115 Geospatial Metadata Standard
- ▶ is fully compliant with the ISO 19115 Geospatial Metadata Standard
- ▶ follows ISO rules for the development of a community profile
- ▶ closely resembles the CSDGM in content but has a more complex, robust, structure

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Geospatial Metadata
Inside the ISO 19115 North American Profile