

ISO 19131 Canadian Drought Monitor – Data Product Specifications

Revision: A

Data product specifications: Canadian Drought Monitor

- Table of Contents-

1.	Overview	3
1.1.	Informal description	3
1.2.	Data product specification - metadata	3
1.3.	Terms and definitions	4
1.4.	Abbreviations	5
2.	SPECIFICATION SCOPE	5
2.1.	Data series identification	6
2.2.	Data product identification	7
2.2.1.	Areas of Drought in Canada	7
2.2.2.	Drought Impact Lines	8
2.2.3.	Drought Impact Labels	9
3.	DATA CONTENT AND STRUCTURE	10
3.1.	Feature-based application schema	10
3.2.	Feature catalogue – Canadian Drought Monitor	11
3.2.1.	Feature attributes	11
3.2.1.1.	Drought Intensity (DM)	11
3.2.1.2.	Impact Type (IMPACT)	12
3.2.1.3.	Area of Impact in Acres (AREA_SQKM)	12
4.	REFERENCE SYSTEMS	12
4.1.	Spatial reference system	12
4.2.	Temporal reference system	12
5.	DATA QUALITY	13
5.1.	Completeness	13
5.2.	Logical consistency	13
5.3.	Positional accuracy	13
5.4.	Temporal accuracy	13
5.5.	Thematic accuracy	13
5.6.	Lineage statement	13
6.	DATA CAPTURE	13
7.	DATA MAINTENANCE	13
8.	PORTRAYAL	13
9.	DATA PRODUCT DELIVERY	14
10.	METADATA	14

Data product specifications: Canadian Drought Monitor

1. Overview

1.1. Informal description

The Canadian Drought Monitor is a monthly composite map which provides the current status of drought across Canada. The CDM uses an easily understood five-class system to define the severity, spatial extent and impacts of drought, using a wide variety of federal, provincial and regional data.

Drought classes in the CDM range from D0 to D4, with D1 to D4 indicating moderate to exceptional drought and D0 indicating abnormally dry conditions. While D0 is not recognized as a drought classification; however, it provides a warning of areas that are currently vulnerable to drought or areas that are recovering from drought. Each category is based on the percentile chance of those conditions occurring.

Development of the CDM originates from Canada's participation in the North American Drought Monitor (NADM), a cooperative effort between Canada, the U.S. and Mexico to provide monthly assessments of drought across the continent.

The ongoing development of the CDM and NADM is led by AAFC's National Agroclimate Information Service (NAIS) of the Agro-Climatic, Geomatics and Earth Observations (ACGEO) Division of the Science and Technology Branch. A number of provincial and federal organizations are consulted to produce the CDM including, Environment Canada, Natural Resources Canada and provincial water, forestry and resource ministries in British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick and Nova Scotia. NAIS also communicates regularly with partners in the U.S and Mexico including the National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) and the National Meteorological Service of Mexico.

In addition to the map product, the accompanying narrative provides specific detail on agricultural impacts, including statistics on land area, cattle, and the number of producers impacted.

For more information please contact the National Agroclimate Information Service at nais-snia@agr.gc.ca or visit the Drought Watch website at www.agr.gc.ca/drought.

1.2. Data product specification - metadata

This section provides metadata about the creation of this data product specification

Data product specification – title:	Canadian Drought Monitor
Data product specification - reference date:	2014-11-12
Data product specification - responsible party:	Agriculture and Agri-food Canada
Data product specification – language:	English
Data product specification - topic category:	climatologyMeteorologyAtmosphere (Climatology/Meteorology/Atmosphere/Climatologie/Météorologie/Atmosphère)

1.3. Terms and definitions

- Feature attribute / Attribut d'entité
characteristic of a feature
- Class
description of a set of objects that share the same attributes, operations, methods, relationships, and semantics [UML Semantics]
NOTE: A class does not always have an associated geometry (e.g. the metadata class).
- Feature
abstraction of real world phenomena
- Object
entity with a well-defined boundary and identity that encapsulates state and behaviour [UML Semantics]
NOTE: An object is an instance of a class.
- Package
grouping of a set of classes, relationships, and even other packages with a view to organizing the model into more abstract structures

1.4. Abbreviations

AAFC	Agriculture and Agri-Food Canada
NAIS	National Agroclimate Information Service
ACGEO	Agro-Climate, Geomatics and Earth Observations
NADM	North American Drought Monitor

2. SPECIFICATION SCOPE

This data specification has only one scope, the general scope.

NOTE: The term 'specification scope' originates from the International Standard ISO19131. 'Specification scope' does not express the purpose for the creation of a data specification or the potential use of data, but identifies partitions of the data specification where specific requirements apply.

2.1. Data series identification

Title	Canadian Drought Monitor (CDM)
Alternate Title	
Abstract	<p>This series of datasets has been created by AAFC's National Agroclimate Information Service (NAIS) of the Agro-Climatic, Geomatics and Earth Observations (ACGEO) Division of the Science and Technology Branch.</p> <p>The CDM is a composite product developed from a wide assortment of information such as the Normalized Difference Vegetation Index (NDVI), streamflow values, Palmer Drought Index, and drought indicators used by the agriculture, forest and water management sectors. Drought prone regions are analyzed based on precipitation, temperature, drought model index maps, and climate data and are interpreted by federal, provincial and academic scientists.</p> <p>Once a consensus is reached, a monthly map showing drought designations for Canada is digitized.</p> <p>AAFC's National Agroclimate Information Service (NAIS) updates this dataset on a monthly basis, usually by the 10th of every month to correspond to the end of the previous month, and subsequent Canadian input into the larger North American Drought Monitor (NA-DM).</p> <p>The drought areas are classified as follows:</p> <p>D0 (Abnormally Dry) – represents an event that occurs once every 3-5 years; D1 (Moderate Drought) – represents an event that occurs every 5-10 years; D2 (Severe Drought) – represents an event that occurs every 10-20 years; D3 (Extreme Drought) – represents an event that occurs every 20-25 years; and D4 (Exceptional Drought) – represents an event that occurs every 50 years.</p> <p>Impact lines highlight areas that have been physically impacted by drought. Impact labels specify the longitude and magnitude of impacts. The impact labels are classified as follows: S – Short-Term, typically less than 6 months (e.g. agriculture, grasslands). L – Long-Term, typically more than 6 months (e.g. hydrology, ecology).</p>
Purpose	
Topic Category	climatologyMeteorologyAtmosphere
Spatial Representation Type	vector
Spatial Resolution	
Geographic Description	Canada
Supplemental Information	
Constraints	Open Government Licence - Canada – (http://data.gc.ca/eng/open-government-licence-canada)
Keywords	Drought, Climate, Precipitation Government of Canada Core Subject Thesaurus (2000-02-01)
Scope identification	series

2.2. Data product identification

2.2.1. Areas of Drought in Canada

Title	Areas of Drought in Canada
Alternate Title	
Abstract	<p>The Areas of Drought dataset has been created to define and depict the severity, spatial extent, and impacts of drought within Canada except for Nunavut and the Arctic Archipelago. Drought classes in the CDM range from D0 to D4, with D0 indicating abnormally dry conditions, and D1 to D4 indicating moderate to exceptional drought. Each category is based on the percentile chance of those conditions occurring.</p> <p>The drought areas are classified as follows:</p> <p>D0 (Abnormally Dry) – represents an event that occurs once every 3-5 years; D1 (Moderate Drought) – represents an event that occurs every 5-10 years; D2 (Severe Drought) – represents an event that occurs every 10-20 years; D3 (Extreme Drought) – represents an event that occurs every 20-25 years; and D4 (Exceptional Drought) – represents an event that occurs every 50 years.</p>
Purpose	
Topic Category	climatologyMeteorologyAtmosphere
Spatial Representation Type	vector
Spatial Resolution	
Geographic Description	Canada
Supplemental Information	
Constraints	Open Government Licence - Canada – (http://data.gc.ca/eng/open-government-licence-canada)
Keywords	Drought, Climate, Precipitation Government of Canada Core Subject Thesaurus (2000-02-01)
Scope identification	dataset
Feature Attribute Names	DM, AREA_SQKM

2.2.2. Drought Impact Lines

Title	Drought Impact Lines
Alternate Title	
Abstract	<p>The Drought Impact Lines dataset highlights areas that have been physically impacted by drought. All drought impact lines have a drought impact label inside of them to express the longevity of the impact.</p> <p>The impact lines are classified using impact labels as follows: S – Short-Term, typically less than 6 months. L – Long-Term, typically more than 6 months. SL – A combination of Short and Long-Term impacts.</p>
Purpose	
Topic Category	climatologyMeteorologyAtmosphere
Spatial Representation Type	vector
Spatial Resolution	
Geographic Description	Canada
Supplemental Information	
Constraints	Open Government Licence - Canada – (http://data.gc.ca/eng/open-government-licence-canada)
Keywords	Drought, Climate, Precipitation Government of Canada Core Subject Thesaurus (2000-02-01)
Scope identification	dataset
Feature Attribute Names	IMPACT

2.2.3. Drought Impact Labels

Title	Drought Impact Labels
Alternate Title	
Abstract	<p>The Drought Impact Label dataset is used on all drought polygons from D1 to D4 to specify the longitude and magnitude of impacts. Impact labels are often used in association with the Drought Impact Line dataset.</p> <p>The impact labels are classified as follows: S – Short-Term, typically less than 6 months. L – Long-Term, typically more than 6 months. SL – A combination of Short and Long-Term impacts.</p>
Purpose	
Topic Category	climatologyMeteorologyAtmosphere
Spatial Representation Type	vector
Spatial Resolution	
Geographic Description	Canada
Supplemental Information	
Constraints	Open Government Licence - Canada – (http://data.gc.ca/eng/open-government-licence-canada)
Keywords	Drought, Climate, Precipitation Government of Canada Core Subject Thesaurus (2000-02-01)
Scope identification	dataset
Feature Attribute Names	IMPACT

3. DATA CONTENT AND STRUCTURE

3.1. Feature-based application schema

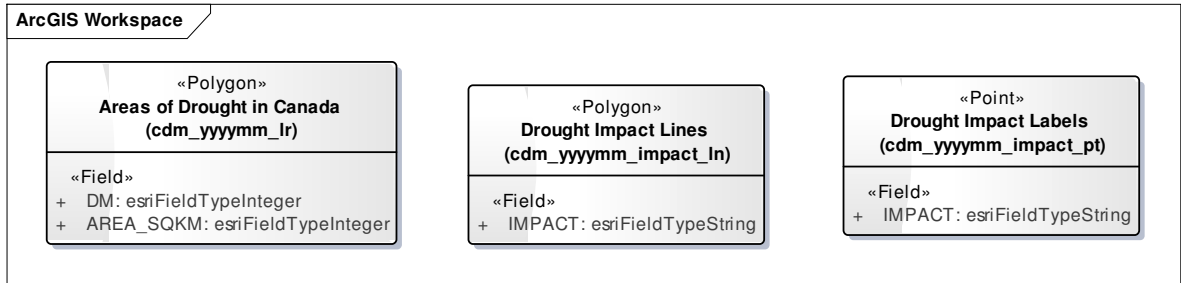


Figure 1 - Canadian Drought Monitor UML Class Diagram

3.2. Feature catalogue – Canadian Drought Monitor

Title	Canadian Drought Monitor
Scope	series
Version Number	1.0
Version Date	2017-06-09
Producer	Agriculture and Agri-food Canada

System-generated attributes (for example, OBJECTID, Shape, Shape Length and Area) are not defined in the feature catalog.

3.2.1. Feature attributes

3.2.1.1. Drought Intensity (DM)

Name	Drought Intensity (DM)		
Definition	The consolidated level of drought severity.		
Aliases			
Producer	Agriculture and Agri-food Canada		
Value Data Type	Integer		
Value Domain Type	1 (enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition
	Abnormally Dry	0	Represents an event that occurs once every 3-5 years
	Moderate Drought	1	Represents an event that occurs every 5-10 years
	Severe Drought	2	Represents an event that occurs every 10-20 years
	Extreme Drought	3	Represents an event that occurs every 20-25 years
	Exceptional Drought	4	Represents an event that occurs every 50 years

3.2.1.2. Impact Type (IMPACT)

Name	Impact Type (IMPACT)		
Definition	The impact information for the hydrological and agricultural drought indicators.		
Aliases			
Producer	Agriculture and Agri-food Canada		
Value Data Type	character		
Value Domain Type	1 (enumerated)		
Value Domain			
	Feature Attribute Value		
	Label	Code	Definition
	Short Term	S	Drought lasting typically less than 6 months (e.g. agriculture, grasslands).
	Long Term	L	Drought lasting typically more than 6 months (e.g. hydrology, ecology).
	Short and Long Term	SL	A combination of Short and Long-Term impacts.

3.2.1.3. Area of Impact in Square Kilometers (AREA_SQKM)

Name	Area of Impact in Acres (AREA_SQKM)		
Definition	The area of land in square kilometers that has been classified under each Drought Intensity.		
Aliases			
Producer	Agriculture and Agri-food Canada		
Value Data Type	Integer		
Value Domain Type	0 (not enumerated)		

4. REFERENCE SYSTEMS

4.1. Spatial reference system

Horizontal coordinate reference system: WGS 84

Map projection: Web Mercator Auxiliary Sphere; EPSG: 3857; Version 8.1.4

4.2. Temporal reference system

Gregorian calendar

5. DATA QUALITY

Measures not defined at this time

5.1. Completeness

5.2. Logical consistency

5.3. Positional accuracy

5.4. Temporal accuracy

5.5. Thematic accuracy

5.6. Lineage statement

Lineage Statement	This dataset represents the severity, spatial extent and impacts of drought for a given month.
Scope	series

6. DATA CAPTURE

This dataset was created by AAFC’s National Agroclimate Information Service (NAIS) of the Agro-Climate, Geomatics and Earth Observations (ACGEO) Division of the Science and Technology Branch.

The CDM is a composite product developed from a wide assortment of information such as the Normalized Difference Vegetation Index (NDVI), streamflow values, Palmer Drought Index, and drought indicators used by the agriculture, forest and water management sectors. Drought prone regions are analyzed based on precipitation, temperature, drought model index maps, and climate data and are interpreted by federal, provincial and academic scientists.

Once a consensus is reached, a monthly map showing drought designations for Canada is digitized.

AAFC’s National Agroclimate Information Service (NAIS) updates this dataset on a monthly basis, usually by the 10th of every month to correspond to the end of the previous month, and subsequent Canadian input into the larger North American Drought Monitor (NA-DM)

7. DATA MAINTENANCE

monthly

8. PORTRAYAL

Not applicable.

9. DATA PRODUCT DELIVERY

File Geodatabase

format name: Esri Geodatabase (File-based)
format version: 10.1
specification: A collection of various types of GIS datasets held in a file system folder.
(<http://arcgis.com>)
languages: eng
character set: utf8

SHP

format name: ESRI Shapefile
specification: Esri Shapefile Technical Description, An Esri White Paper – July 1998
(<http://www.esri.com/library/whitepapers/pdfs/shapefile.pdf>)
languages: eng
character set: utf8

GML

format name: Geography Markup Language
format version: 2.0
specification: Open Geospatial Consortium Inc., OpenGIS®Geography Markup Language
(GML) Implementation Specification, Version 3.1.1, 2004-02-07, Reference
number of this OGC® project document: 03-105r1
(http://portal.opengeospatial.org/files/?artifact_id=4700)

languages: eng
character set: utf8

Delivery medium information/Informations relatives au support de livraison:

units of delivery/Unités de livraison: package
medium name/nom du support: online via HTTP, online via direct access

10. METADATA

The metadata requirements follow the Government of Canada's Treasury Board Standard on Geospatial Data (ISO 19115).