Proposal for the development of a spatial data model based on the OIE Zoning procedure

DOCUMENT INFORMATION

Title:	Proposal for the development of a spatial data model based on the OIE Zoning procedure
Creator:	Nicola Ferrè, Qiu Songyin
Subject:	Spatial data specification.
Description:	This document describes a study proposal for the development of a spatial data specification model for zones defined according to the Zoning procedure as described in chapter 4.3 of the Terrestrial Code (OIE – Terrestrial Animal Health Code, 2014)
Publisher:	• Istituto Zooprofilattico Sperimentale delle Venezie (Italy) • Chinese Academy of Inspection and Quarantine (China)
Date:	21/09/2016
Identifier:	Zoning conceptual model
Language:	En
Relation:	OIE – Terrestrial Animal Health Code, 2014

Credits

This document has been produced in the framework of the OIE Cooperation Project "Capacity development for implementing a Geographic Information System (GIS) applied to surveillance, control and zoning of avian influenza and other emerging avian diseases in China".

Terminology

Data capture. Process to collect geographic information. The process includes: (i) establishing data requirements, (ii) setting up of appropriate GIS hardware and software systems to edit and store the geographical data, (iii) editing or obtaining the data, possible redrafting poor quality data sources, and removing noise, and (iv) data validation, error correction and quality improvement.

Data quality. Degree up to which a set inherent characteristics fulfils requirements. In other words, completeness of attributes in order to achieve the given task.

Data product specification. Detailed description of a dataset together with additional information that will enable it to be created, supplied to and used by another party.

Geographic information. Information concerning phenomena implicitly or explicitly associated with a location relative to the Earth.

Metadata. Data about data. In other words, Metadata describes how and when and by whom a particular set of data was collected, and how the data is formatted.

Portrayal. Presentation of information to humans.

Rationale

According to the OIE Terrestrial Code, Zoning or regionalisation is a procedure implemented by an OIE Member Country under the provisions of the relevant chapters of the Terrestrial Code in order to define subpopulations, on a geographical basis, of distinct health status within its territory for the purpose of disease control and/or international trade (Article 4.3.1).

Zones defined according to the Zoning procedure contain a subpopulation with a distinct health status within its territory. The subpopulation may be separated by natural or artificial geographical barriers or, in certain situations, by the application of appropriate management practices (Article 4.3.1).

Spatial considerations (together with good management and biosecurity plans) play an important role in the application of the Zoning concept. In particular, the extent of a zone and its geographical limits should be established by the Veterinary Authority on the basis of natural, artificial and/or legal boundaries, and made public through official channels (Article 4.3.3).

The OIE Terrestrial Code provides neither specifications nor instructions on how to represent the geographical limits of a zone defined according to OIE's Zoning procedure, nor methods or services to share and transfer such information in digital/electronic form to the OIE and other relevant stakeholders.

In geomatics words, what the OIE Terrestrial Code does not provide is the *data product specification* of the geographical representation of a zone, defined according to the OIE Zoning process. According to ISO 19131:2007 Geographic Information – Data Product Specification[1], a "data product specification is a detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party. It is a precise technical description of the data product in terms of the requirements that it will or may fulfil. It forms the basis for producing or acquiring data. It may also help potential users to evaluate the data product to determine its fitness for use by them". In lay terms, with a data specification for a geographical information, the following elements are clearly described:

1. data content and structure (e.g. application schema, feature catalogue);
2. reference system;
3. data quality;
4. data capture;
5. data maintenance;
6. technologies and framework for data product delivery;
7. metadata needs.

Implementing the geographical representation of zones defined according to the OIE Zoning process by means of a data product model, will:

- enhance the understanding and usage of geographic information;
- promote availability, access, integration, and sharing of geographic information;
- promote transparency, consensus and methodological coherence of geographic information;
- promote the efficient and effective use of digital geographic information and associated software systems.

---

[1] This International Standard describes requirements for the specification of geographic data products, based upon the concepts of other ISO 19100 International Standards. It describes the content and structure of a data product specification. It also provides help in the creation of data product specifications, so that they are easily understood and fit for their intended purpose.

Proposal for the development of a spatial data model based on the OIE Zoning procedure

Objective

Propose a data product specification for the spatial information of zones defined according to the OIE Zoning process, in order to enable the Veterinary Authority to create and use it for the description of the zone extent.

Zone - essential elements

Zones are established according to the following elements:

- In accordance with specific legislative requirements;
- For the purpose of one or more diseases control and/or for international trade;
- A Veterinary Authority defines a specific action plan (within such plans, measures such as permit, promote, prohibit, restrict, etc.) are defined;
- The action plan applied over:
  - a specific zone;
  - a specific animal subpopulation;
  - a continuous time period or only within specific schedules time slots.

Moreover, a zone can be:

- subjected to various restrictions, or regulations, or management regimes at the same time;
- related to other zones.

Finally, the zone geographical boundary must not necessarily correspond to administrative limits, but it can also take into account natural borders (e.g.: rivers, lakes), artifacts (e.g. fences), and infrastructures (e.g. road, railroad).

Zone data content – main characteristics

Based on the assumption made in the "Zone - essential elements" paragraph, it is possible to draw a first hypothesis of relevant Zone data content characteristics.

1. Zone specific properties

   Information about the essential spatial information for describing the zone:

   - Geometry (representing the spatial extent of the spatial object. This shall be either a GM_Surface or GM_MultiSurface);
   - Time period when a zone was legally designated or became effective;
   - Relation to other zones.

2. Type / subtype of zones

   This information specifies the reason why the zone has been established:

   - Type (e.g.: containment, protection);
   - Diseases (for this information a multilingual registry should be considered)

3. Identification and maintenance properties

   Information about the zone identification:

   - Id (there could be more than one code but one must be chosen as unique identifier);
   - Geographical name (for this information a geographical reference should be associated).

4. Competent authority

   Information about the competent authority responsible for delivering, regulating and monitoring the zone:

   - Authority (name, address, web site, etc.);
   - Contact person (name, address, email, etc.).

Proposal for the development of a spatial data model based on the OIE Zoning procedure

5. Reference to legal basis
   Reference to the legislative document that establishes the zone:
   - Legal reference.

6. Controlled activities
   Information describing the type of activity (i.e.: vaccination, monitoring) that is implemented within the zone. For this information, a set of multilingual registry should be considered:
   - Type of measure;
   - Time period;
   - Animal subpopulation.

Conclusion

Data Specification is an important cornerstone of any data sharing framework. With a Data Specification document, the veterinary scientific community can ensure a coordinated approach regarding harmonisation of the zones defined according to the OIE Zoning process's data and services in matters of content, resolution and quality.

When adopted by Member States, Data Specification of the zones defined according to the OIE Zoning process will form the base for the definition of user-oriented cross-border and worldwide data services and products. Moreover, conformance to the Data Specification of the zones defined according to the OIE Zoning process will ensure the aggregation of data in a more cost effective and efficient way.

The Data Specification of the zones defined according to the OIE Zoning process will be edited according to the ISO standard ISO 19131:2007 Geographic Information – Data Product Specification.