Idaho Technology Authority (ITA)

ENTERPRISE STANDARDS – S4000 – INFORMATION AND DATA

Category: S4264 – Standard for Historic Earthquakes Data

CONTENTS:

I. DEFINITION

See ITA Guideline G105 (ITA Glossary of Terms) for definitions.

II. RATIONALE

A statewide Historic Earthquake layer and data standard, which is part of the Hazards data theme is a critical source of information for resource land management, community and economic development needs, infrastructure maintenance, research and analysis, business development, public safety, and more. This standard provides the foundation for aggregating historic earthquake data for centralized access and stewardship information. This standard applies to the Historic Earthquake element of The Idaho Map (TIM). When implemented, it will enable access to geometry and attribute information about historic Idaho earthquakes and earthquakes that occurred with 50 kilometers of the state border. It will increase interoperability between automated geographic information systems and enable sharing and efficient transfer of information for aggregation. Further, it will encourage partnerships between government, the private sector, and the public

in order to avoid duplication of effort and ensure effective management of information resources. It will help improve historic earthquake data quality as errors are identified and resolved.

III. APPROVED STANDARD(S)

See Attachment

IV. APPROVED PRODUCTS(S)

Any GIS Software, either desktop or online, capable of ingesting and displaying Open Geospatial Consortium (OGC) Web Map Standard (WMS) services.

V. JUSTIFICATION

A statewide Historic Earthquake dataset is a critical source of information, as stated under 'II Rationale' in this standard. A data exchange standard support the use of the Historic Earthquake to facility a predictable format, improve collaboration and encourage of this dataset.

VI. TECHNICAL AND IMPLEMENTATION CONSIDERATIONS

Any GIS Software, either desktop or online, capable of ingesting and displaying Open Geospatial Consortium (OGC) Web Map Standard (WMS) services.

VII. EMERGING TRENDS AND ARCHITECTURAL DIRECTIONS

Data will be shared in accordance with ITA Standard S4250 –Geographic Information System (GIS) Data Sharing Standards.

VIII. PROCEDURE REFERENCE

The format, content, and development of this standard adhere to ITA Policy P5030 - Framework Standards, ITA Standard S4250 - Data Sharing Standards and ITA Standard S4220 - Geospatial Metadata.

IX. REVIEW CYCLE

Review will occur at least annually.

X. CONTACT INFORMATION

For more information, contact the ITA Staff at (208) 605-4064.

REVISION HISTORY

07/20/2023 – Standard Presented to the IGC-EC

STATE OF IDAHO

Idaho Historic Earthquakes Data Standard

Part of the Hazards Theme

Version 1
Effective July 20, 2023

Developed by the Hazards Technical Working Group

Contact
ITA Staff
Office of Information Technology Services
(208) 605-4064
contact@its.idaho.gov

CONTENTS

1. Introduction to the Historic Earthquake Data Standard

A statewide Historic Earthquake layer is a critical source of information for resource land management, community and economic development needs, infrastructure maintenance, research and analysis, business development, public safety, and more. This standard provides the foundation for aggregating historic earthquake data for centralized access and stewardship information. This standard applies to the Historic Earthquake element of The Idaho Map (TIM). When implemented, it will enable access to geometry and attribute information about historic Idaho earthquakes and earthquakes that occurred with 50 kilometers of the state border. It will increase interoperability between automated geographic information systems and enable sharing and efficient transfer of information for aggregation. Further, it will encourage partnerships between government, the private sector, and the public to avoid duplication of effort and ensure effective management of information resources. It will help improve historic earthquake data quality as errors are identified and resolved. As can be seen from the above examples, many private sector and local, state, and federal government agencies have business needs for Historic Earthquake data.

A Historic Earthquake Standard is intended to facilitate integration and sharing of up-to-date Historic Earthquake data and enhance the dissemination and use of Historic Earthquake information. This standard does not instruct on how Historic Earthquake databases are designed for internal use.

This standard was developed by the Hazards Technical Working Group, a subgroup of the Idaho Geospatial Council – Executive Committee (IGC-EC). This standard will be reviewed on a regular basis and updated as needed.

1.1. Mission and Goals of the Standard

The Historic Earthquake Standard supports a statewide dataset that is consistent with applicable state and national standards. It establishes the minimum attributes and geospatial database schema for the Historic Earthquake Framework. The Standard will communicate with and may have similar attributes to other Idaho Framework data standards. It encourages all Idaho-based agencies with geospatial Historic Earthquake data to contribute to Historic Earthquake Framework.

The Historic Earthquake Framework will be appropriately shared and beneficial to all. The fields in the Historic Earthquake Data Exchange Standard will be general enough to incorporate basic information without requiring major changes in internal data models. This standard allows for expansion to a more complex data structure and schema.

1.2. **Relationship to Existing Standards**

This Historic Earthquake Exchange Standard relates to existing standards as follows:

- No other standards apply.

1.3. **Description of the Standard**

This standard describes the vision and geospatial data structure of a Historic Earthquake Framework in the state of Idaho. This standard is devised to be:

- Simple, easy to understand, and logical
- Uniformly applicable, whenever possible
- Flexible and capable of accommodating future expansions
- Dynamic in terms of continuous review

1.4. **Applicability and Intended Uses**

This standard applies to the Historic Earthquake element of the Hazards theme of The Idaho Map (TIM).

When implemented, this standard will enable access and exchange of the data. A predictable standard will support data collaboration, improve data collaboration, help identify and report errors, and allow agencies to incorporate this data into their own data products.

This standard does not consider data sharing agreements, contracts, transactions, privacy concerns, or any other issues relating to the acquisition and dissemination of Historic Earthquake data.

1.5. **Standard Development Process**

The Hazards Technical Working Group is a voluntary group of private, city, county, tribal, state, and federal representatives. In 2023, the Historic Earthquake Lead began developing the standard for the Historic Earthquake Framework using the standard development automation tools developed by the IGC-EC to generate the first draft of the Standard. This standard was then reviewed and edited by the members of the Hazards Technical Working Group.

After initial development, the draft standard document was shared with the Idaho Geospatial Council Executive Committee (IGC-EC) and the Idaho Geospatial Council (IGC) in accordance with the review and approval process described in ITA Policy P5030 Framework Standards Development.

1.6. **Maintenance of the Standard**

This standard will be revised on an annual basis and in accordance with ITA Policy P5030 - Framework Standards Development.

2. **Body of the Standard**

2.1. **Scope and Content**

The scope of the Historic Earthquake Data Exchange Standard is to describe a statewide layer which identifies the physical locations and attributes of Historic Earthquakes in Idaho.

2.2. **Need**

Historic Earthquake Layer is a key dataset needed for resource land management, community and economic development needs, infrastructure maintenance, research and analysis, business development, public safety, and more. This standard provides the foundation for aggregating historic earthquake data for centralized access and stewardship information.

2.3. **Participation in the Standard Development**

The development of the Historic Earthquake Data Exchange Standard adheres to the ITA Framework Standards Development Policy (P5030). The Hazards Standard Team tasked with development, invite input and comments from private, county, state, and federal organizations. As the standard is reviewed in accordance with Policy P5030 requirements, there will be opportunity for broad participation and input by stakeholders. The process will be equally broad for input on updates and enhancements to the standard. As with all Idaho Framework standards, public review and comment on the Historic Earthquake Data Exchange Standard are encouraged.

2.4. **Integration with Other Standards**

The Historic Earthquake Data Exchange Standard follows the same format as other Idaho geospatial framework data standards. The Historic Earthquake standard may contain some of the same attributes as other framework standards and may adopt the field name, definition, and domain from the other standards to promote consistency.

2.5. **Technical and Operation Context**

2.5.1. **Data Environment**

The data environment is a digital vector point with a specific, standardized set of attributes pertinent to the Historic Earthquake Framework. Historic Earthquake data shared under this standard must be in a format supporting vector points.

2.5.2. **Reference Systems**

The Historic Earthquake Framework will be published in the WGS 1984 Web Mercator (auxiliary sphere) coordinate system, which is the State of Idaho's single-zone coordinate system.

2.5.3. **Global Positioning Systems (GPS)**

Some data provided might contain geometry from GPS methods, and the provided metadata should describe this, if applicable. Some data provided might contain geometry from GPS methods, and the provided metadata should describe this, if applicable.

2.5.4. **Interdependence of Themes**

The Historic Earthquake Standard follows the same format as other Idaho geospatial framework data standards. The Historic Earthquake Standard may contain some of the same attributes as other framework standards and may adopt the field name, definition, and domain from the other standards to promote consistency.

2.5.5. **Encoding**

When data is imported into and exported from the Historic Earthquake Framework, encoding will take place to convert data formats and attributes.

2.5.6. **Resolution**

No specific requirements for resolution are specified in this standard. Resolution will be documented in the metadata. Resolution will be documented in the metadata.

2.5.7. **Accuracy**

No specific requirements for accuracy are specified in this standard. Accuracy will be documented in the metadata.

2.5.8. **Edge Matching**

No edge matching is required between jurisdictions or between this and other framework layers.

2.5.9. **Unique Identifier**

The unique identifier is ‘id,’ which generally consists of a two-character network identifier and an eight-character network-assigned code.

2.5.10. **Attributes**

Attributes for public and intergovernmental distribution are described in Section 3 of this standard.

2.5.11. **Stewardship**

Perpetual maintenance and other aspects of lifecycle management are essential to Historic Earthquake Framework. Details of stewards, their roles and responsibilities, and processes are set forth, or are being planned to set forth in a Historic Earthquake Framework Stewardship Plan and related documents.

2.5.12. **Records Management and Archiving**

Details of records management and archiving for Historic Earthquake Framework should be set forth in a Historic Earthquake Framework Stewardship Plan and related documents.

2.5.13. **Metadata**

The Historic Earthquake Framework metadata will describe the methods used to update and aggregate the individual Historic Earthquake data contributions, processes or crosswalks performed, definition of attributes, and other required information. This metadata will conform to the metadata standards as set out in ITA Standard S4220 Geospatial Metadata.

3. Data Characteristics

3.1. Minimum Graphic Data Elements

The geometry of the features in Historic Earthquake Framework is vector point.

3.2. Optional Graphic Data Elements

Not applicable.

3.3. Standard Attribute Schema

Field Name	Data Type	Length	Description	Examples
time	Text	30	Date and time of earthquake reported in milliseconds since epoch	1998-08-20T13:50:25.600Z
latitude	Double		Decimal degrees latitude	41.898
longitude	Double		Decimal degrees longitude	-111.816
depth	Double		Depth of event in kilometers	10
mag	Double		Magnitude for the event	5.02
magType	Text	30	Method or algorithm used to calculate the preferred magnitude for the event	mw
nst	Long		Total number of seismic stations used to determine earthquake location	11
gap	Double		Largest azimuthal gap between azimuthally adjacent stations in degrees	201.6
dmin	Double		Horizontal distance from epicenter to nearest station in degrees	0.753687
rms	Double		Root-mean-square travel time residual, in seconds, using all weights	0.14
net	Text	30	The ID of the data contributor	iscgem

Field Name	Data Type	Length	Description	Examples
id	Text	30	Unique identifier for the event	iscgem863670
updated	Text	30	Time when the event was most recently updated	2022-04-26T23:56:16.557Z
place	Text	100	Textual description of named geographic region near to the event	3 km NNE of Hope, ID
type	Text	30	Type of seismic event	earthquake
horizontalError	Double		Uncertainty of reported location in kilometers	19.29
depthError	Double		Uncertainty of reported depth in kilometers	31.61
magError	Double		Uncertainty of reported magnitude of the event	0.013
magNst	Long		Total number of seismic stations used to calculate the magnitude for the event	2
status	Text	30	Indicated whether the event has been reviewed by a human	reviewed
locationSource	Text	30	Network that originally authored the reported location of the event	uw
magSource	Text	30	Network that originally authored the reported magnitude for the event	uw
url	Text	254	url link to detailed information, maps, and data downloads for the event	https://earthquake.usgs.gov/earthquakes/eventpage/uu60539831
ShakeMap	Text	3	If a ShakeMap of the event is available	Yes, No
Eqtime	Date		Time field in Date format	5/13/2023 6:45:38 PM

3.4. **Data Quality**

Data quality considerations for Historic Earthquakes include:

a) All Historic Earthquakes should have Historic Earthquake IDs.

Appendix A: References

Idaho Technology Authority (ITA). *Information and Data Policy P5000, Category: P5030 Framework Standards Development Policy.* https://ita.idaho.gov/psg/P5030.pdf

Idaho Technology Authority (ITA). *Enterprise Standards S4000 Geographic Information Systems (GIS) Data, Category: S4220 Geospatial Metadata.* https://ita.idaho.gov/psg/S4220.pdf

U.S. Geological Survey, Earthquake Hazards Program, 2017, Advanced National Seismic System (ANSS) Comprehensive Catalog of Earthquake Events and Products: Various, https://doi.org/10.5066/F7MS3QZH.

Appendix B: Glossary

See ITA Guideline G105 (ITA Glossary of Terms) for definitions.