Idaho Technology Authority (ITA)

ENTERPRISE STANDARDS – S4000 – INFORMATION AND DATA

Category: S4XXX –Data Standard Geologic Map of Idaho Layer

CONTENTS:

I. DEFINITION

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

II. RATIONALE

A statewide Geologic Map of Idaho layer and data standard, which is part of the Geosciences data theme is a critical source of information for geologists, hydrologists, engineers, forest and land managers, conservationists, and more. Standardized Geologic Map of Idaho data supports those groups by providing easily accessible data from an authoritative source.

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 Geologic Map of Idaho dataset is a critical source of information as stated under 'II Rationale' in this standard. A data standard supports the use of the Geologic Map of Idaho to facility a predictable format, improve collaboration and encourage the use 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 Enterprise 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 Development, 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

05/16/2024 – Standard Presented to the IGC-EC

STATE OF IDAHO

Geologic Map of Idaho Data Standard

Part of the Geosciences Theme

Version 1
Effective May 16, 2024

Developed by the Geosciences Technical Working Group

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

CONTENTS

1. Introduction to the Geologic Map of Idaho Data Exchange Standard

A statewide Geologic Map of Idaho is a critical source of information for geologists, hydrologists, engineers, forest and land managers, conservationists, and more. Those groups will benefit because it provides easily accessible data from an authoritative source. As can be seen from the above examples, many private sector and local, state, and federal government agencies have business needs for Geologic Map of Idaho data.

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

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

1.1. **Mission and Goals of the Standard**

The Geologic Map of Idaho 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 Geologic Map of Idaho Framework. The Standard will communicate with, and may have similar attributes to, other Idaho Framework data standards.

The Geologic Map of Idaho Framework will be appropriately shared and beneficial to all. The fields in the Geologic Map of Idaho Data 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 Geologic Map of Idaho Standard relates to existing standards as follows: ITA Standard S4220 – Geospatial Metadata

1.3. **Description of the Standard**

This standard describes the vision and geospatial data structure of a Geologic Map of Idaho 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 Geologic Map of Idaho element of the Geosciences theme of The Idaho Map (TIM).

When implemented, this standard will enable access to the data. A predictable standard will support data collaboration and help identify and report errors. The standard will 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 Geologic Map of Idaho data.

1.5. **Standard Development Process**

The Geosciences Technical Working Group is a voluntary group of private, city, county, tribal, state, and federal representatives. In 2023 the Geologic Map of Idaho Lead began developing the standard for the Geologic Map of Idaho 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 Geosciences 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 as needed and in accordance with the ITA Policy P5030 Framework Standards Development.

2. **Body of the Standard**

2.1. **Scope and Content**

The scope of the Geologic Map of Idaho Data Standard is to describe a statewide layer which identifies the physical locations and attributes of Geologic Map of Idaho in Idaho.

2.2. **Need**

Geologic Map of Idaho is a key dataset needed for geologists, hydrologists, engineers, forest and land managers, conservationists, and more. This standard provides the foundation to aggregate Geologic Map of Idaho data for centralized access and stewardship information.

2.3. **Participation in the Standard Development**

The development of the Geologic Map of Idaho Data Standard adheres to the ITA Policy P5030 Framework Standards Development. The Geosciences Standard Team tasked with developing this standard invite input and comments from private, county, state, and federal organizations. As the standard is reviewed in accordance with ITA Policy P5030 Framework Standards Development requirements, there will be opportunity for broad participation and input by stakeholders in the development of this standard. 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 Geologic Map of Idaho Data Standard is encouraged.

2.4. **Integration with Other Standards**

The Geologic Map of Idaho Data Standard may contain some of the same attributes as other 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 polygon with a specific, standardized set of attributes pertinent to the Geologic Map of Idaho Framework. Geologic Map of Idaho data shared under this standard must be in a format supporting vector polygons.

2.5.2. **Reference Systems**

The Geologic Map of Idaho Framework uses WGS 1984. Data is not required to be submitted in the Idaho Transverse Mercator NAD83 (IDTM83) coordinate system but must have a defined coordinate system clearly described in the metadata.

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.

2.5.4. **Interdependence of Themes**

Not Applicable.

2.5.5. **Encoding**

When data is imported into and exported from the Geologic Map of Idaho Framework, encoding will take place to convert data formats and attributes.

2.5.6. **Resolution**

Requirements for resolution are specified in this standard as 1:750,000

2.5.7. **Accuracy**

These data (geologic contacts) are highly simplified and generalized for the purposes of generating a published map at a scale of 1:750,000. This is NOT a geologic data set but rather data resulting from a process of compiling a map for publication at a small scale. Positional accuracy is hard to determine for these data. Error in positional location of geologic boundaries cannot be quantitatively determined. Rather, numerous factors need to be taken into account to judge the accuracy and reliability of these data. The geology is highly simplified. Also, the original compilation base (Lambert conformal conic, 1:500.000) is not suited for regional compilation due to flaws in the topography and planimetrics (roads, boundary, streams, etc.), i.e., things don't fit well when compared to the real world. Efforts were made by the authors to resolve some of these issues and improve the overall quality and accuracy of the map data. One way to determine the best possible accuracy is to convert the linewidth of a polygon boundary (geologic contact) to real units. For example, a .25 mm (about .25 points) line at 1:500,000 converts to about 410 feet (125 m). This represents the best possible accuracy. If the arguments above are

added the positional accuracy must fall somewhere between 410-1000 feet 125-305 m). Obviously, these data should not be used for analysis purposes.

2.5.8. **Edge Matching**

Not Applicable.

2.5.9. **Unique Identifier**

The unique identifier is the Id - Identifier

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 Geologic Map of Idaho Framework. Details of stewards, their roles and responsibilities, and processes are set forth, or are being planned to set forth in a Geologic Map of Idaho Framework Stewardship Plan and related documents.

2.5.12. **Records Management and Archiving**

Changes are rare but are documented in the "Lineage" section in the metadata.

2.5.13. **Metadata**

The Geologic Map of Idaho Framework metadata will describe the methods used to update and aggregate the individual Geologic Map of Idaho 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 Geologic Map of Idaho Framework is vector polygon.

3.2. **Optional Graphic Data Elements**

Not applicable.

3.3. **Standard Attribute Schema**

Field Name	Data Type	Length	Description	Examples
Shape	Geometry			
Description	Text	1,250		Alluvial deposits (Quaternary)—Deposits in valleys consisting of gravel, sand, and silt. Includes younger terrace deposits. May contain some glacial deposits and colluvium in uplands.
ranking	Short		Rank, Coded Value Domain	Formation
unitType	Short		Geologic Unit Type, Coded Value Domain	Lithostratigraphic Unit
unitName	Short		Name, Coded Value Domain	Alluvial Deposits (Quaternary)
abbr	Short		Unit Abbreviation, Coded Value Domain	Qa
id	Short		Identifier	57
history	Short		Geologic History, Coded Value Domain	Magma Cooling, Mesoproterozoic
litholo	Short		Lithology, Coded Value Domain	Biotite granite | augen gneiss

See Appendix C for coded value domain description tables.

3.4. **Data Quality**

Data quality considerations for Geologic Map of Idaho include:

a) All Geologic Map of Idaho should have Geologic Map of Idaho IDs.

Appendix A: References

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

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

Idaho Geological Survey. *Map units contacts (lines), faults (lines), and map unit polygons*. Updated March 24, 2024. https://www.idahogeology.org/

Appendix B: Glossary

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

Appendix C: Domain Tables

Domain Name	Description	Field Type	Domain Type
History	Geologic History	short	Coded Value

Code	Description
1	Deposition, Quaternary
2	Flood plain deposition, Quaternary
3	Deposition, Mesoproterozoic | Metamorphism, Mesoproterozoic
4	Glacial deposition, Pleistocene
5	Magma cooling, Cretaceous
6	Deposition, Permian | Deposition, Pennsylvanian
7	Deposition, Pleistocene | Deposition, Pliocene
8	Basaltic volcanism, Pleistocene | Basaltic volcanism, Pliocene
9	Water bodies
10	Intrusion, Eocene
11	Volcanism, Eocene
12	Deposition, Devonian | Deposition, Ordovician

13	Deposition, Mississippian
14	Basaltic volcanism, Pliocene | Basaltic volcanism, Miocene
15	Deposition, Miocene
16	Mass wasting, Quaternary
17	Lake Bonneville sediments deposition, Pleistocene
18	Rhyolite volcanism, Miocene
19	Deposition, Cambrian | Deposition, Neoproterozoic
20	Eruptive flooding basalt, Miocene
21	Deposition, Ordovician | Deposition, Cambrian
22	Deposition, Mesoproterozoic
23	Rhyolite volcanism, Pliocene | Rhyolite volcanism, Miocene
24	Deposition, Triassic
25	Magma cooling, Cretaceous | Magma cooling, Jurassic
26	Deposition, Oligocene | Deposition, Eocene
27	Deposition, Jurassic
28	Metamorphism, Paleoproterozoic
29	Loess deposit, Pleistocene
30	Rhyolite volcanism, Pleistocene
31	Windblown sand deposition, Quaternary
32	Deposition, Cretaceous | Deposition Permian | Metamorphism, Cretaceous
33	Deposition, Eocene
34	Deposition, Cretaceous
35	Deposition, Paleozoic | Deposition, Mesoproterozoic | Metamorphism, Paleozoic
36	Deposition, Jurassic | Deposition, Triassic | Volcanism, Jurassic |Volcanism, Triassic
37	Magma cooling, Mesoproterozoic
38	Intrusion, Triassic | Intrusion Permian
39	Volcanism, Triassic | Volcanism, Permian
40	Volcanism, Jurassic |Volcanism, Triassic
41	Intrusion, Paleocene | Intrusion Cretaceous
42	Missoula Flood sediments deposition, Pleistocene
43	Deposition, Cretaceous | Deposition Jurassic
44	Deposition, Permian | Deposition, Mississippian

45	Extrusion, Mesoproterozoic | Metamorphism, Mesoproterozoic
46	Intrusion, Oligocene
47	Deposition, Devonian | Deposition, Cambrian
48	Intrusion, Ordovician | Intrusion, Cambrian
49	Basalt flows, Quaternary
50	Intrusion, Neoproterozoic
51	Volcanism, Oligocene
52	null
53	Deposition, Mesozoic | Deposition, Paleozoic
54	Magma cooling, Jurassic
55	Deposition, Paleocene | Deposition, Cretaceous

Domain Name	Description	Field Type	Domain Type
Lithology	Lithology description	short	Coded Value

Code	Description
1	Alkali olivine basalt
2	Amphibolite
3	Anorthosite
4	Basaltic | rhyolitic
5	Basaltic volcaniclastic rock | rhyolitic volcaniclastic rock
6	Biotite | muscovite-biotite | muscovite granite
7	Biotite granite | augen gneiss
8	Biotite granite | granitic augen gneiss
9	Biotite tonalite gneiss | hornblende-biotite tonalite gneiss
10	Biotite-rich paragneiss | schist | minor feldspathic quartzite
11	Calcareous siltite | dolomitic siltite | quartzite |minor argillite
12	Conglomerate | sandstone
13	Conglomerate | sandstone | mudstone | tuff

14	Conglomerate | sandstone | shale | gravel
15	Dacite | andesite | rhyolite tuffs
16	Diorite | tonalite | granodiorite | gabbro | norite | quartz diorite| trondhjemite
17	Dolostone | limestone | sandstone
18	Dolostone | limestone | sandstone | minor shale | sandstone
19	Feldspathic fine-grained quartzite
20	Feldspathic fine-grained quartzite | siltite | minor argillite | carbonate-bearing rock
21	Feldspathic quartzite | minor schist | calc-silicate rock
22	Feldspathic quartzite | minor siltite | argillite
23	Granodiorite | granite
24	Granodiorite | quartz monzodiorite | minor diorite | granite | subvolcanic dacite
25	Granodiorite | tonalite | quartz diorite
26	Granodiorite gneiss | schist | gneiss |minor quartzite
27	Gravel | sand | clay
28	Gravel | sand | silt | clay
29	Gravel | sand |silt
30	Kyanite | sillimanite gneiss | schist | quartzite | amphibolite
31	Limestone | dolomite | minor shale | sandstone
32	Limestone | marble | calcareous mudstone | phyllite
33	Limestone | turbiditic sandstone | mudstone | conglomerate
34	Made structure
35	Metasedimentary rock | metavolcanic schist | gneiss |amphibolite |marble
36	Mudstone | Minor conglomerate | sandstone
37	Olivine tholeiite basalt
38	Olivine tholeiite basalt | minor latite | alkaline basalt
39	Phosphorite | shale | chert
40	Phosphorite | shale | chert |limestone | turbiditic sandstone | mudstone | conglomerate
41	Quartz diorite
42	Quartzite
43	Quartzite | feldspathic quartzite | calc-silicate gneiss | biotite gneiss | schist | amphibolite
44	Quartzose sandstone | minor siltite |minor shale | limestone

45	Red mudrock | fine-grained sandstone | limestone
46	Rhyolite
47	Ribbon chert | phyllite | argillite | cherty limestone | limestone
48	Sand
49	Sandstone | limestone
50	Sandstone | shale
51	Sandstone |siltstone | arkose | conglomerate | claystone | tuffaceous sediment |minor basalt |minor rhyolitic tuff
52	Silt
53	Silt | clay | sand
54	Siltite | argillite | dolomitic siltite
55	Siltite | calc-silicate rock | argillite | minor marble
56	Siltite | quartzite | argillite
57	Syenite | diorite
58	Syenite | monzonite |quartz monzonite | minor pyroxenite
59	Syenite | quartz syenite | alkali-feldspar granite | minor gabbro
60	Tholeiitic basalt
61	Tonalite
62	Tonalite | granodiorite | quartz diorite
63	Tonalite | trondhjemite
64	Tonalitic orthogneiss | foliated granodiorite
65	water

Domain Name	Description	Field Type	Domain Type
Name	Geologic unit name	short	Coded Value

Code	Description
0	Alluvial-fan deposits (Quaternary)
1	Alluvial deposits (Quaternary)

2	Amphibolite (Mesoproterozoic)
3	Anorthosite (Paleoproterozoic)
4	Augen gneiss (Mesoproterozoic)
5	Baker Terrane (Mesozoic and Paleozoic)
6	Basalt (Pleistocene and Pliocene)
7	Basalt (Pliocene and Miocene)
8	Basalt (Quaternary)
9	Challis intrusive rocks (Eocene)
10	Challis Volcanic Group (Eocene)
11	Columbia River Basalt Group (Miocene)
12	Coon Hollow and Weatherby formations (Cretaceous and Jurassic)
13	dam
14	Fluvial and lake sediment (Quaternary)
15	Glacial deposits (Pleistocene)
16	Gneiss, schist, and quartzite (Mesoproterozoic)
17	Gneissic and schistose metasedimentary rocks (Mesoproterozoic)
18	Granite (Oligocene)
19	Granodiorite and granite (Paleocene and Cretaceous)
20	Granodiorite and two-mica granite (Cretaceous)
21	Hoodoo Quartzite and argillaceous quartzite (Mesoproterozoic)
22	Intrusive rocks (Neoproterozoic)
23	Intrusive rocks (Triassic and Permian)
24	Laclede augen gneiss (Mesoproterozoic)
25	Lake Bonneville deposits (Pleistocene)
26	Landslide deposits (Quaternary)
27	Lemhi Group (Mesoproterozoic)
28	Loess deposits (Pleistocene)
29	Lower Missoula Group (Mesoproterozoic)
30	Metamorphic rocks (Paleoproterozoic and Archean)
31	Metasedimentary rocks (Paleozoic to Mesoproterozoic)
32	Missoula Flood deposits (Pleistocene)
33	Older rhyolite, latite, and andesite (Miocene)

34	Olds Ferry terrane (Jurassic and Triassic)
35	Orthogneiss (Paleoproterozoic)
36	Piegan Group (Mesoproterozoic)
37	Plutonic rocks along the western Idaho shear zone (Cretaceous and Jurassic)
38	Prichard Formation (Mesoproterozoic)
39	Quartz diorite (Cretaceous and Jurassic)
40	Quartzitic metamorphic rocks (Mesoproterozoic)
41	Ravalli Group (Mesoproterozoic)
42	Rhyolite (Miocene)
43	Rhyolite (Pleistocene)
44	Rhyolite (Pliocene and Miocene)
45	Riggins Group, Orofino series, and related rocks (Cretaceous to Permian)
46	Sedimentary and volcanic rocks (Jurassic and Triassic)
47	Sedimentary rocks (Cretaceous)
48	Sedimentary rocks (Devonian to Cambrian)
49	Sedimentary rocks (Devonian to Ordovician)
50	Sedimentary rocks (Eocene)
51	Sedimentary rocks (Jurassic)
52	Sedimentary rocks (Mississippian)
53	Sedimentary rocks (Ordovician and Cambrian)
54	Sedimentary rocks (Paleocene and Cretaceous)
55	Sedimentary rocks (Permian and Pennsylvanian)
56	Sedimentary rocks (Permian to Mississippian)
57	Sedimentary rocks (Triassic)
58	Sedimentary rocks and sediments (Oligocene and Eocene)
59	Sedimentary rocks associated with Basin and Range extension (Quaternary, Pliocene, and Miocene)
60	Sedimentary rocks associated with flood basalts (Miocene)
61	Sediments and sedimentary rocks (Pleistocene and Pliocene)
62	Seven Devils Group (Triassic and Permian)
63	Swauger and Lawson Creek formations (Mesoproterozoic)
64	Syenite and related rocks (Cretaceous)

65	Syenitic intrusive rocks (Ordovician and Cambrian)
66	Tonalite and trondhjemite (Cretaceous)
67	Tonalite, granodiorite, and quartz diorite (Cretaceous)
68	Tonalite, hornblendite, and gabbro (Jurassic)
69	Tonalitic orthogneiss and foliated granodiorite (Cretaceous)
70	Upper Missoula Group (Mesoproterozoic)
71	Volcanic rocks (Oligocene)
72	water bodies
73	Windblown sand deposits (Quaternary)
74	Windermere Supergroup (Cambrian and Neoproterozoic)
75	Yellowjacket Formation (Mesoproterozoic)

Domain Name	Description	Field Type	Domain Type
Rank	Geologic unit view rank	short	Coded Value

Code	Description
0	Not Specified
1	Group
2	Supergroup
3	Formation

Domain Name	Description	Field Type	Domain Type
Unitabbr	Unit name abbreviation	short	Coded Value

Code	Description
0	JT_of
1	CZs
2	dam
3	DCs
4	DSOs
5	Ji
6	Js
7	JT_sv
8	Kg
9	Kis
10	KJcw
11	KJp
12	KJqd
13	Kog
14	KPro
15	Ks
16	Ktg
17	Ktt
18	Ms
19	MzPzb
20	OCi
21	OCs
22	PMs
23	PP_s
24	PzYs
25	Qa
26	Qaf
27	Qb
28	Qbs
29	Qg
30	Ql

31	Qls
32	Qm
33	Qr
34	Qs
35	QTb
36	QTpms
37	QTs
38	Qw
39	T_Pi
40	T_Psd
41	T_s
42	Tcr
43	Tcv
44	Tei
45	Tes
46	TKg
47	TKs
48	Tmfo
49	Tmr
50	Tms
51	Toes
52	Toi
53	Tov
54	Tpmb
55	Tpmr
56	water
57	XAm
58	Xan
59	Xog
60	Yag
61	Yagl
62	Yam

63	Ygs
64	Yha
65	Yl
66	Ym
67	Ymil
68	Ymiu
69	Yp
70	Ypi
71	Yq
72	Yra
73	Ysl
74	Yy
75	Zi

Domain Name	Description	Field Type	Domain Type
unitType	Geologic unit type	short	Coded Value

Code	Description
0	Lithostratigraphic Unit
1	Water Body
2	Artificial Ground