

Idaho Technology Authority (ITA)

ENTERPRISE STANDARDS – S4000 – INFORMATION AND DATA

Category: S4256 – Idaho Geologic Map Data Layer

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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 adheres 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

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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 annual 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. This draft 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 reviewed on an annual basis and revised 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. 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 “Identifier” field. The Identifier field is a numeric code assigned by the Idaho Geological Survey that corresponds to the unique geologic unit type, name, history, lithology, rank, and description.

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 volcanoclastic rock rhyolitic volcanoclastic 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	KJew
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

