Data structure for DI-19: Geologic spatial data for the Roskruge and Waterman Mountains and western Avra Valley area, Pima County, Arizona

by

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Text to accompany DI-19

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INTRODUCTION AND PURPOSE

Digital Information Series 19 (DI-19), *Geologic spatial data for the Roskruge and Waterman Mountains and western Avra Valley area, Pima County, Arizona*, is a geospatial database containing information about the geology of the Cocoraque Butte, Three Points, Waterman Peak, and West of Avra 7½-minute quadrangles, and the northern part of the La Tortuga Butte 7½-minute quadrangle. The map extent for this database also includes the southern part of the La Tortuga Butte and the San Pedro 7½-minute quadrangles, but the geologic mapping for this area has not been converted to digital format in this version of DI-19.

The purpose of this document is to describe the database structure of DI-19 by providing a written description of (1) the procedures used to create the dataset; (2) the structure of the geospatial data; and (3) the structure of the MS Access database lookup tables that define the geospatial data. It is assumed that the reader is familiar with the basics of the ESRI coverage data model and the use of ESRI ArcView GIS 3.x and Microsoft Access 97-2000 software.

DIGITIZING PROCEDURE

This dataset was digitized from pencil compilations of geologic field mapping and photogeologic interpretations on USGS topographic base maps using ArcInfo 8.0. The digitizing methods included manual digitizing of the paper base maps using a Calcomp Drawingboard II table digitizer, as well as on-screen digitizing from georeferenced scans of field sheets using ArcEdit. These scans were georeferenced using the interactive ArcInfo 'register' program.

The datasets were digitized in a UTM27, zone 12 map projection but have been unprojected so that they can be distributed using geographic coordinates measured in decimal degrees. Editing, edge-matching, and joining of coverages were done using ArcEdit. Attribution of polygons, arcs, and points was done using ArcView GIS 3.2. Additional shapefiles were created using ArcView GIS 3.2. Database lookup tables were created using Microsoft Access 2000 and Microsoft Excel 2000 software and are included as an Access database. The metadata was created using the FGDC metadata editor in ArcCatalog 8.0, then parsed for FGDC compliancy using the MP metadata compiler written by Peter Schweitzer of the USGS in Reston, VA.

DATA OVERVIEW AND ORGANIZATION

This geographic database is an implementation that is an outgrowth from a proposed North American standard data model for geologic maps [Johnson and others, 1998]. A logical schema for the database structure is shown in Figure 1,at the end of this document, and should be referenced throughout this discussion. The geologic and cartographic information in the database is organized into several ArcInfo coverages and ArcView shapefiles. The RoskGeo polygon and arc coverage contains the lines that represent geologic contacts and faults, and the associated polygons based on those lines that define the outcrop area of map units. The RoskPnt point coverage contains the field observation stations that record things such as structural measurements and collected rock samples. The RoskGeoLines line shapefile contains the geologic lines that do not define boundaries between rock units, such as concealed faults and fold hinge surface traces. The RoskCartoLines line shapefile contains cartographic lines, such as text lead-in lines. Last,

the RoskCartoPnts point shapefile locates the cartographic point features used in the default map layout, such as text labels. There is also a **RoskMapSource** shapefile that contains generalized polygons showing the extent of mapping responsibility areas for each source used to compile the geologic map. This shapefile is included as a cartographic aid and is not further discussed. Each of these coverages and shapefiles and the user-defined features included in their feature attribute tables, excluding the **RoskMapSource** shapefile, are also summarized in Table 1, Table 8, and Table 11.

Every spatial object (point, line, or polygon) is uniquely identified by a compound primary key consisting of a source-file identifier, *DatasetID*, and a unique identifier within that file, *ObjectID*. The ArcInfo-assigned *Coverage-ID* field, a seemingly good candidate for unique identifiers, is apparently not immutable under build and clean operations on the dataset. Therefore, *ObjectID* was added as a user-defined attribute, and the uniqueness constraint must be enforced by the user. The *ObjectID* values in the tables in this database should not be edited unless the user fully understands the data structure and the ramifications of editing the primary key in a relational database table. All points, lines, and polygons have a *TrackingID* attribute that joins with the TrackingRecord table to show the source origination and tracking information for each object. Geologic points and lines also have an *Accuracy* attribute that defines the location uncertainty for the point or line in meters. The compound object key, *ObjectID* and *DatasetID*, and the compound source tracking key, *TrackingID* and *TrackingDS*, plus the *Accuracy* attribute for geologic points and lines, are the minimal set of attributes fundamental to each spatial object.

A number of other attributes are also included in the coverage and shapefile tables to facilitate visualization of the geologic data in a default layout, and to allow querying against a default classification scheme equivalent to the original source map. These default values also make simple analyses of the map possible in non-relational database environments required by some users of AZGS data. The compound classification concept attribute, *ConceptID* and *ConceptDS*, defines the default classification of every object (Fault; Bedding; Surficial Map Unit…); the classification confidence attribute, *CConf*, provides a subjective measure of the identification confidence of the object (Low; Standard...); and the compound cartographic object attribute, *CartoObjID* and *CartoObjDS*, defines the cartographic object used to symbolize each feature in the default visualization (0.35pt. solid black line (24K); Inclined bedding symbol – color black (24K); PMS-1205…). There is also a *Label* attribute used to store any labels or names associated with an object, such as unit names for geologic polygons, and a *Name* attribute that contains a brief description of each object for simplification purposes. Polygon features have a map unit confidence attribute, *MConf*, that provides a subjective measure of the identification confidence of a polygon to a particular map unit. Point features also have a *Rotate* attribute that defines the degree of rotation of graphical elements used for feature symbolization in the ArcView project. This rotation is calculated from the azimuth of the structural feature to display properly in ArcView 3.2; it is measured anticlockwise, starting from a compass azimuth of 90º. Rotation magnitude is also partly dependent on the orientation of each symbol in its font definition (the AZGS_geo.ttf True Type font, included with this package in the /support/fonts directory).

Different visualizations of a single set of geologic data could be constructed using different sets of spatial objects, possibly originating from different sources, and different user-defined classifications of rock-units, contacts, and stations. This would require that *ConceptID*, *CartoObjID*, and *Rotate* be defined through correlation tables joined to the spatial objects on the compound primary key, *ObjectID* and *DatasetID*. These correlations tables are defined in the full AZGS geologic data model design [Richard and Orr, in prep.], but are not implemented in this database.

GEOLOGIC COVERAGES

The coverages below are part of the geospatial database for DI-19. These coverages, and the user-defined features included in their feature attribute tables, are summarized in Table 1.

Table 1. Summary of coverages showing fields, field definitions, and associated database tables. The *ObjectID* field, along with the *DataSetID* field, is the compound primary key for each coverage. If a field is a foreign key to a lookup table, the table name is shown adjacent to that field in the last column.

Coverage Name	Type	Field Name	Data Type	Width	Lookup Tables
RoskGeo.pat (field definitions start on page 4)	Poly	ObjectID	Integer	16	
		DataSetID	Integer	16	DataSetAZ
		TrackingID	Integer	16	TrackingRecord
		TrackingDS	Integer	16	DataSetAZ
		ConceptID	Integer	16	ClassificationConcept
		ConceptDS	Integer	16	DataSetAZ
		CConf	Character	16	
		CartoObjID	Integer	16	CartographicObject
		CartoObjDS	Integer	16	DataSetAZ
		MapUnitID	Integer	16	MapUnitsRoskruge
		MapUnitDS	Integer	16	DataSetAZ
		MConf	Character	16	
		Label	Character	50	
		Name	Character	255	
RoskGeo.aat (field definitions start on page 9)	Line	ObjectID	Integer	16	
		DataSetID	Integer	16	DataSetAZ
		Accuracy	Float	8	
		TrackingID	Integer	16	TrackingRecord
		TrackingDS	Integer	16	DataSetAZ
		ConceptID	Integer	16	ClassificationConcept
		ConceptDS	Integer	16	DataSetAZ
		CConf	Character	16	
		CartoObjID	Integer	16	CartographicObject
		CartoObjDS	Integer	16	DataSetAZ
		Label	Character	50	
		Name	Character	255	
RoskPnt.pat (field definitions start on page 11)	Point	ObjectID	Integer	16	
		DataSetID	Integer	16	DataSetAZ
		Accuracy	Float	8	
		TrackingID	Integer	16	TrackingRecord
		TrackingDS	Integer	16	DataSetAZ
		ConceptID	Integer	16	ClassificationConcept
		ConceptDS	Integer	16	DataSetAZ
		CConf	Character	16	
		CartoObjID	Integer	16	CartographicObject
		CartoObjDS	Integer	16	DataSetAZ
		Label	Character	50	
		Rotate	Integer	4	
		Name	Character	255	

Roskruge Geology Coverage

The **RoskGeo** coverage is a polygon and arc coverage that contains geologic lines that bound polygons (contacts, faults, mapping boundaries...), or represent surfaces that are discontinuous within polygons (faults that become buried or die out). The polygon

topology defined by the lines in this coverage identifies the mapped distribution of rock units.

Polygon Attributes

- **ObjectID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies each feature in the *RoskGeo* polygon coverage. Each feature has a different value. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies the *RoskGeo* polygon coverage. All features in the dataset have the same value. Domain: 421 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each object. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID* for each record. Domain: 18 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **ConceptID**: Integer, width 16. This field contains an integer value that specifies the concept used to classify the kind of unit a particular polygon represents. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 2.

Table 2. Classification concept ID codes used in the *RoskGeo.pat* table.

ConceptID	Name
2405	Surficial Map Unit
2406	Rock Volume Map Unit
2424	Not Defined

- **ConceptDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *ConceptID* for each record. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **CConf**: Character, width 16. This field contains a text string that indicates the subjective confidence of the person classifying the kind of unit represented by the polygon. Domain: 'low', 'standard', or 'high'.
- **CartoObjID**: Integer, width 16. This field contains an integer value that identifies the cartographic symbolization used for each spatial object on the default map visualization. It is a foreign key that links to the *CartoObjID* field of the *CartographicObject* table in the *RoskrugeWaterman* database. Domain: See Table 3.

Table 3. Cartographic object codes used in the *RoskGeo.pat* table.

CartoObjID	Seq.	Name
999	1	Transparent
1008	1	PMS-100
1036	1	PMS-1205
1050	1	PMS-134
1071	1	PMS-148
1085	1	PMS-155
1106	1	PMS-1625

CartoObjID	Seq.	Name
1107	1	PMS-1635
1120	1	PMS-176
1121	1	PMS-177
1169	1	PMS-203
1450	1	PMS-366
1528	1	PMS-436
1574	1	PMS-454

CartoObjID	Seq.	Name
1580	1	PMS-4535
1581	1	PMS-4545
1594	1	PMS-467
1595	1	PMS-468
1600	1	PMS-4665
1601	1	PMS-4675
1608	1	PMS-474
1614	1	PMS-4735
1616	1	PMS-4755
1636	1	PMS-495
1643	1	PMS-502
1644	1	PMS-503
1658	1	PMS-510
1720	1	PMS-5445
1727	1	PMS-551
1732	1	PMS-5493
1733	1	PMS-5503
1735	1	PMS-5523
1748	1	PMS-558
1753	1	PMS-5565
1755	1	PMS-5585
1784	1	PMS-580
1796	1	PMS-5787
1798	1	PMS-5807
1813	1	PMS-600
1828	1	PMS-615
1880	1	PMS-667
1907	1	PMS-694
1939	1	PMS-726
1940	1	PMS-727
1941	1	PMS-728
2200	1	Blue (R135,G207,B254)
2201	1	Blue (R149,G253,B253)
2203	1	Brown (R203,G156,B105)
2204	1	Brown (R218,G194,B170)
2205	1	Brown (R231,G170,B116)
2206	1	DkOrange (R254,G133,B90)
2207	1	DkPurple (R202,G0,B220)
2208	1	DkYellowGreen (R199,G204,B137)
2209	1	Gray (R165,G165,B165)
2210	1	GrayGreen (R170,G196,B195)
2212	1	Green (R136,G209,B166)
2213	1	Green (R143,G193,B133)
2214	1	Green (R157,G199,B171)
2215	1	LtBlue (R219,G252,B252)

CartoObjID	Seq.	Name
2216	1	LtGreen (R120,G254,B185)
2217	1	LtGreen (R155,G254,B154)
2218	1	LtGreen (R188,G236,B139)
2219	1	LtGreen (R190,G237,B190)
2220	1	LtGreen (R192,G252,B203)
2221	1	LtPurple (R204,G195,B223)
2223	1	LtViolet (R202,G225,B254)
2224	1	Orange (R254,G174,B79)
2225	1	Pink (R254,G175,B207)
2226	1	Pink (R255,G195,B195)
2227	1	Purple (R225,G146,B180)
2228	1	Red (R240,G128,B128)
2229	1	Red (R254,G123,B101)
2230	1	Tan (R244,G213,B158)
2231	1	Transparent background
2231	2	Blue (R39,G146,B182) 1st pattern layer
2232	1	Transparent background
2232	2	Blue (R69,G228,B236) 1st pattern layer
2233	1	Transparent background
2233	2	DkGreen (R39,G99,B35) 1st pattern layer
2234	1	Transparent background
2234	2	DkGreen (R86,G129,B86) 1st pattern layer
2235	1	Transparent background
2235	2	DkYellowGreen (R168,G174,B95) 1st pattern layer
2236	1	Transparent background
2236	2	Green (R0,G205,B0) 1st pattern layer
2237	1	Transparent background
2237	2	Green (R124,G205,B124) 1st pattern layer
2238	1	Transparent background
2238	2	Green (R124,G205,B124) 1st pattern layer
2239	1	Transparent background
2239	2	Green (R80,G158,B78) 1st pattern layer
2240	1	Transparent background
2240	2	LtGreen (R130,G250,B183) 1st pattern layer
2241	1	Transparent background
2241	2	LtPurple (R179,G175,B213) 1st pattern layer
2242	1	Transparent background
2242	2	LtPurple (R212,G202,B232) 1st pattern layer
2243	1	Transparent background

CartoObjID	Seq.	Name
2243	2	Peach (R255,G199,B174) 1st pattern layer
2244	1	Transparent background
2244	2	Pink (R253,G154,B192) 1st pattern layer
2245	1	Transparent background
2245	2	PMS-184 1st pattern layer
2246	1	Transparent background
2246	2	PMS-467 1st pattern layer
2247	1	Transparent background
2247	2	PMS-5503 1st pattern layer
2248	1	Transparent background
2248	2	Purple (R237,G132,B236) 1st pattern layer
2249	1	Transparent background
2249	2	Red (R250,G128,B114) 1st pattern layer
2250	1	Transparent background
2250	2	Violet (R130,G132,B254) 1st pattern layer
2251	1	Transparent background
2251	2	Violet (R136,G109,B231) 1st pattern layer
2252	1	DKBlue (R100,G149,B237) background
2252	2	Blue (R153,G230,B253) 1st pattern layer
2253	1	Brown (R243,G214,B158) background
2253	2	GrayBrown (R192,G181,B162) 1st pattern layer
2254	1	PMS-454 background
2254	2	PMS-1205 1st pattern layer
2255	1	PMS-406 background
2255	2	PMS-1635 1st pattern layer
2256	1	PMS-406 background
2256	2	PMS-452 1st pattern layer
2257	1	PMS-4675 background

CartoObjID	Seq.	Name
2257	2	PMS-4525 1st pattern layer
2258	1	PMS-4675 background
2258	2	PMS-454 1st pattern layer
2259	1	PMS-4675 background
2259	2	PMS-466 1st pattern layer
2260	1	PMS-454 background
2260	2	PMS-467 1st pattern layer
2261	1	PMS-454 background
2261	2	PMS-467 1st pattern layer
2262	1	PMS-468 background
2262	2	PMS-4675 1st pattern layer
2263	1	PMS-670 background
2263	2	PMS-695 1st pattern layer
2264	1	Pink (R255,G195,B195) background
2264	2	Red (R224,G58,B0) 1st pattern layer
2265	1	Pink (R255,G195,B195) background
2265	2	Red (R224,G58,B0) 1st pattern layer
2266	1	Pink (R255,G195,B195) background
2266	2	Red (R224,G58,B0) 1st pattern layer
2267	1	Pink (R255,G195,B195) background
2267	2	Red (R224,G58,B0) 1st pattern layer
2268	1	Pink (R255,G195,B195) background
2268	2	Red (R224,G58,B0) 1st pattern layer
2269	1	Green (R179,G204,B122) background
2269	2	YellowGreen (R187,G178,B77) 1st pattern layer

- **CartoObjDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *CartoObjID* for each record. Domain: 21 = the *DataSetID* for the *CartographicObject* table.
- **MapUnitID**: Integer, width 16. This field contains an integer value that identifies the geologic map unit associated with each polygon of type "Rock Volume Map Unit" (ID = 2406) or "Surficial Map Unit" (ID = 2405). It is a foreign key that links to the *ObjectID* field of the *MapUnits* table in the *RoskrugeWaterman* database. Domain: See Table 4.

Table 4. Rock unit identification codes used in the *RoskGeo.pat* table.

MapUnitID	Name
0	Area not digitized
1	Abrigo Formation (Middle Cambrian)
2	Abrigo Formation (Middle Cambrian) - lower sandstone and mudstone unit
3	Abrigo Formation (Middle Cambrian) - middle mottled carbonate unit
4	Abrigo Formation (Middle Cambrian) - upper sandstone, marl, and limestone unit
5	Bolsa Quartzite (Cambrian)
6	Bolsa and Abrigo Formations, undivided
7	Bolsa, Abrigo and Martin Formations, undivided, photogeologic identification
8	Martin Formation (Devonian)
9	Quartz arenite (Jurassic?)
11	Andesite to dacite volcaniclastic breccia (Jurassic?)
12	Reddish mudstone, siliceous argillite, and quartz-arenite (Jurassic or Triassic)
13	Light gray to white, feldspathic quartz arenite, and quartzite cobble conglomerate (Jurassic or Triassic)
14	Light greenish-gray siliceous argillite and feldspathic sandstone (Jurassic or Triassic)
15	Red mudstone and volcanic lithic sandstone, with interbedded quartzite in lower part (Jurassic or Triassic)
16	Andesite (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
17	Intrusive andesite (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
18	Andesite breccia (Cretaceous); sedimentary and volcanic sequence east of the Recortado Well Fault
19	Conglomerate with sandstone clasts (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
20	Eolian sandstone/quartzite (Cretaceous); sedimentary and volcanic sequence east of the Recortado Well Fault
21	Granodiorite of Cocoraque Butte (Cretaceous or Jurassic)
22	Border phase for the Granodiorite of Cocoraque Butte? (Cretaceous or Jurassic)
23	Hypabyssal rock? (Cretaceous or Jurassic)
24	Mafic to intermediate volcanic and shallow intrusive rocks (Cretaceous or Jurassic)
25	Mafic sill (Cretaceous); sedimentary and volcanic sequence east of the Recortado Well Fault
26	Sandstone photogeologic unit 1 (Cretaceous or Jurassic)
27	Sandstone photogeologic unit 2 (Cretaceous or Jurassic)
28	Flow-banded rhyolite (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
29	Reddish feldspathic-lithic sandstone, argillite, and limestone (Cretaceous or Jurassic)
30	Rhyolite breccia (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
31	Sandstone, mudstone, and conglomerate (Cretaceous or Jurassic)
32	Coarse-grained sandstone and conglomerate (Cretaceous or Jurassic)
33	Limestone (Cretaceous or Jurassic)
34	Siltstone (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
35	Clastic sedimentary rocks, undivided (Cretaceous or Jurassic)
36	Dark volcanic lithic sandstone and conglomerate (Cretaceous or Jurassic)
37	Ash-flow tuff (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
38	Tuff (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
39	Unit of Tunnel Well (Cretaceous or Jurassic)
40	Breccia (Cretaceous or Jurassic)
41	Conglomerate (Cretaceous?)
42	Confidence Peak Tuff (Cretaceous)
43	Felsite of Dos Titos (Cretaceous) - aphyric felsite
44	Felsite of Dos Titos (Cretaceous) - main phase
45	Felsite of Dos Titos (Cretaceous) - mixed felsite and mesobreccia of the tuff of Sharp Peak
46	Tuff of San Pedro (Cretaceous)
47	Quartz-hematite breccia (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault
48	Rhyolite lava (Cretaceous)
49	Main member of the Tuff of Sharp Peak (Cretaceous)
50	Bedded tuff (Cretaceous)
51	Upper member of the Tuff of Sharp Peak (Cretaceous)
52	Tuff of Sharp Peak (Cretaceous) - mesobreccia
53	Welded tuff (Cretaceous or Jurassic)

MapUnitID	Name
54	Bedded tuff of map unit Kt (Cretaceous or Jurassic)
55	Escabrosa Limestone (Mississippian)
56	Interbedded chert-rich carbonate and argillite (Paleozoic or Mesozoic)
57	Limestone (Cretaceous, Jurassic or Paleozoic)
58	Karst(?) breccia (Early Mesozoic)
59	Escabrosa and Horquilla Formations, undivided, photogeologic identification
60	Concha Limestone (Permian)
61	Colina Limestone (Permian)
62	Earp Formation (Permian to Pennsylvanian)
64	Horquilla Formation (Pennsylvanian)
65	Horquilla Formation (Pennsylvanian) - lower massive limestone unit
66	Horquilla Formation (Pennsylvanian) - upper red-brown mudstone unit
67	Rainvalley(?) Formation (Permian)
68	Scherrer Formation (Permian)
69	Early Pleistocene to Pliocene alluvium (~1 to 5 Ma)
70	Hillslope talus and colluvium deposits (Holocene and Pleistocene)
71	Late Pleistocene alluvium (~10 to 130 ka)
72	Late Pleistocene alluvium over a petrocalcic horizon (~10 to 130 ka)
73	Late to middle Pleistocene alluvium (~10 to 750 ka)
74	Late Pleistocene alluvium over pedimented surfaces (~10 to 130 ka)
75	Late Pleistocene to Holocene alluvium (~0 to 130 ka)
76	Middle Pleistocene alluvium (~130 to 500 ka)
77	Middle Pleistocene alluvium over a petrocalcic unit (~130 to 750 ka)
78	Middle to late Pleistocene river deposits (~10 to 500 ka)
79	Middle to early Pleistocene alluvium (~500 ka to 1 Ma)
80	Middle Pleistocene alluvium over pedimented surfaces (~130 to 750 ka)
81	Early Pleistocene alluvium (~750 ka to 2 Ma)
82	Holocene alluvium, undifferentiated (~0 to 10 ka)
83	Middle Holocene alluvium (~2 to 10 ka)
84	Holocene distal floodplain and terrace deposits (0 to ~10 ka)
85	Late Holocene alluvium (<~2 ka)
86	Late Holocene proximal floodplain (<~2 ka)
87	Late Holocene active channel deposits (< ~100 y)
88	Modern river channel deposits (< 100 years)

MapUnitID	Name
89	Holocene floodplain and terrace deposits (0 to ~10 ka)
90	Holocene stream terrace deposits and eolian deposits (< 10 ka)
91	Bedrock, undifferentiated (Tertiary to Proterozoic)
92	Andesitic lava and hypabyssal intrusive rock (Paleocene or Cretaceous)
93	Intermediate-composition hypabyssal intrusive rocks (Paleocene or Cretaceous)
94	Crystal poor felsite (Paleocene or Cretaceous)
96	Rhyolite (Tertiary or Cretaceous)
97	Crystal-rich rhyolite (Tertiary or Cretaceous)
98	Tan, crystal-poor ash-flow tuff (Tertiary or Cretaceous)
99	Breccia, southern exposure (Tertiary or Cretaceous)
100	Basalt of Brawley Wash (~10 Ma)
102	Conglomerate (Tertiary)
103	Conglomerate with basalt clasts (Tertiary)
104	Conglomerate, sandstone, and siltstone (Tertiary)
105	Felsite of El Cerrito de Gallinas (Oligocene or Miocene)
106	Mafic lava flows (Oligocene or Miocene)
107	Rhyolite lava (Oligocene or Miocene)
108	Rhyolite intrusions (Oligocene or Miocene)
109	Crystal-rich rhyolite lava (Oligocene or Miocene)
111	Sandstone and conglomerate (Oligocene or Miocene)
112	Sandstone and conglomerate (Tertiary)
113	Lithic-rich tuff (Oligocene or Miocene)
114	Trachyte of Nessie's Hill (Oligocene or Miocene)
115	Tuff of Recortado Mountain (Tertiary)
116	Non-welded lithic-rich unit of the Tuff of Recortado Mountain (Tertiary)
117	Trachyte of El Cerrito de Represso (Oligocene or Miocene) - crystal rich
118	Trachyte of El Cerrito de Represso (Oligocene or Miocene) - crystal poor
119	Breccia (late Tertiary)
120	Sierra Ancha Diabase(?) (Middle Proterozoic)
121	Coarse-grained biotite granite (Middle Proterozoic)
122	Quartz veins (Tertiary or Mesozoic)
123	Arkosic sandstone (Cretaceous or Jurassic); sedimentary and volcanic sequence east of the Recortado Well Fault

- **MapUnitDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *MapUnitID* for each record. Domain: 427 = the *DataSetID* for the *MapUnits* table.
- **MConf**: Character, width 16. For polygons of type "Rock Volume Map Unit" (ID = 2406) or "Surficial Map Unit" (ID = 2405), this field contains a text string that indicates the subjective confidence of the person making the map unit classification in the assignment of the material within the polygon to a particular rock volume or surficial geologic map unit. Otherwise the field does not contain a value. Domain: 'low', 'standard', or 'high'.
- **Label**: Character, width 50. This field contains strings that are equivalent to the geologic map unit labels on the default map visualization. This attribute represents the default classification of each polygon to a particular rock unit and is included to make symbolizing and viewing the default map visualization relatively simple. The label is queried if the classification confidence is low. In addition, map labels with Tertiary, Pennsylvanian, Precambrian, Cambrian, Paleozoic, or Mesozoic geologic age prefixes are shown using their corresponding special font symbols included in the AZGSArial font (included with this database, /support/fonts/Azgsa___.ttf). When shown in the default ArcView font, as in ArcView tables, these special characters are displayed as follows: TR = ² (Alt-0178) ; PP = ³ (Alt-0179); pC = ¹ (Alt-0185); C = º (Alt-0186); PZ = ¼ (Alt-0188); and MZ = ¾ (Alt-0190). Domain: Free text.
- **Name**: Character, width 255. This field contains strings that are equivalent to the geologic map unit names in the map explanation on the default map visualization. This is a redundant field added to simplify the use of the dataset in non-relational database environments. Domain: Free text.

Arc Attributes

- **ObjectID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies each feature in the *RoskGeo* arc coverage. Each feature has a different value. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies the *RoskGeo* arc coverage. All features in the dataset have the same value. Domain: 422 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Accuracy**: Integer, width 8. This field contains an integer value that represents the spatial uncertainty in the location of a feature, in meters. For example, a value of 10 for a line feature indicates that the geologic entity represented by the line on the default map visualization is within 10 meters of the mapped feature's actual location on the ground. At present this uncertainty combines the geologic uncertainty in the accuracy of location (e.g. for a gradational or poorly exposed contact), and the numerical uncertainty in the computer representation of the line location resulting from accumulated calculation and digitizing errors. The uncertainty must be greater than the numerical precision of the X,Y coordinates that locate a point (i.e. the accuracy cannot exceed the precision). This value determines the line style that represents the line by using standard solid, dashed, and dotted lines. For most existing maps, this length will be based on standard map accuracy, i.e. the geologic entity is located within the width of the line shown on a map for a solid line. In this data set, location uncertainties are qualitatively estimated. A value of 0 indicates that accuracy is not defined, as in the case of cartographic lines. Domain: >numerical precision of data and $<10^{8}$.

- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each object. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID* for each record. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **ConceptID**: Integer, width 16. This field contains an integer value that specifies the concept used to identify the kind of spatial feature represented by this record. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 5.

Table 5. Classification concept code values used in the *RoskGeo.aat* table.

ConceptID	Name
7	Contact, not classified, timing not specified
58	Fault, High-angle, normal separation
596	Fault, Generic high-angle, separation unknown
642	Mapping boundary surface
2423	Contact, intraformational, timing not specified

- **ConceptDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *ConceptID* for each record. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **CConf**: Character, width 16. This field contains a text string that subjectively describes the identification confidence by which an object has been classified. Domain: 'low', 'standard', or 'high'.
- **CartoObjID**: Integer, width 16. This field contains an integer value that identifies the cartographic symbolization for each spatial object on the default map visualization. It is a foreign key that links to the *CartoObjID* field of the *CartographicObject* table in the *RoskrugeWaterman* database. Domain: See Table 6.

Table 6. Cartographic object codes used in *RoskGeo.aat* table.

CartoObjID	Name
53	Null line symbol
54	0.5pt dashed black line (24K) (Approximate contact)
55	0.5 pt solid black line (24K) (Accurate contact)
59	1.5pt dashed black line (24K) (Approximate fault)
60	1.5pt solid black line with queries (24K) (Queried accurate fault)
61	1.5pt solid black line (24K) (Accurate fault)
65	2.5pt solid black line (24K) (Map neat line)
67	0.75pt dotted black line (24K) (Concealed contact)
68	0.5pt solid black line with queries (24K) (Queried accurate contact)
71	0.5pt black line with dash-dot pattern (24K) (Scratch contact)

- **CartoObjDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *CartoObjID* for each record. Domain: 21 = the *DataSetID* for the *CartographicObject* table.

- **Label**: Character, width 50. This field, when used, contains strings that identify line features that have a label associated with them, as in the case of named faults. Domain: Free text.
- **Name**: Character, width 255. This field contains strings that identify the default classification of each type of line and is included for simplification purposes. Features not shown on the default map visualization are indicated here as being hidden. Domain: Free text.

Roskruge Point Coverage

The **RoskPnt** coverage is a point coverage that represents geologic spatial features located at a distinct point (structural measurement stations, rock samples collection stations...).

Point Attributes

- **ObjectID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies each feature in the *RoskPnt* point coverage. Each feature has a different value. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies the *RoskPnt* point coverage. All features in the dataset have the same value. Domain: 424 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Accuracy**: Integer, width 8. This field contains an integer value that represents the spatial uncertainty in the location of a feature, in meters. For example, a value of 10 for a point feature indicates that location of the point recorded in the database is within 10 meters of the mapped feature's actual location on the ground. At present this uncertainty combines the geologic uncertainty in the accuracy of location (e.g. for a gradational or poorly exposed contact), and the numerical uncertainty in the computer representation of the line location resulting from accumulated calculation and digitizing errors. The uncertainty must be greater than the numerical precision of the X,Y coordinates that locate a point (i.e. the accuracy cannot exceed the precision). A value of 0 indicates that accuracy is not defined. Domain: >numerical precision of data and $<10^{8}$.
- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each object. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **ConceptID**: Integer, width 16. This field contains an integer value that specifies the concept used to identify the kind of spatial feature represented by this record. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: 3340 = Field Observation Station.
- **ConceptDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *ConceptID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **CConf**: Character, width 16. This field contains a text string that subjectively describes the accuracy (classification confidence) for the classification of this object. Domain: 'low', 'standard', or 'high'.

- **CartoObjID**: Integer, width 16. This field contains an integer value that identifies the cartographic symbolization for each spatial object on the default map visualization. It is a foreign key that links to the *CartoObjID* field of the *CartographicObject* table in the *RoskrugeWaterman* database. Domain: See Table 7.

Table 7. Cartographic object codes used in the *RoskPnt.pat* table.

CartoObjID	Name
52	Null point symbol
2055	Inclined bedding symbol - color black (24K)
2056	Approximate inclined bedding symbol - color black (24K)
2057	Inclined crenulated or warped bedding symbol - color black (24K)
2058	Inclined bedding w/tops known symbol - color black (24K)
2059	Overturned bedding symbol - color black (24K)
2060	Overturned bedding w/tops known symbol - color black (24K)
2062	Vertical bedding symbol - color black (24K)
2064	Vertical bedding w/tops known symbol - color black (24K)
2076	Generic inclined foliation symbol - color black, open triangle (24K)
2093	Inclined eutaxitic foliation symbol - color black (24K)
2096	Inclined flow foliation symbol - color black (24K)
2110	Inclined close disjunct cleavage symbol - color black (24K)
2111	Vertical close disjunct cleavage symbol - color black (24K)
2115	Inclined bedding parallel to cleavage symbol - color black (24K)
2128	Horizontal joint symbol - color black, open rectangle (24K)
2129	Inclined joint symbol - color black, open rectangle (24K)
2143	Minor anticline symbol - color red (24K)
2165	Fault attitude symbol - color black (24K)
2172	Circle with filled central circle (USGS 26.2.5) - color black (24K)

- **CartoObjDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *CartoObjID*. Domain: 21 = the *DataSetID* for the *CartographicObject* table.
- **Label**: Character, width 50. This field, when used, contains strings that are equivalent to any labels associated with point features on the default map visualization. In this database, this field contains sample identification numbers or is empty. Domain: Free text.
- **Rotation**: Integer, width 4. This field contains an integer value that specifies the rotation of the font symbol to correctly represent the azimuth of the of geologic feature displayed on the default map visualization at this point. This value is specific to the graphical environment of ArcView 3.2 using the AZGSgeo.ttf font (/support/fonts directory in the distribution package); the rotation angle is measured anticlockwise, starting from a compass azimuth of 90º, and is also dependent on the orientation of the symbol in its font definition. Domain: 0 to ±360.
- **Name**: Character, width 255. This field contains strings that identify the default classification of each type of point and is included for simplification purposes. Features not shown on the default map visualization are indicated here as being hidden. Domain: Free text.

GEOLOGIC SHAPEFILES

One ESRI shape file containing geologic lines is included in the geospatial database for DI-19. This shapefile, and the user-defined features included in its feature attribute table, is summarized in Table 8.

Table 8. Summary of geologic shapefiles showing fields, field definitions, and associated database tables. The *ObjectID* field, along with the *DataSetID* field, is the compound primary key for each shapefile. If a field joins to a lookup table, the table name is shown adjacent to that field in the last column.

Shapefile Name	Type	Field Name	Data Type	Width	Lookup Tables
RoskGeoLines	Line	ObjectID	Integer	16	
		DataSetID	Integer	16	DataSetAZ
		Accuracy	Integer	8	
(field definitions start on page 13)		TrackingID	Integer	16	TrackingRecord
		TrackingDS	Integer	16	DataSetAZ
		ConceptID	Integer	16	ClassificationConcept
		ConceptDS	Integer	16	DataSetAZ
		CConf	Character	16	
		CartoObjID	Integer	16	CartographicObject
		CartoObjDS	Integer	16	DataSetAZ
		Label	Character	50	
		Name	Character	255	

Roskruge Other Geologic Lines Shapefile

The **RoskGeoLines** shapefile is a line shapefile that contains those geologic lines that do not define polygon topology (concealed faults, fold hinges, dikes, marker beds...).

Arc Attributes

- **ObjectID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies each feature in the *RoskGeoLines* line shapefile. Each feature has a different value. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies the *RoskGeoLines* line shapefile. All features in the dataset have the same value. Domain: 423 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Accuracy**: Integer, width 8. This field contains an integer value that represents the spatial uncertainty in the location of a feature, in meters. For example, a value of 10 for a line feature indicates that the geologic entity represented by the line on the default map visualization is within 10 meters of the mapped feature's actual location on the ground. At present this uncertainty combines the geologic uncertainty in the accuracy of location (e.g. for a gradational or poorly exposed contact), and the numerical uncertainty in the computer representation of the line location resulting from accumulated calculation and digitizing errors. The uncertainty must be greater than the numerical precision of the X,Y coordinates that locate a point (i.e. the accuracy cannot exceed the precision). This value determines the line style that represents the line by using standard solid, dashed and dotted lines. For most existing maps, this length will be based on standard map accuracy, i.e. the geologic entity is located within the width of the line shown on a map for a solid line. A value of 0 indicates that accuracy is not defined, as in the case of cartographic lines or the map neatline. Domain: >numerical precision of data and $<10^{8}$.

- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each object. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingDS*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **ConceptID**: Integer, width 16. This field contains an integer value that specifies the classification concept used to identify the kind of spatial feature represented by this record. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 9.

Table 9. Classification concept codes used in the *RoskGeoLines* table.

ConceptID	Name
58	Fault, High-angle, normal separation
530	Vein
596	Fault, Generic high-angle, separation unknown
612	Marker bed
1988	Fold hinge surface, upright anticline
1994	Fold hinge surface, upright syncline
2379	Mafic dike
2380	Intermediate dike
2381	Felsic dike

- **ConceptDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *ConceptID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **CConf**: Character, width 16. This field contains a text string that subjectively describes the confidence for the classification of this object. Domain: 'low', 'standard', or 'high'.
- **CartoObjID**: Integer, width 16. This field contains an integer value that identifies the cartographic symbolization for each spatial object on the default map visualization. It is a foreign key that links to the *CartoObjID* field of the *CartographicObject* table in the *RoskrugeWaterman* database. Domain: See Table 10.

Table 10. Cartographic object codes used in the *RoskGeoLines* table.

CartoObjID	Name
53	Null line symbol
56	0.35pt dashed red line (24K) (Approximate fold hinge line)
58	0.35pt solid red line (24k) (Accurate fold hinge line)
63	1.75pt dotted black line (24K) (Concealed fault)
66	0.5pt solid black line with perpendicular hashes (24K) (Dike symbol)
69	0.5pt solid black line with spaced X's (24K) (Dike symbol)
70	0.5pt solid black line with open circles (24K) (Vein symbol)
72	0.5pt black line with dash-dot-dot pattern (24K) (Marker bed)
73	0.35pt dotted red line (24K) (Concealed fold hinge line)
74	0.5pt solid black line with alternating slashes (24K) (Dike symbol)

- **CartoObjDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by CartoObjID. Domain: 21 = the *DataSetID* for the *CartographicObject* table.
- **Label**: Character, width 50. This field, when used, contains strings that identify line features that have a label associated with them, as in the case of dikes that are associated with a particular geologic map unit. Domain: Free text.
- **Name**: Character, width 255. This field contains strings that identify the default classification of each type of line and is included for simplification purposes. Features not shown on the default map visualization are indicated here as being hidden. Domain: Free text.

CARTOGRAPHIC SHAPEFILES

The ArcView shapefiles below contain the cartographic elements for the default map visualization for DI-19. These shapefiles, and the user-defined features included in their feature attribute tables, are summarized in Table 11. Because the locations of points and lines in these shapefiles are chosen to provide cartographic clarity, the *Accuracy* and *CConf* fields are irrelevant and therefore not included.

Table 11. Summary of cartographic shapefiles showing fields, field definitions, and associated database tables. The *ObjectID* field, along with the *DataSetID* field, is the compound primary key for each shapefile. If a field joins to a lookup table, the table is shown adjacent to that field in the last column.

Shapefile Name	Type	Field Name	Data Type	Width	Lookup Tables
RoskCartoLines (field definitions start on page 15)	Line	ObjectID DataSetID TrackingID TrackingDS ConceptID ConceptDS CartoObjID CartoObjDS Name	Integer Integer Integer Integer Integer Integer Integer Integer Character	16 16 16 16 16 16 16 16 255	 DataSetAZ TrackingRecord DataSetAZ ClassificationConcept DataSetAZ CartographicObject DataSetAZ
RoskCartoPnts (field definitions start on page 16)	Point	ObjectID DataSetID TrackingID TrackingDS ConceptID ConceptDS CartoObjID CartoObjDS Label Rotate Name	Integer Integer Integer Integer Integer Integer Integer Integer Character Integer Character	16 16 16 16 16 16 16 16 50 4 255	 DataSetAZ TrackingRecord DataSetAZ ClassificationConcept DataSetAZ CartographicObject DataSetAZ

Roskruge Cartographic Lines Shapefile

The **RoskCartoLines** shapefile contains the cartographic lines (text lead-in lines...) used in the default map visualization. The location of these lines has no geologic significance.

Arc Attributes

- **ObjectID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies each feature in the *RoskCartoLines* line shapefile. Each feature has a different value. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies the *RoskCartoLines* line shapefile. All features in the dataset have the same value. Domain: 425 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each object. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **ConceptID**: Integer, width 16. This field contains an integer value that specifies the classification concept used to identify the kind of spatial feature represented by this record. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: 2396 = Text lead-in line; 2419 = Cross Section Surface trace.
- **ConceptDS**: Integer, width 16. This field contains an integer value that identifies the dataset that contains the data object identified by *ConceptID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **CartoObjID**: Integer, width 16. This field contains an integer value that identifies the cartographic symbolization for each spatial object on the default map visualization. It is a foreign key that links to the *CartoObjID* field of the *CartographicObject* table in the *RoskrugeWaterman* database. Domain: 53 = Null line symbol; 57 = 0.35pt solid black line (24K).
- **CartoObjDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *CartoObjID*. Domain: 21 = the *DataSetID* for the *CartographicObject* table.
- **Label**: Character, width 50. This field, when used, contains strings that identify line features that have a label associated with them. Domain: Free text.
- **Name**: Character, width 255. This field contains strings that identify the default classification of each type of line and is included for simplification purposes. Domain: Free text.

Roskruge Cartographic Points Shapefile

The **RoskCartoPnts** shapefile contains the cartographic points (text labels, fault symbols, fold geometry symbols...) used in the default map visualization . The locations of these points have no direct geologic significance.

Point Attributes

- **ObjectID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies each feature in the *RoskCartoPnts* point coverage. Each feature has a different value. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Integer, width 16. Compound primary key. This field contains an integer value that uniquely identifies the *RoskCartoPnts* point coverage. All features in the dataset have the same value. Domain: 426 = the *DataSetID* for this table in the *DataSetAZ* dataset.

- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each object. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **ConceptID**: Integer, width 16. This field contains an integer value that specifies the classification concept used to identify the kind of spatial feature represented by this record. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 12.

Table 12. Classification concept codes used in the *RoskCartoPnts* table.

ConceptID	Name
3057	Discrete feature point symbols
3317	Annotation, unit label
3318	Annotation, structural measurement label
3321	Annotation, generic text

- **ConceptDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *ConceptID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **CartoObjID**: Integer, width 16. This field contains an integer value that identifies the cartographic symbolization for each spatial object on the default map visualization. It is a foreign key that links to the *CartoObjID* field of the *CartographicObject* table in the *RoskrugeWaterman* database. Domain: See Table 13.

Table 13. Cartographic object codes used in the *RoskCartoPnts* table.

CartoObjID	Name
2134	anticline symbol
2137	syncline symbol
2169	normal fault symbol
2177	plunge arrowhead
2270	structural measurement label
2270	unit label
2271	dike label
2271	generic text label
2271	structural measurement label
2271	unit label
2272	dike label
2272	generic text label
2272	unit label
2273	generic text label
2275	unit label
2276	unit label
2277	unit label
2279	generic text label

- **CartoObjDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *CartoObjID*. Domain: 21 = the *DataSetID* for the *CartographicObject* table.
- **Rotation**: Integer, width 4. This field contains an integer value that specifies the rotation of the font symbol to correctly represent the azimuth of the of geologic feature displayed on the default map visualization at this point. This value is specific to the graphical environment of ArcView 3.2 using the AZGSgeo.ttf font (/support/fonts directory in the distribution package); the rotation angle is measured anticlockwise, starting from a compass azimuth of 90º, and is also dependent on the orientation of the symbol in its font definition. Domain: 0 to ±360.
- **Label**: Character, width 50. This field, when used, contains strings that identify point features that have a label associated with them. For text label points, the field contains strings that are equivalent to the text labels that appear on the default map visualization. Domain: Free text.
- **Name**: Character, width 255. This field contains a text string that identifies the default classification of each type of point and is included for simplification purposes. Domain: Free text.

ROSKRUGE-SPECIFIC DATABASE TABLES

The two lookup tables defined below contain supporting information specific to DI-19. These tables, summarized in Table 14, are included as a Microsoft Access database. By default, each dataset field below references a table that is included in the Arizona Geological Survey namespace.

Table 14. Summary of project-specific Microsoft Access database tables showing fields, field definitions, and associated database tables. If a field joins to a lookup table, the table name is shown adjacent to that field in the last column.

Table Name	Field Name	Data Type	Width	Lookup Tables
MapUnitsRoskruge (field definitions start on page 18)	MapUnitID DataSetID TrackingID TrackingDS MapLabel Name Description	Number Number Number Number Text Text Memo	Long Integer Long Integer Long Integer Long Integer 50 255	 DataSetAZ TrackingRecord DataSetAZ
StructureDataRoskruge (field definitions start on page 20)	StructMeasureID DataSetID SpObjID SpObjDS TrackingID TrackingDS Name StructMeasureTypeID StructMeasureTypeDS ConceptConfidence UTME UTMN LocErr Azimuth AzimuthErr Dip DipErr DipDirection	Number Number Number Number Number Number Text Number Number Text Number Number Number Number Number Number Number Text	Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer 255 Long Integer Long Integer 16 Single Single Single Single Single Single Single 16	 DataSetAZ RoskPnt DataSetAZ TrackingRecord DataSetAZ ClassificationConcept DataSetAZ

Table Name	Field Name	Data Type	Width	Lookup Tables
MajorConstituents (field definitions start on page 22)	ObjectID DataSetID SampleID SampleDS TrackingID TrackingDS Sample AnalyticalResults (13 fields)	Number Number Number Number Number Number Text Number	Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer 255 Single	 DataSetAZ TrackingRecord DataSetAZ
Samples (field definitions start on page 22)	ObjectID DataSetID ActivityID ActivityDS FieldID DataCollected UTME UTMN UTMzone SpObjID SpObjDS Area Quadrangle RockUnitID RockUnitDS MapUnit Notes TrackingID TrackingDS	Number Number Number Number Text Date Number Number Number Number Number Text Text Number Number Text Memo Number Number	Long Integer Long Integer Long Integer Long Integer 30 dd/mm/yy Single Single Long Integer Long Integer Long Integer 255 255 Long Integer Long Integer 50 Long Integer Long Integer	 DataSetAZ Activities DataSetAZ RoskPnt DataSetAZ MapUnits DataSetAZ TrackingRecord DataSetAZ
TraceElements (field definitions start on page 24)	ObjectID DataSetID SampleID SampleDS TrackingID TrackingDS Sample AnalyticalResults (20 fields)	Number Number Number Number Number Number Text Number	Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer 255 Single	 DataSetAZ TrackingRecord DataSetAZ

Map Unit Table

The **MapUnits** table defines the map units used to classify polygons in the Roskruge Geology coverage.

Database Table Fields

- **MapUnitID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each geologic map unit in the *MapUnits* dataset. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *MapUnits* dataset. Domain: 427 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.

- **OriginDate**: Date/Time, short date. This field contains a date value, in the mm/dd/yy format, that records when the record was created. This information provides more detailed information on the time that records were originally entered, supplementing the information in the associated *TrackingRecord* table. Domain: Valid date.
- **MapLabel**: Text, width 25. This field contains strings used to label polygons on the default geologic map visualization. These map labels do not necessarily correspond to the map labels in the *Label* field of the *RoskGeo.pat* table for the polygon that contains the point. This is because some generalization of the geology has been made for the default visualization, and because labels may be located outside of the polygon they identify. Map labels with Tertiary, Pennsylvanian, Precambrian, Cambrian, Paleozoic, or Mesozoic geologic age prefixes are shown using their corresponding special font symbols included in the AZGSArial True Type font (/support/fonts/ Azgsa___.ttf). When shown in the default ArcView font, as in ArcView tables, these prefixes map to the following characters: T = ² (Alt-0178) ; P = ³ (Alt-0179); pC = ¹ (Alt-0185); C = º (Alt-0186); P = ¼ (Alt-0188); and Mz = ¾ (Alt-0190). Domain: Limited to the map labels on the original source maps.
- **Name**: Text, width 255. This field contains a text string that identifies the map unit name or rock type. Domain: Free text.
- **Description**: Memo. This field contains a full description of the rock unit. Domain: Free text.

Roskruge Structural Measurement Data Table

The **StructureDataRoskruge** table contains values that define the orientation of structural features. The inclusion of both the UTM coordinates for the station location and a link to a spatial object representing the station location is redundant, but both forms of location are included for reliability. If the link with the spatial object data set is corrupted, the **StructureDataRoskruge** table still contains sufficient information to locate the station. Likewise, the **StructureDataRoskruge** table can be exported for data exchange without including a data set with location spatial objects. A separate correlation table to link stations with locations is unnecessary because each station has a unique location.

Database Table Fields

- **StructMeasureID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each structural measurement in the *StructureDataRoskruge* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *StructureDataRoskruge* table. Domain: 429 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **SpObjID**: Number, long integer. This field contains an integer value that uniquely identifies a field station record in an associated point coverage. It is a foreign key that joins with the *ObjectID* field of the *RoskPnt* point coverage. Domain: >0 and $<10^{16}$, but limited to the values in the *ObjectID* field of the associated point datasets.
- **SpObjDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *SpObjID*. Domain: 424 = the *DataSetID* for the *RoskPnt* point coverage.
- **TrackingID**: Number, long integer. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.

- **TrackingDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **Name**: Text, width 255. This field contains a text string that provides a descriptive name for each type of structural measurement. Domain: Free text.
- **StructMeasureTypeID**: Number, long integer. This field contains an integer value that classifies the geologic concept for each structural measurement. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 15.

Table 15. Structural measurement type codes used in the *StructureDataRoskruge* table.

StructMeasureTypeID	Name
42	Close disjunct cleavage
543	Flow foliation
544	Eutaxitic foliation
546	Foliation, generic
555	Joints
559	Well developed s-tectonite
563	Cleavage parallel to bedding
567	Minor fault surface
572	Lineation, generic tectonic
581	Fold hinge, anticline
588	Orientation, fault surface
762	Bedding, crude or indistinct
768	Bedding, planar parallel
3324	Bedding, planar parallel, w/tops
3326	Bedding, contorted or variable
3329	Fold hinge, syncline

- **StructMeasureTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *StructMeasureTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **ConceptConfidence**: Text, width 16. This field contains a text string that subjectively describes the accuracy for the classification of this object. Domain: 'low', 'standard', or 'high'.
- **UTME**: Number, single. This field contains a positive real number that reflects the UTM easting coordinate (X-value), in meters, for the location of the structural measurement. Domain: >0 and $<10^8$.
- **UTMN**: Number, single. This field contains a positive real number that reflects the UTM northing coordinate (Y-value), in meters, for the location of the structural measurement. Domain: >0 and $<10^8$.
- **LocErr**: Number, single. This field contains a real number that records the location error, in meters, for the UTM coordinates. Domain: >0 and $<10^8$.
- **Azimuth**: Number, single. This field contains a positive real number that records the trend or strike of a structural feature in degrees. For planar surfaces, the measurement is recorded using the right-hand rule (i.e. the measurement is made such that the down-dip direction is to the right when facing in the azimuth direction). The

magnitude of the angle is measured clockwise starting from a compass azimuth of 0º. Domain: ≥0 to ≤360

- **AzimuthErr**: Number, single. This field contains a real number that records the uncertainty, in degrees, associated with an azimuth measurement. For example, an AzimuthErr of 5 for an Azimuth of 127 would indicate that the azimuth actually falls within the range from 122 to 132 degrees. Domain: >0 and $<10^8$.
- **Dip**: Number, single. This field contains a positive real number that records the angle between a planar or linear feature and horizontal (degrees). The angle is measured in the vertical plane perpendicular to strike for planar features and parallel to trend for linear features. The dip angle here measures total rotation rather than the conventional inclination measurement. For overturned beds this results in dips >90º. This allows conceptually consistent representation of the dip of upright, overturned, or doubly overturned structures. Overturned beds have 90 < dip <=180. Doubly overturned beds have dip >180. Domain: ≥0.
- **DipErr**: Number, single. This field contains a real number that records the uncertainty, in degrees, associated with a dip measurement. For example, a DipErr of 3 for a Dip of 29 would indicate that the dip actually falls within the range from 26 to 32 degrees. Domain: >0 and $<10^8$.
- **DipDirection**: Text, width 2. This field contains a dip direction modifier, based on compass directions, that may be used as a redundant check for structural measurements recorded using the right-hand rule. Domain: N, NE, E, SE, S, SW, W, NW.

MajorConstituents

The **MajorConstituents** table contains whole rock chemical analyses for samples listed in the *Samples* table.

Database Table Fields

- **ObjectID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each record in the *MajorConstituents* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains a value of –1 because this dataset is unique to the *RoskrugeWaterman* database. A system for representing of chemical analyses is still under development at the AZGS.
- **SampleID**: Number, long integer. Foreign key to the *Samples* table. This field contains an integer value that identifies the rock sample that was analyzed to produce the data in this record. Domain: >0 and $<10^{16}$, no duplicates.
- **SampleDS**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *Samples* table. Domain: 430 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **TrackingID**: Number, long integer. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **Sample**: Text, width 30. This field contains a text string that records the sample identifier assigned to the rock collected in the field by the original collector.

- **Analytical results**: Number, real, single precision. Weight per cent fractions for the following constituents: SiO_2, TiO_2, Al_2O_3, Fe_2O_3 (Total), MnO, MgO, CaO, K_2O, Na_2O, P_2O_5, LOI, and Total. Also includes ppm Ba.

Samples

The **Samples** table contains location and description information for rock samples submitted for chemical analyses reported in the *MajorConstituents* and *TraceElements* tables. The inclusion of both the UTM coordinates for the sample location and a link to a spatial object representing the sample location is redundant, but both forms of location are included for reliability. If the link with the spatial object data set is corrupted, the **Samples** table still contains sufficient information to locate the sample. Likewise, the sample table can be exported for data exchange without including a data set with location spatial objects.

Database Table Fields

- **ObjectID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each record in the *Samples* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *Samples* table. Domain: 430 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **ActivityID**: Number, long integer. Compound primary key. This field contains an integer value that identifies the Activity for collection of the sample. Activities for sample collection should indicate the person who collected the sample. Domain: >0 and $<10^{16}$, no duplicates.
- **ActivityDS**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *Activities* dataset. Domain: 2 = the *DataSetID* for the *Activities* table.
- **FieldID**: Text, width 30. This field contains a text string that records the sample identifier assigned to the rock collected in the field by the original collector.
- **DateCollected**: Date. Date sample was collected.
- **UTME**: Number, real, single precision. UTM easting coordinate for sample location. Domain: 122000 < UTME < 700000.
- **UTMN**: Number, real, single precision. UTM northing coordinate for sample location. Domain: 3420000 < UTMN < 4110000.
- **UTMzone**: Number, long integer. Zone number for UTM coordinates. Domain: 11 or 12 for the State of Arizona.
- **SpObjID**: Number, long integer. This field contains an integer value that uniquely identifies the field station record in an associated point coverage where the sample was collected. It is a foreign key that joins with the *ObjectID* field of the *RoskPnt* point coverage. Domain: >0 and $<10^{16}$, but limited to the values in the *ObjectID* field of the associated point datasets.
- **SpObjDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *SpObjID*. Domain: 424 = the *DataSetID* for the *RoskPnt* point coverage.
- **Area:** Text, width 64. Geographic area name from Arizona Geological Survey Place Names list. Domain: Place names included in Trapp and Reynolds [1998]
- **Quadrangle:** Text, width 64. Name of USGS 7½ minute quadrangle that contains the sample location. Domain: USGS 7½ Quadrangle names.

- **RockUnitID**: Number, long integer. This field contains an integer value that uniquely identifies the geologic map unit in the *MapUnits* dataset from which the sample was collected. Domain: >0 and $<10^{16}$, no duplicates.
- **RockUnitDS**: Number, long integer. This field contains an integer value that uniquely identifies the *MapUnits* dataset. Domain: 427 = the *DataSetID* for the *MapUnits* dataset in the *DataSetAZ* dataset.
- **MapUnit:** Text, width 32. Abbreviation for map unit from which sample was collected that is used on the default map visualization for the *RoskrugeWaterman* database. Domain: Map unit labels used in *RoskrugeWaterman* database.
- **Notes:** Memo. Free text notes on sample.
- **TrackingID**: Number, long integer. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.

TraceElements

The **TraceElements** table contains trace element analyses for samples listed in the *Samples* table. Twenty trace elements are reported.

Database Table Fields

- **ObjectID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each record in the *TraceElements* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains a value of –1 because this dataset is unique to the *RoskrugeWaterman* database. A system for representing of chemical analyses is still under development at the AZGS.
- **SampleID**: Number, long integer. Foreign key to the *Samples* table. This field contains an integer value that identifies the rock sample that was analyzed to produce the data in this record. Domain: >0 and $<10^{16}$, no duplicates.
- **SampleDS**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *Samples* table. Domain: 430 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **TrackingID**: Number, long integer. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **Sample**: Text, width 30. This field contains a text string that records the sample identifier assigned to the rock collected in the field by the original collector.
- **Analytical results**: Number, real, single precision. Parts per million (ppm) analyses (except as noted) for the following elements: Sr, Rb, Th, Pb, Ga, Zn, Cu, Ni, Fe_20_3 (wt. %), MnO (wt %), Cr, TiO_2 (wt. %), Ba, V, As, U, Y, Zr, Nb, Mo.

ARIZONA GEOLOGIC DATA SYSTEM TABLES

The lookup tables defined below contain the supporting data that complete the geographic database portion of DI-19. These tables, summarized in Table 16, are included as a Microsoft Access database. By default, each dataset field below references a table that is included in the Arizona Geological Survey namespace.

Table 16. Summary of general Microsoft Access database tables showing fields, field definitions, and associated database tables. If a field joins to a lookup table, the table name is shown adjacent to that field in the last column.

Table Name	Field Name	Data Type	Field Size	Lookup Tables
AzGeoBibCite (field definitions start on page 27)	Refnum	Number	Long Integer	AzGeoBib [Trapp et al., 1996]
	Cite	Text	255	
Activities (field definitions start on page 28)	ActivityID	Number	Long Integer	
	DataSetID	Number	Long Integer	DataSetAZ
	Name	Text	255	
	PersonOrgID	Number	Long Integer	PersonOrg
	PersonOrgDS	Number	Long Integer	DataSetAZ
	ProjectID	Number	Long Integer	Projects
	ProjectDS	Number	Long Integer	DataSetAZ
	Comment	Memo		
CartographicObject (field definitions start on page 29)	CartoObjID	Number	Long Integer	
	DataSetID	Number	Long Integer	DataSetAZ
	Sequence	Number	Integer	
	TrackingID	Number	Long Integer	TrackingRecord
	TrackingDS	Number	Long Integer	DataSetAZ
	Name	Text	255	
	CartoObjTypeID	Number	Long Integer	ClassificationConcept
	CartoObjTypeDS	Number	Long Integer	DataSetAZ
	GraObjID	Number	Long Integer	GraphicLine GraphicPattern GraphicLineOrnamented GraphicTextFormat
	GraObjDS	Number	Long Integer	DataSetAZ
	ColorID	Number	Long Integer	Color
	ColorDS	Number	Long Integer	DataSetAZ
	OriginDate	Date/Time	Short Date	
	Comment	Memo		
ClassificationConcept (field definitions start on page 32)	ConceptID	Number	Long Integer	
	DataSetID	Number	Long Integer	DataSetAZ
	TrackingID	Number	Long Integer	ClassificationConcept
	TrackingDS	Number	Long Integer	DataSetAZ
	Name	Text	255	
	ParentID	Number	Long Integer	TrackingRecord
	ParentDS	Number	Long Integer	DataSetAZ
	OriginDate	Date/Time	Short Date	
	Definition	Memo		
Color (field definitions start on page 33)	ColorID	Number	Long Integer	
	DataSetID	Number	Long Integer	DataSetAZ
	Name	Text	255	
	CMYK	Text	25	
	RGB	Text	25	
	R	Number	Integer	
	G	Number	Integer	
	B	Number	Integer	

Table Name	Field Name	Data Type	Field Size	Lookup Tables
DataSetAZ (field definitions start on page 34)	DataSetID NameSpace NameSpaceID NameSpaceDS DataSetName DataSetTypeID DataSetTypeDS DataSetSubjectID DataSetSubjectDS TrackingID TrackingDS SourceFileTypeID SourceFileTypeDS PhysicalAddressTypeID PhysicalAddressTypeDS PhysicalAddress IdentifierFieldName DataSetFieldName Comment	Number Text Number Number Text Number Number Number Number Number Number Number Number Number Number Text Text Text Memo	Long Integer 50 Long Integer Long Integer 255 Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer 255 50 50	 ClassificationConcept DataSetAZ ClassificationConcept DataSetAZ ClassificationConcept DataSetAZ TrackingRecord DataSetAZ ClassificationConcept DataSetAZ ClassificationConcept DataSetAZ
GraphicLine (field definitions start on page 36)	GraObjID DataSetID Name Width Scale Pattern	Number Number Text Number Number Text	Long Integer Long Integer 255 Single Long Integer 50	 DataSetAZ
GraphicLineOrnamented (field definitions start on page 37)	GraObjID DataSetID Name SymbolID SymbolDS Spacing Scale Pattern Offset	Number Number Text Number Number Number Number Text Number	Long Integer Long Integer 255 Long Integer Long Integer Single Long Integer 50 Single	 DataSetAZ DataSetAZ
GraphicPattern (field definitions start on page 37)	GraObjID DataSetID Name PatternID PatternDS Scale Rotation	Number Number Text Number Number Number Number	Long Integer Long Integer 255 Long Integer Long Integer Long Integer Integer	 DataSetAZ PatternDefinition DataSetAZ
GraphicTextFormat (field definitions start on page 38)	GraObjID DataSetID FontName Style Spacing Alignment Size Scale ColorID ColorDS	Number Number Text Text Number Text Number Number Number Number	Long Integer Long Integer 25 16 Single 25 Single Long Integer Long Integer Long Integer	 DataSetAZ Color DataSetAZ

Table Name	Field Name	Data Type	Field Size	Lookup Tables
HierarchyRelationship (field definitions start on page 39)	RelationshipID DataSetID HierarchyTypeID HierarchyTypeDS ParentID ParentDS ChildID ChildDS TrackingID TrackingDS	Number Number Number Number Number Number Number Number Number Number	Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer	 DataSetAZ ClassificationConcept DataSetAZ ClassificationConcept DataSetAZ ClassificationConcept DataSetAZ TrackingRecord DataSetAZ
MetadataRelationship (field definitions start on page 40)	MetadataRelationshipID DataSetID RelTypeID RelTypeDS FirstRoleID FirstRoleDS SecondRoleID SecondRoleDS TrackingID TrackingDS Comment	Number Number Number Number Number Number Number Number Number Number Memo	Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer Long Integer	 DataSetAZ ClassificationConcept DataSetAZ DataSetAZ DataSetAZ TrackingRecord DataSetAZ
PatternDefinition	(not included in this database)			
PersonOrg	(not included in this database)			
Projects	(not included in this database)			
TrackingRecord (field definitions start on page 42)	TrackingID DataSetID TrackingRecordTypeID TrackingRecordTypeDS Name LogDate ActivityID ActivityDS DataProcMethodID DataProcMethodDS Description	Number Number Number Number Text Date/Time Number Number Number Number Memo	Long Integer Long Integer Long Integer Long Integer 255 Short Date Long Integer Long Integer Long Integer Long Integer	 DataSetAZ ClassificationConcept DataSetAZ Activities DataSetAZ ClassificationConcept DataSetAZ

Bibliographic Citations Table (_AzGeoBibCite)

The **_AzGeoBibCite** table is derived from the Arizona Geological Survey bibliographic data base (AzGeoBib, Trapp et al. [1996], *DataSetID* = 4 in the *DataSetAZ* table), and provides a mechanism for citing published literature. In this database citations are related to tracking records through the *MetadataRelationship* table. This derivative table is included to replace links to the full *AzGeoBib* database.

Database Table Fields

- **RefNum**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each citation in the *_AzGeoBibCite* table. Domain: >0 and $<10^{16}$, no duplicates. The identifiers used here are the same as identifiers for the citation in *AzGeoBib*.
- **Cite**: Text, length 255. A text citation in standard bibliographic format (author, date, title, citation).

Activities Table

The **Activities** table is a link to an activity responsible for update of, or addition to, the database. An activity is a particular person, working for a particular organization, under the auspices of a particular project.

Database Table Fields

- **ActivityID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each activity in the *Activities* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DatasetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *Activities* dataset. Domain: 2 = the *DataSetID* for the *Activities* table.
- **Name**: Text, width 255. This field contains a descriptive string that provides a unique name identifier for each activity. This is the string the is displayed in combo boxes on data entry forms. Domain: Free text.
- **PersonOrgID**: Number, long integer. This field contains an integer value that uniquely identifies the person and the organization that are associated with each activity. It is a foreign key that links to the *PersonOrgID* field of the *PersonOrg* table in the *RoskrugeWaterman* database (the *PersonOrg* table is not included with this database, but the *PersonOrgID* field is included for future compatibility). Domain: See Table 17.

Table 17. PersonOrg codes used in Tracking Records in this database

PersonOrgID	DataSetID	PersonName	Organization
1	15	Dr. Stephen M. Richard	Arizona Geological Survey
2	15	Mr. Tim R. Orr	Arizona Geological Survey
4	15	Mr. Null N Null	None
5	15	Mr. Jason . Brander	Bureau of Land Management
11	15	Dr. Philip A. Pearthree	Arizona Geological Survey
12	15	Ms. Ann . Youberg	Arizona Geological Survey
13	15	Mr. Ray C. Harris	Arizona Geological Survey

- **PersonOrgDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *PersonOrgID*. Domain: 15 = the *DataSetID* for the *PersonOrg* link table.
- **ProjectID**: Number, long integer. This field contains an integer value that identifies the project associated with each activity. It is a foreign key that links to the *ProjectID* field of the *Projects* table in the *RoskrugeWaterman* database (the *Projects* table is not included with this database, but the *ProjectID* field is included for future compatibility). Domain: See Table 18.

Table 18. ProjectID codes used in tracking records for this database

ProjectID	ProjectDS	Project_title	Prj_comment
1	17	Arizona NADM implementation development	Develop NADM 5.2 implementation and use for new geologic map of Arizona database
2	17	DI-8 Version 3 database development	Construct NADM-compliant database with geologic data compiled for Map 35.
3	17	Phoenix N, East Half Database development	Activities related to development of databases for east half of Phoenix North 30 by 60 minute quadrangle
4	17	Null	No project assigned

ProjectID	ProjectDS	Project_title	Prj_comment
5	17	Digitize Geologic Map of Arizona, using MOSS	get 1:1,000,000 scale geologic map in digital form to assist management decisions
8	17	Edit Map 26 Data to release as DI8 V.1	Get original MOSS version converted to ARC and into a form that could be released
10	17	Statemap 1999, Waterman Peak 1:24000 quad	Generate Statemap deliverable, geologic map of Waterman Peak quad
11	17	TheodoreRoosevelt100KGISV2	Generate final, complete 100K geology GIS for Theodore Roosevelt Lake 100K quad.
13	17	Statemap 1999 Surficial	Surficial Geologic maps of Avra Valley and Green Valley areas
16	17	AZ Geologic Map Index database conversion	conversion of DI-9 (AZ Map Index) to new AZ_NADM datastructure
17	17	Statemap2000PhxDatabases	Project to complete 1:24k GIS databases for quads in phoenix area; includes preliminary development work on Waterman-Roskruge database also funded by this project
20	17	Statemap 1999, Roskruge/Waterman Digital Data	Digital geologic information for the Roskruge and Waterman Mountains

- **ProjectDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *ProjectID*. Domain: 17 = the *DataSetID* for the *Projects* table.
- **Comment**: Memo. This field contains descriptive text about each activity, including the name of the person who conducted the activity, their employing organization, and the project they were working on. Domain: Free text.

Cartographic Object Table

The **CartographicObject** table is an implementation-independent representation of symbols used to display points, lines, polygons, and text on map visualization. This is done by defining links to tables that provide implementation-dependent descriptions of graphical objects used for symbolization. Graphical object tables in this database are designed to describe symbology for ArcView 3.2 running in a Microsoft Windows environment. Individual cartographic objects may consist of several graphical objects stacked according to the sequence attribute in the table, with the lowest sequence symbol overlain by subsequent symbols in the sequence.

Database Table Fields

- **CartoObjID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each cartographic object in the *CartographicObject* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DatasetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *CartographicObject* dataset. Domain: 21 = the *DataSetID* for the *CartographicObject* table.
- **Sequence**: Number, integer. Compound primary key. This field contains an integer value that corresponds to the layer order in which graphical elements are created. For example, an ornamented line, such as a line with queries, would be created using two layers. The first layer, the line itself, would have a sequence value of 1, while the second layer, the query symbol, would have a sequence value of 2. Domain: >0 and $<10^{8}$.
- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.

- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **Name**: Text, width 255. This field contains a text string that uniquely identifies and describes each cartographic object and is included for intelligibility. Domain: Free text.
- **CartoObjTypeID**: Number, long integer. This field contains an integer value that classifies the graphical element type. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 19.

Table 19. Cartographic object type codes used in the *CartographicObject* table.

CartoObjTypeID	Name
1957	Cartographic Object -- point
1958	Cartographic Object -- line
2392	Point symbol from font
2393	Annotation at point
2408	Fill, solid
2409	Fill, pattern
3019	Line, solid
3020	Line symbol, dash-dot pattern
3021	Line symbol, ornamented

- **CartoObjTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *CartoObjTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **GraObjID**: Number, long integer. This field contains an integer value that corresponds to a specific graphical element. It is a foreign key that links to the *GraObjID* field of either the *GraphicLine* table, the *GraphicLineOrnamented* table, the *GraphicPattern* table, or the *GraphicTextFormat* table in the *RoskrugeWaterman* database. Domain: See Table 20.

Table 20. Graphic object codes used in the *CartographicObject* table.

GraObjID	GraObjDS	Name
11	26	thick line (1.5 pt), solid
3	26	medium thin line (0.35 pt), standard short dash
4	26	medium thin line (0.35 pt), solid
5	26	medium line (0.5 pt), standard short dash
6	26	medium line (0.5 pt), solid
7	26	medium line (0.5 pt), dash-dot
18	26	medium thin line (0.35 pt), dotted
14	26	thick line(1.75 pt), dotted
10	26	thick line (1.5 pt), standard medium dash
13	26	very thick line (2.5 pt), solid
19	26	medium line (0.5 pt), dash-dot-dot
20	26	medium line (0.75 pt), dotted
14	411	cross hatch, lines at 30° 90° and 150°, separation = 4 pt.
33	411	vertical hatch, separation = 1 pt.

GraObjID	GraObjDS	Name
13	411	cross hatch, lines at 0° and 90°, separation = 4 pt.
0	411	Null Pattern
12	411	cross hatch, lines at 0° and 90°, separation = 3.25 pt.
15	411	cross hatch, lines at 45° and 135°, separation = 2 pt.
10	411	cross hatch, lines at 0° and 90°, separation = 2.5 pt.
9	411	cross hatch, lines at 0° and 90°, separation = 2 pt.
8	411	cross hatch, lines at 0° and 90°, separation = 1 pt.
1	411	Solid Color Fill; scale invariant
11	411	cross hatch, lines at 0° and 90°, separation = 3 pt.
27	411	hatch, 60°, separation = 1 pt.
32	411	horizontal hatch, separation = 3 pt.
31	411	horizontal hatch, separation = 1 pt.
30	411	hatch, 60°, separation = 4 pt.
29	411	hatch, 60°, separation = 2.5 pt.
28	411	hatch, 60°, separation = 1.75 pt.
16	411	cross hatch, lines at 45° and 135°, separation = 2.5 pt.
26	411	hatch, 45°, separation = 4 pt.
25	411	hatch, 45°, separation = 1.75 pt.
24	411	hatch, 135°, separation = 4 pt.
22	411	hatch, 135°, separation = 1.75 pt.
21	411	hatch, 120°, separation = 1.75 pt.
20	411	cross hatch, lines at 60° and 120°, separation = 4 pt.
17	411	cross hatch, lines at 45° and 135°, separation = 3 pt.
18	411	cross hatch, lines at 45° and 135°, separation = 3.25 pt.
19	411	cross hatch, lines at 60° and 120°, separation = 2 pt.
23	411	hatch, 135°, separation = 3.25 pt.
5	412	Open circle
1	412	Solid triangle
2	412	Query
3	412	Perpendicular hash
4	412	X pattern
6	412	Alternating slash
6	420	Arial, Normal, Spacing: 1, JUST_LEFT, 11 point, PMS-Black
3	420	Arial, Normal, Spacing: 1, JUST_LEFT, 8 point, PMS-Black
12	420	AzGSArial, Normal, Spacing: 1, JUST_LEFT, 7 point, PMS-Black
19	420	Arial, Bold, Spacing: 1, JUST_LEFT, 7 point, PMS-Black
2	420	Arial, Normal, Spacing: 1, JUST_LEFT, 7 point, PMS-Black
8	420	Arial, Normal, Spacing: 1, JUST_LEFT, 14 point, PMS-Black
1	420	Arial, Normal, Spacing: 1, JUST_LEFT, 6 point, PMS-Black
11	420	AzGSArial, Normal, Spacing: 1, JUST_LEFT, 6 point, PMS-Black
32	420	Arial, Italic, Spacing: 1, JUST_LEFT, 12 point, PMS-Black
13	420	AzGSArial, Normal, Spacing: 1, JUST_LEFT, 8 point, PMS-Black

- **GraObjDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *GraObjID*. Domain: 26 = the *DataSetID* for the *GraphicLine* table; 411 = the *DataSetID* for the *GraphicPattern* table; 412 = the *DataSetID* for the *GraphicLineOrnamentated* table; 420 = the *DataSetID* for the *GraphicTextFormat* table.
- **ColorID**: Number, long integer. This field contains an integer value that represents a specific color. It is a foreign key that links to the *GraObjID* field of the *Color* table in the *RoskrugeWaterman* database. Domain: *Color* codeset – *RoskrugeWaterman* database.
- **ColorDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *ColorID*. Domain: 23 = the *DataSetID* for the *Color* table.
- **OriginDate**: Date/Time, short date. This field contains a date value, in the mm/dd/yy format, that records when the record was created. This information provides more detailed information on the time that records were originally entered, supplementing the information in the associated *TrackingRecord* table. Domain: Valid date.
- **Comment**: Memo. This field contains text that provides additional descriptive information about a record. Domain: Free text.

Classification Concept Table

The **ClassificationConcept** table is a collection of terminology definitions—a term with a definition. These terms are used to classify other objects in all parts of the database. Each concept is identified by its unique identifier (*ConceptID* - *DatasetID* pair). Thus the name of the concept may be changed without updating other links.

Database Table Fields

- **ConceptID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each classification object in the *ClassificationConcept* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DatasetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *ClassificationConcept* dataset. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **TrackingID**: Integer, width 16. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Integer, width 16. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID*. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **Name**: Text, width 255. This field contains a text string that provides a descriptive name for each classification concept. Domain: Free text.
- **ParentID**: Number, long integer. This field contains an integer value that represents the concept type. Semantically this is equivalent to the parent of the concept and the links between classification concepts and parent concepts defines the classification concept hierarchy. This hierarchy is represented by the *HierarchyRelationship* table for use in general database queries. Inclusion of this attribute with each classification concept facilitates management of a single, simple tree hierarchy for classification concepts, but future development may allow a more complex concept hierarchy with multiple parent links. The *ParentID* is a foreign key that links to the *ConceptID* field

in this same table. Domain: *ClassificationConcept* codeset – *RoskrugeWaterman* database.

- **ParentDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *ConceptTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **OriginDate**: Date/Time, short date. This field contains a date value, in the mm/dd/yy format, that records when the record was created. This information provides more detailed information on the time that records were originally entered, supplementing the information in the associated *TrackingRecord* table. Domain: Valid date.
- **Definition**: Text, width 255. This field contains a text string that defines each classification concept. Domain: Free text.

Color Table

The **Color** table defines RGB values for colors used in the default symbolization. The RGB values were derived from the Pantone® [Pantone®, Inc., 1991] color swatch library in Adobe Illustrator®, and represent red, green, and blue values that approximate Pantone® colors for onscreen viewing.

Database Table Fields

- **ColorID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each color in the *Color* table. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *Color* dataset. Domain: 23 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Name**: Text, width 255. This field contains a text string that uniquely identifies each color by Pantone® name (PMS-466), or by a string concatenated from a color description and the RGB values for that color (Blue (R39,G146,B182)). Domain: Pantone color names from the Pantone® [Pantone®, Inc., 1991] color swatch library, or free text.
- **CMYK**: Text, width 25. This optional field contains a string concatenated from the CMYK color values for a particular color. Domain: A sequence of four numbers each consisting of three integers ranging from 0 to 255.
- **RGB**: Text, width 25. This optional field contains a string concatenated from the RGB color values for a particular color. Domain: A sequence of three numbers each consisting of three integers ranging from 0 to 255.
- **R**: Number, integer. This field contains an integer value that represents the red color intensity for the screen display of a particular color. Domain: An integer from 0 to 255.
- **G**: Number, integer. This field contains an integer value that represents the green color intensity for the screen display of a particular color. Domain: An integer from 0 to 255.
- **B**: Number, integer. This field contains an integer value that represents the blue color intensity for the screen display of a particular color. Domain: An integer from 0 to 255.

DataSetAZ Table

The **DataSetAZ** table identifies each dataset included in, or referenced by, the *RoskrugeWaterman* database. A dataset is any collection of data that is held in an individual file or table. Examples include individual Arc/Info coverages, ESRI shape files,

tables in Microsoft Access databases, dBase tables in individual .dbf files, and files containing images (e.g. tiff, jpeg). The contents of the **DataSetAZ** table define the 'Arizona Geological Survey' namespace.

Database Table Fields

- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each dataset in the *DataSetAz* table. Domain: >0 and $<10^{16}$, no duplicates.
- **NameSpace**: Text, width 50. Compound primary key. This field contains a text string that identifies the agency or organization that owns or maintains the dataset. Domain: 'Arizona Geological Survey'.
- **NameSpaceID**: Number, long integer. This field contains an integer value that classifies the NameSpace for each dataset record in the *DataSetAz* dataset. There is a 1:1 correspondence between values in this field and values in the *NameSpace* field, i.e. they are redundant. Both a string value and an numeric value are included to facilitate implementation using the convention adopted for this database system that a data object within a particular namespace is identified by a compound primary key consisting of 2 long integers. *NameSpaceID* is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: 2541 = the *ConceptID* for the "Arizona Geological Survey" namespace.
- **NameSpaceDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *NameSpaceID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **DataSetName**: Text, width 255. This field contains a text string that uniquely identifies each dataset. Domain: Free text.
- **DataSetTypeID**: Number, long integer. This field contains an integer value that classifies each dataset according to a dataset type from the *ClassificationConcept* table. The dataset type identifies the physical data structure of the dataset (e.g. ArcInfo coverage, Microsoft Access table….). It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 21.

Table 21. Dataset type codes used in the *DataSetAZ* table.

DataSetTypeID	Name
2744	Classification/Description/Definition Dataset
2761	Generic Attributed Relationship Dataset
2762	Description Container Dataset
2794	Geographic Dataset

- **DataSetTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *DataSetTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **DataSetSubjectID**: Number, long integer. This field contains an integer value that classifies each dataset according to a subject classification term. The subject classification term identifies the domain of interest for the data in the dataset. In future implementations, the dataset subject will be used for error and consistency checking. A more complete key word index for datasets would need to be implemented through a correlation table allowing a many-to-many join between datasets and subjects. The *DataSetSubjectID* is a foreign key that links to the

ConceptID field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 22.

Table 22. Dataset subject codes used in the *DataSetAZ* table.

DataSetSubjectID	Name
2759	NADM Implementation Infrastructure
2767	AZ Cordlink base table
3306	Graphic Definition Tables
3336	Roskruge and Waterman Mountains and western Avra Valley

- **DataSetSubjectDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *DataSetSubjectID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **TrackingID**: Number, long integer. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID* for each record. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **SourceFileTypeID**: Number, long integer. This field contains an integer value that classifies each dataset by its physical file type or format. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 23.

Table 23. Source file type codes used in the *DataSetAZ* table.

SourceFileTypeID	Name
2542	MicroSoft Access Database Table
2543	dBase Table
2544	ESRI coverage, point
2545	ESRI coverage, arc
2547	ESRI coverage, polygon
2548	AV shape file, point
2549	AV shape file, line

- **SourceFileTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *SourceFileTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **PhysicalAddressTypeID**: Number, long integer. This field contains an integer value that classifies the type of physical address that records where each dataset is stored. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: 2726 = DOS-style path name; 2727 = Microsoft Network file path name.
- **PhysicalAddressTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *PhysicalAddressTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.

- **PhysicalAddress**: Text, width 255. This field contains a text string that identifies the actual physical location of the dataset. Domain: Free text restricted to formats defined by *PhysicalAddressTypeID*.
- **IdentifierFieldName**: Text, width 50. This field contains a string that records the name of the field in the DataSet that contains the identifier component of the compound unique identifier for each record. Domain: Restricted to the indexed, primary key field names. This is typically the first field in each dataset, and the field name is typically the table name or an object type name with "*ID*" appended. Identifier field names always end with the string "*ID*".
- **DataSetFieldName**: Text, width 50. This field contains a string that records the name of the field in the DataSet that contains the dataset component of the compound unique identifier for each record. Domain: "CovID", "DataSetID", "Namespace". This is typically the second field in each dataset.
- **Comment**: Memo. This field contains text that provides additional descriptive information about each dataset. Domain: Free text.

Graphic Line Table

The **GraphicLine** table contains descriptions of the graphical elements used to symbolize lines. This description is implementation dependent, and is based on attributes used to define line symbols in ArcView 3.2 and Adobe Illustrator.

Database Table Fields

- **GraObjID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each line in the *GraphicLine* dataset. Domain: >0 and $<10^{16}$, no duplicates.
- **DatasetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *GraphicLine* dataset. Domain: 26 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Name**: Text, width 255. This field contains a descriptive text string that uniquely identifies each type of line and is included for simplification purposes. Domain: Free text.
- **Width**: Number, single. This field contains a positive real number that specifies line thickness in millimeters. Domain: >0 and $<10^{8}$.
- **Scale**: Number, long integer. This field contains an integer value that represents the denominator of the map scale at which the graphical specifications of a line are valid. For example, a map scale of 1:12,000 would be recorded as '12000'. Domain: >0 and $<10^{16}$.
- **Pattern**: Text, width 50. This field contains a sequence of numbers, as a space- or comma-delimited string, that specifies the alternating solid (on) and empty (off) length of line segments, in millimeters, starting with the 'on' value, that are repeated to create each line pattern. For example, a string shown as '0.36 0.71 1.07 0.71' defines a repeating line pattern created by a 0.36 mm line segment, followed by a 0.71 mm space, followed by a 1.07 mm line segment, and followed by another 0.71 mm space. This approximates a line with a dot-dash pattern. Domain: A string composed of a series of real numbers separated by spaces.

Graphic Line with Ornamentation Table

The **GraphicLineOrnamented** table contains descriptions of symbols used to create ornamented lines (e.g. queries dashed lines, thrust faults). This description is

implementation dependent, and is based on attributes used to define line symbols in ArcView 3.2 running in a Microsoft Windows environment.

Database Table Fields

- **GraObjID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each style of line ornamentation in the *GraphicLineOrnamented* dataset. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *GraphicLineOrnamented* dataset. Domain: 412 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Name**: Text, width 255. This field contains a descriptive text string that uniquely identifies each type of line ornamentation symbol and is included for simplification purposes. Domain: Free text.
- **SymbolID**: Number, long integer. This field contains an integer value that identifies the graphical object used as an ornament along a decorated line (the *SymbolID* field is not implemented here but is included for future compatibility). In the implementation environment for this table, these symbols are characters from a font, and *SymbolID* would identify the index of a symbol in the font dataset specified by *SymbolDS*. Domain: 0
- **SymbolDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *SymbolID* (the *SymbolDS* field is not implemented here but is included for future compatibility). In the implementation environment for this table, SymbolDS would identify a font dataset. Domain: 0.
- **Spacing**: Number, single. This field contains a number that specifies spacing, in millimeters, between the centers of adjacent line ornamentation symbols. Domain: >0 and $<10^{8}$.
- **Scale**: Number, long integer. This field contains an integer value that represents the denominator of the map scale at which the graphical specifications of line ornamentation is valid. For example, a map scale of 1:12,000 would be recorded as '12000'. Domain: >0 and $<10^{16}$.
- **Pattern**: Text, width 50. This field contains a string that records a stream of integer draw or skip intervals. For example, '12' means draw one and skip two. A leading zero, such as in '021', means skip two and draw one. The interval size is dependent on ornament size (the *Pattern* field is not implemented here but is included for future compatibility). Domain: Free text composed of a single string of integers.
- **Offset**: Number, single. This field contains a real number that specifies the offset of an ornamentation symbol perpendicular to the line with which it is associated (the *Offset* field is not implemented here but is included for future compatibility). Domain: ≥ 0 and $<10^{8}$.

Graphic Pattern Table

The **GraphicPattern** table defines the graphical specifications for polygon fills in the default symbolization.

Database Table Fields

- **GraObjID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each polygon fill in the *GraphicPattern* dataset. Domain: >0 and $<10^{16}$, no duplicates.

- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *GraphicPattern* dataset. Domain: 411 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **Name**: Text, width 255. This field contains a descriptive text string that uniquely identifies each type of polygon fill pattern and is included for simplification purposes. Domain: Free text.
- **PatternID**: Number, long integer. This field contains an integer value that corresponds to the pattern used to create each type of polygon fill pattern. It is a foreign key that links to the *GraObjID* field of the *PatternDefinition* table in the *RoskrugeWaterman* database. (The *PatternDefinition* table is not included with this database, but the *PatternID* field is included for future compatibility.) Domain: 0: solid fill; -1: not defined.
- **PatternDS**: Number, long integer. This field contains an integer value that identifies the dataset that contains the data object identified by *PatternID*. Domain: 31 = the *DataSetID* for the *PatternDefinition* table.
- **Scale**: Number, long integer. This field contains an integer value that represents the denominator of the map scale at which the graphical specifications of each polygon fill pattern is valid. For example, a map scale of 1:12,000 would be recorded as '12000'. Domain: >0 and $<10^{16}$.
- **Rotation**: Number, integer. This field contains an integer value that represents the rotation angle, in degrees, of the graphical pattern for a particular polygon fill. The magnitude of the angle is measured clockwise starting from a compass azimuth of 0º. Domain: 0 to ±360.

Graphic Text Format Table

The **GraphicTextFormat** table defines the font specifications (type, style, size...) for cartographic text used in the default symbolization. This description is implementation dependent, and is based on attributes used to define text formatting in ArcView 3.2 running in a Microsoft Windows environment.

Database Table Fields

- **GraObjID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each type of text in the *GraphicTextFormat* dataset. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies the *GraphicTextFormat* dataset. Domain: 420 = the *DataSetID* for this table in the *DataSetAZ* dataset.
- **FontName**: Text, width 25. This field contains a text string that represents the name of the font used to symbolize a text object. Domain: Any valid font (requires that custom, or non-standard fonts, be distributed with the datasets they accompany). In DI-19, the *FontName* domain is restricted to 'AZGSArial' and 'Arial'.
- **Style**: Text, width 16. This field contains a text string that identifies the style of the font used to symbolize a text object. Domain: 'Normal'; 'Bold'; 'Italic'; 'Bold Italic'. In DI-19, the *Style* domain is limited to 'Normal', 'Bold', or 'Italic'.
- **Spacing**: Number, single. This field contains a number that specifies the vertical spacing between lines of text. Domain: >0 and $<10^{8}$.
- **Alignment**: Text, width 25. This field contains an ArcView-generated text string that specifies line justification. Domain: 'TEXTCOMPOSER_JUST_RIGHT', 'TEXTCOMPOSER_JUST_LEFT', 'TEXTCOMPOSER_JUST_CENTER'. In DI-19, the *Alignment* domain is limited to 'TEXTCOMPOSER_JUST_LEFT'.

- **Size**: Number, single. This field contains a number that defines the font size, in points, of a text object. Domain: >0 and $<10^8$.
- **Scale**: Number, long integer. This field contains an integer value that represents the denominator of the map scale at which the graphical specifications of a text format is valid. For example, a map scale of 1:12,000 would be recorded as '12000'. Domain: >0 and $<10^{16}$.
- **ColorID**: Number, long integer. This field contains an integer value that represents a specific color. It is a foreign key that links to the *ColorID* field of the *Color* table in the *RoskrugeWaterman* database. Domain: *Color* codeset – *RoskrugeWaterman* database.
- **ColorDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *ColorID*. Domain: 23 = the *DataSetID* for the *Color* table.

Hierarchy Relationship Table

The **HierarchyRelationship** table represents parent-child relationships. Multiple tree hierarchies may be represented, each identified by a Hierarchy Type, a classification concept that defines the nature of the hierarchy. For implementation simplicity, a hierarchy is represented in this table as a set of links between each parent and all the child objects beneath it in the hierarchy tree (its transitive closure). The depth of any child object in the tree is determined by the number of parent object linked to it. This representation makes response to queries that require all kinds (sub types) of a thing (e.g. 'all spatial objects', 'all map units') simple to execute. Currently, each child has only one parent.

Database Table Fields

- **RelationshipID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each record in the *HierarchyRelationship* table. Although the compound key {*HierarchyTypeID*, *HierarchyTypeDS*, *ParentID*, *ParentDS*, *ChildID*, *ChildDS*} provides a unique key, the table has a standard {*ObjectID*, *DatasetID*} key to allow a relationship to play a role in another relationship using the standard relationship tables. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that specifies the dataset that contains the data object identified by *RelationshipID*. Domain: 27 = the *DataSetID* for the *HierarchyRelationship* table.
- **HierarchyTypeID**: Number, long integer. This field contains and integer value that uniquely identifies the kind of hierarchy. This allows the *HierarchyRelationship* table to represent multiple concept hierarchies as well as other unrelated hierarchies. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: 2478 = ClassificationConceptHierarchy; only one hierarchy is currently represented.
- **HierarchyTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *HierarchyTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **ParentID:** Number, long integer. First part of compound foreign key that identifies the parent object in the parent-child (IsA) relationship. Because one classification concept hierarchy is the only hierarchy in this database, this field is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: *ClassificationConcept* codeset – *RoskrugeWaterman* database.

- **ParentDS:** Number, long integer. Second part of compound foreign key that identifies the parent object in the parent-child (IsA) relationship. This field contains an integer value that specifies the dataset that contains the data object identified by *ParentID*. Because one classification concept hierarchy is the only hierarchy in this database, this field has only one value. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **ChildID:** Number, long integer. First part of compound foreign key that identifies the child object in the parent-child (IsA) relationship. Because one classification concept hierarchy is the only hierarchy in this database, this field is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: *ClassificationConcept* codeset – *RoskrugeWaterman* database.
- **ChildDS:** Number, long integer. Second part of compound foreign key that identifies the child object in the parent-child (IsA) relationship. This field contains an integer value that specifies the dataset that contains the data object identified by *ChildID*. Because one classification concept hierarchy is the only hierarchy in this database, this field has only one value. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **TrackingID**: Number, long integer. This field contains an integer value that uniquely identifies the origin tracking for each record. It is a foreign key that links to the *TrackingID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecord* codeset – *RoskrugeWaterman* database.
- **TrackingDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingID* for each record. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.

Metadata Relationship Table

The **MetadataRelationship** table is a relationship table that provides a general mechanism for semantic links between metadata instances. A relationship type identifier links to a classification concept that defines the semantics of the relationship. Constraints on kinds of objects that may play the first and second role, and the number of fillers allowed for each role, will eventually be specified by a ValidRelationshipConstraint data structure, but this part of the database is currently being revised and is not implemented here. In this database, this table is used to implement a many-to-many join between tracking records and citations. Other applications in a more developed database would include relationships like project hierarchy (large project with subprojects), organization successor (when an organization changes name), organization aggregation (to represent individual departments as part of a larger organization), *StartDate* and *EndDate* links between *Person-Organization* affiliations and a metadata dates entity, *PersonOrg-ContactInformation* links to allow multiple contact addresses and types (phone, internet, surface mail…), *Object-LogEntries* to allow multiple tracking records to be related to any object, to track revisions, comments etc.

Database Table Fields

- **MetadataRelationshipID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each record in the *MetadataRelationship* table. Although the compound key {*RelTypeID*, *RelTypeDS*, *FirstRoleID*, *FirstRoleDS*, *SecondRoleID*, *SecondRoleDS*} provides a unique key, the table has a standard {*ObjectID*, *DatasetID*} key to allow a relationship to play a role

in another relationship using the standard relationship tables. Domain: >0 and $<10^{16}$, no duplicates.

- **DataSetID**: Number, long integer. Compound primary key. This field contains an integer value that specifies the dataset that contains the data object identified by *MetadataRelationshipID*. Domain: 12 = the *DataSetID* for the *MetadataRelationship* table.
- **RelTypeID**: Number, long integer. This field contains and integer value that uniquely identifies the kind of relationship. This allows the *MetadataRelationship* table to represent any kind of relationship. The *RelType* defines the semantics of the relationship. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: 2535 = *TrackingRecord-Citation* link. The only relationship currently represented, is a link between records in the *TrackingRecord* table and citations in the *_AzGeoBibCite* table, allowing a many-to-many relationship between citations and tracking records.
- **RelTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *RelTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **FirstRoleID:** Number, long integer. First part of compound foreign key that identifies the object in the first role of the metadata relationship. Because only the *TrackingRecord-Citation* relationship is represented in this database, this field is a foreign key that links to the *TrackingRecordID* field of the *TrackingRecord* table in the *RoskrugeWaterman* database. Domain: *TrackingRecordID* codeset – *RoskrugeWaterman* database.
- **FirstRoleDS:** Number, long integer. Second part of compound foreign key that identifies the object in the first role of the metadata relationship. This field contains an integer value that specifies the dataset that contains the data object identified by *FirstRoleID*. Because only the *TrackingRecord-Citation* relationship is represented in this database, this field has only one value. Domain: 18 = the *DataSetID* for the *TrackingRecord* table.
- **SecondRoleID:** Number, long integer. First part of compound foreign key that identifies the object in the second role of the metadata relationship. Because only the *TrackingRecord-Citation* relationship is represented in this database, this field is a foreign key that links to the *RefNum* field of the *_AzGeoBibCite* table in the *RoskrugeWaterman* database. Domain: *RefNum* codeset – *RoskrugeWaterman* database.
- **SecondRoleDS:** Number, long integer. Second part of compound foreign key that identifies the object in the second role of the metadata relationship. This field contains an integer value that specifies the dataset that contains the data object identified by *SecondRoleID*. Because only the *TrackingRecord-Citation* relationship is represented in this database, this field has only one value. Domain: 4 = the *DataSetID* for the *_AzGeoBibCite* table.

Pattern Definition Table

The **PatternDefinition** table is not included in this database.

Person and Organization Table

The **PersonOrg** table is not included in this database. The values in DI-19 used from this table are shown in Table 17.

Projects Table

The **Projects** table is not included in this database. The values in DI-19 used from this table are shown in Table 18.

Tracking Record Table

The **TrackingRecord** table keeps a record of the intellectual and physical sources for objects and data by defining links to tables that describe the processes and activities through which data was created.

Database Table Fields

- **TrackingID**: Number, long integer. Compound primary key. This field contains an integer value that uniquely identifies each record in the *TrackingRecord* dataset. Domain: >0 and $<10^{16}$, no duplicates.
- **DataSetID**: Number, long integer. This field contains an integer value that uniquely identifies the *TrackingRecord* dataset. Domain: 18 = the *DataSetID* for this table in the *RoskrugeWaterman* database.
- **TrackingRecordTypeID**: Number, long integer. This field contains and integer value that uniquely identifies the type of origin tracking record. It is a foreign key that links to the *ConceptID* field of the *ClassificationConcept* table in the *RoskrugeWaterman* database. Domain: See Table 24.

Table 24. Tracking Record Type codes used in the *TrackingRecord* table.

ConceptID	Name	Definition
2534	Origin Tracking Record	Tracking record that records the origin of a data object or data set
2742	Log Entry Tracking Record	Tracking record type for tracking records that add information about a data entity
2765	Termination Tracking Record	Tracking record that indicates a data object has been superceded by a newer object.
3210	Feature-level Origin Tracking Record	Use as supertype to group tracking records that document origin of individual feature records in datasets.
3211	Feature-Level Tracking for DI8 V3	Supertype to group feature tracking records for Geologic map of Arizona Database, v3
3228	Feature-Level Tracking for Infrastructure Objects	Tracking record type for records that track data objects in the infrastructure tables
3231	Dataset Origin Tracking	Tracking records that record facts about the origin of a Dataset, and are inherited by contents of dataset unless feature-level tracking is included for dataset

- **TrackingRecordTypeDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *TrackingRecordTypeID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **Name**: Text, width 255. This field contains a descriptive text string that uniquely identifies each origin tracking record and is included for simplification purposes. Domain: Free text.
- **LogDate**: Date/Time, short date. This field contains a date value, in mm/dd/yy format, that records when an entry was created. Domain: Valid date.
- **ActivityID**: Number, long integer. A foreign key that links to the *ActivityID* field of the *Activities* table in the *RoskrugeWaterman* database. Domain: See Table 25.

Table 25. Activity ID codes used in the TrackingRecord table.

ActivityID	Name	Comment
1	SMRDataModelDevelopment	Stephen M. Richard, Arizona Geological Survey, Arizona NADM implementation development
2	SMR-DI8V3DevelopmentActivity	Stephen M. Richard, Arizona Geological Survey, DI-8 Version 3 database development
3	TRO-PhoenixNDatabaseDevelopment	Tim R. Orr, Arizona Geological Survey, Phoenix N, East Half Database development
4	Null	No Activity assigned; Null N Null, None, Null
5	BLMMOSSdigitizeMap26	BLM activity to produce MOSS version of Reynolds, 1988, AZGS Map26; Jason . Brander, Bureau of Land Management, Digitize Geologic Map of Arizona, using MOSS
8	SMRDI8V1	Convert MOSS data to ARC, adjust to match ALRIS state outline, minor editing to correct obvious linework problems, edit faults to match contacts better, reclassify some polygons; Stephen M. Richard, Arizona Geological Survey, Edit Map 26 Data to release a
10	SMRRoskrugeWatermanDI	Digitizing, editing, and attribution of geologic information by Stephen M. Richard from data collected for Statemap 1999 contract; Stephen M. Richard, Arizona Geological Survey, Statemap 1999, Waterman Peak 1:24000 quad
11	TRO_TheoRoos100KDigitizingandEditing	table digitizing and editing using ArcInfo; Tim R. Orr, Arizona Geological Survey, TheodoreRoosevelt100KGISV2
33	TRO-GreenValleySurfGeology DatabaseConstruction	project specific database construction; Tim R. Orr, Arizona Geological Survey, Statemap 1999 Surficial
37	TRO-AZGeoMapIndexDatabaseConversion	Added new fields to match current data structure of AZ_NADM data model. Renamed and reorganized existing fields; Tim R. Orr, Arizona Geological Survey, AZ Geologic Map Index database conversion
38	TRODataModelDevelopment	Tim R. Orr, Arizona Geological Survey, Arizona NADM implementation development
39	AY-GreenValleyUnitAssignment	assignment of map unit names to geologic polygons; Ann Youberg, Arizona Geological Survey, Statemap 1999 Surficial
40	TRORoskrugeWatermanDatabaseDevelopment	project specific database construction; Tim R. Orr, Arizona Geological Survey, Statemap2000PhxDatabases
45	RCHRoskrugeWatermanDI	Digitizing, editing, and attribution of geologic information by Ray Harris from data collected for Statemap 1999 contract; Ray C. Harris, Arizona Geological Survey, Statemap 1999, Roskruge/Waterman Digital Data
46	TRORoskrugeWatermanDI	Digitizing, editing, and attribution of geologic information by Tim Orr from data collected for Statemap 1999 contract; Tim R. Orr, Arizona Geological Survey, Statemap 1999, Roskruge/Waterman Digital Data
47	TRORoskrugeWatermanCarto	Cartographic layout for Roskruge/Waterman digital data browse graphic; Tim R. Orr, Arizona Geological Survey, Statemap 1999, Roskruge/Waterman Digital Data
48	SMRRoskrugeWatermanCarto	Cartographic layout for Roskruge/Waterman digital data browse graphic; Stephen M. Richard, Arizona Geological Survey, Statemap 1999, Waterman Peak 1:24000 quad
49	NMBMMRGeochemAnalyses	Samples were crushed in a steel jaw crusher, split, and ground in a Tema mill using a WC grinding set. Samples were fused into glass disks and analyzed on a Phillips wavelength dispersive x-ray fluorescence spectrometer for major elements.
82	PAPRoskrugeWatermanDI	DI database contributions by Phil Pearthree

- **ActivityDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *ActivityID*. Domain: 2 = the *DataSetID* for the *Activities* table.
- **DataProcMethodID**: Number, long integer. It is a foreign key that links to a data processing name and definition in the *ClassificationConcept* table in the *RoskrugeWaterman* database. A complete data processing object define the steps in developing a particular data item (digitized spatial feature, record in a data table). In this database the processing steps are not described at a feature level. Domain: 2748 = MS Access Database Construction; 2764 = no processing.
- **DataProcMethodDS**: Number, long integer. This field contains an integer value that specifies the dataset that contains the data object identified by *DataProcMethodID*. Domain: 1 = the *DataSetID* for the *ClassificationConcept* table.
- **Description**: Memo. This field contains a description of the people and processes that define each tracking record. Domain: Free text.

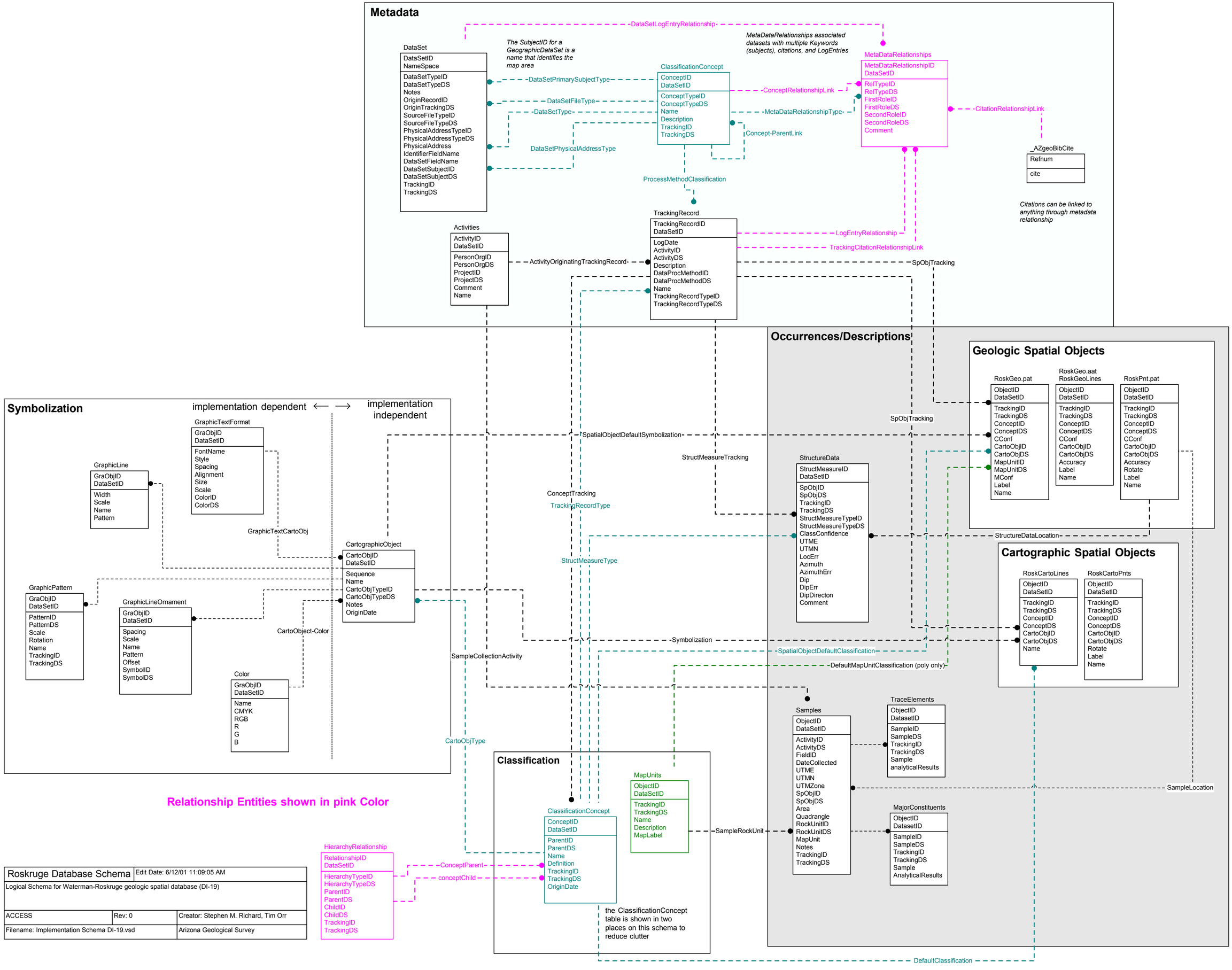
REFERENCES

Johnson, B. R., Brodaric, Boyan, and Raines, G. L., 1998, Digital Geologic Maps Data Model, V. 4.3: http://ncgmp.usgs.gov/ngmdbproject, U. S. Geological Survey.

Richard, S. M., and Orr T. R., in prep., Database design for Arizona Geological Survey Geologic Information Sytem: Tucson, Arizona Geological Survey Open-File Report.

Trapp, R. A., and Reynolds, S. J., 1998, Physiographic areas in Arizona used by the Arizona Geological Survey: Tucson, Arizona Geological Survey, Digital Information Series DI-10, 4 pages, 1 floppy disc.

Trapp, R. A., Schmidt, N., and Reynolds, S. J., 1996, AZGEOBIB, Version 2.1: A List of References on the Geology of Arizona: Arizona Geological Survey Open-File Report OFR-96-01, p. 308.


Metadata
DataSetLogEntryRelationship
The SubjectID for a GeographicDataSet is a name that identifies the map area
MetaDataRelationships associated datasets with multiple Keywords (subjects), citations, and LogEntries
DataSet
DataSetID
NameSpace
DataSetTypeID
DataSetTypeDS
Notes
OriginRecordID
OriginTrackingDS
SourceFileTypeID
SourceFileTypeDS
PhysicalAddressTypeID
PhysicalAddressTypeDS
PhysicalAddress
IdentifierFieldName
DataSetFieldName
DataSetSubjectID
DataSetSubjectDS
TrackingID
TrackingDS
DataSetPrimarySubjectType
DataSetFileType
DataSetType
DataSetPhysicalAddressType
ClassificationConcept
ConceptID
DataSetID
ConceptTypeID
ConceptTypeDS
Name
Description
TrackingID
TrackingDS
ConceptRelationshipLink
MetaDataRelationshipType
Concept-ParentLink
ProcessMethodClassification
MetaDataRelationships
MetaDataRelationshipID
DataSetID
RelTypeID
RelTypeDS
FirstRoleID
FirstRoleDS
SecondRoleID
SecondRoleDS
Comment
CitationRelationshipLink
_AZgeoBibCite
Refnum
cite
Citations can be linked to anything through metadata relationship
Activities
ActivityID
DataSetID
PersonOrgID
PersonOrgDS
ProjectID
ProjectDS
Comment
Name
ActivityOriginatingTrackingRecord
TrackingRecord
TrackingRecordID
DataSetID
LogDate
ActivityID
ActivityDS
Description
DataProcMethodID
DataProcMethodDS
Name
TrackingRecordTypeID
TrackingRecordTypeDS
LogEntryRelationship
TrackingCitationRelationshipLink
SpObjTracking
Occurrences/Descriptions
Geologic Spatial Objects
RoskGeo.pat
ObjectID
DataSetID
TrackingID
TrackingDS
ConceptID
ConceptDS
CConf
CartoObjID
CartoObjDS
MapUnitID
MapUnitDS
MConf
Label
Name
RoskGeo.aat
RoskGeoLines
ObjectID
DataSetID
TrackingID
TrackingDS
ConceptID
ConceptDS
CConf
CartoObjID
CartoObjDS
Accuracy
Label
Name
RoskPnt.pat
ObjectID
DataSetID
TrackingID
TrackingDS
ConceptID
ConceptDS
CConf
CartoObjID
CartoObjDS
Accuracy
Rotate
Label
Name
Symbolization
implementation dependent
implementation independent
GraphicTextFormat
GraOjbID
DataSetID
FontName
Style
Spacing
Alignment
Size
Scale
ColorID
ColorDS
GraphicLine
GraObjID
DataSetID
Width
Scale
Name
Pattern
GraphicTextCartoObj
CartographicObject
CartoObjID
DataSetID
Sequence
Name
CartoObjTypeID
CartoObjTypeDS
Notes
OriginDate
GraphicPattern
GraObjID
DataSetID
PatternID
PatternDS
Scale
Rotation
Name
TrackingID
TrackingDS
GraphicLineOrnament
GraObjID
DataSetID
Spacing
Scale
Name
Pattern
Offset
SymbolID
SymbolDS
CartoObject-Color
Color
GraObjID
DataSetID
Name
CMYK
RGB
R
G
B
SpatialObjectDefaultSymbolization
StructMeasureTracking
ConceptTracking
TrackingRecordType
StructMeasureType
SampleCollectionActivity
CartoObjType
StructureData
StructMeasureID
DataSetID
SpObjID
SpObjDS
TrackingID
TrackingDS
StructMeasureTypeID
StructMeasureTypeDS
ClassConfidence
UTME
UTMN
LocErr
Azimuth
AzimuthErr
Dip
DipErr
DipDirecton
Comment
StructureDataLocation
Cartographic Spatial Objects
RoskCartoLines
ObjectID
DataSetID
TrackingID
TrackingDS
ConceptID
ConceptDS
CartoObjID
CartoObjDS
Name
RoskCartoPnts
ObjectID
DataSetID
TrackingID
TrackingDS
ConceptID
ConceptDS
CartoObjID
CartoObjDS
Rotate
Label
Name
Symbolization
SpatialObjectDefaultClassification
DefaultMapUnitClassification (poly only)
Samples
ObjectID
DataSetID
ActivityID
ActivityDS
FieldID
DateCollected
UTME
UTMN
UTMZone
SpObjID
SpObjDS
Area
Quadrangle
RockUnitID
RockUnitDS
MapUnit
Notes
TrackingID
TrackingDS
TraceElements
ObjectID
DatasetID
SampleID
SampleDS
TrackingID
TrackingDS
Sample
analyticalResults
SampleLocation
MajorConstituents
ObjectID
DatasetID
SampleID
SampleDS
TrackingID
TrackingDS
Sample
AnalyticalResults
Classification
MapUnits
ObjectID
DataSetID
TrackingID
TrackingDS
Name
Description
MapLabel
SampleRockUnit
ClassificationConcept
ConceptID
DataSetID
ParentID
ParentDS
Name
Definition
TrackingID
TrackingDS
OriginDate
the ClassificationConcept table is shown in two places on this schema to reduce clutter
DefaultClassification
HierarchyRelationship
RelationshipID
DataSetID
HierarchyTypeID
HierarchyTypeDS
ParentID
ParentDS
ChildID
ChildDS
TrackingID
TrackingDS
ConceptParent
conceptChild
Relationship Entities shown in pink Color
Roskruge Database Schema
Edit Date: 6/12/01 11:09:05 AM
Logical Schema for Waterman-Roskruge geologic spatial database (DI-19)
ACCESS
Rev: 0
Creator: Stephen M. Richard, Tim Orr
Filename: Implementation Schema DI-19.vsd
Arizona Geological Survey