DIGITAL MAPPING TECHNIQUES 2018

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from the DMT Meetings (1997-2018)

http://ngmdb.usgs.gov/info/dmt/

The Maine Geological Survey's Statewide Geodatabase Architecture and Initial Progress Towards GeMS Compliance.

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Description:
The Maine Geological Survey (MGS) has a statewide, seamless, multi-map, multi-scale, enterprise geodatabase that tightly integrates the mapping, data collection, project tracking, publishing and sales workflows for all Maine surficial and bedrock map products. We'll review the software and infrastructure that host the system. We'll also look in detail at the database schema and procedures that make this a powerful tool for centralizing all MGS data and serving it to ArcGIS, MS Access, MS Excel, ArcServer and our web site. Lastly, we'll review the initial steps taken to prepare the MGS database for providing GeMS-compliant deliverables. This includes a gap analysis between the two systems, a work plan for migration and factors that MGS will be considering before committing to this project.

Abstract:
The Maine Geological Survey (MGS) has had a bedrock and surficial geologic mapping system for over 20 years. The system has migrated through many GIS and data technologies as vendors have upgraded software. Until recently, the GIS and business data have always existed in their own technology silos. Through a lot of experimentation and trial and error MGS has arrived at a single database architecture that meets all the data and GIS needs for users. A Microsoft SQL Server Express database running on-premise stores all the ESRI geodatabase objects that are used in ArcGIS for mapping and the business tables that support the project tracking, publishing and sales workflows. ArcGIS and Access provide the front-end data visualizations. SQL Server database views and stored procedures store the logic for data presentation. This system provides the best mapping draw and query performance and allows for the seamless integration of business and geospatial data. Additionally, mapped features are stored in single feature classes for all quadrangles at the mapped scale. When mapping by quadrangle, definition queries are set on the layers to only display data for the quadrangle. Access forms are used to filter and display tabular data by quadrangle to be entered or edited.

MGS started the GeMS evaluation process this winter. It was quickly apparent that MGS wouldn't use the GeMS file geodatabase, single quadrangle-based mapping tools because this would have been a technological step backwards. However, there were many excellent features of GeMS that MGS could implement like correlation of map units, the glossary and paragraph styles for the description of map units. The decision was made to treat GeMS as a data export product. A gap analysis was performed to assess what data was missing from the MGS system that would be needed to produce a GeMS compliant database for submission to USGS. The analysis also provided a work plan for migration. Results showed that there weren't significant amounts of data missing. However, there is still a significant amount of work that needs to be done. MGS is currently evaluating the costs and benefits of migration and assessing the correct timing for implementing the work plan.

Maine Geological Survey's Statewide Geodatabase Architecture and Initial Progress Towards GeMS Compliance

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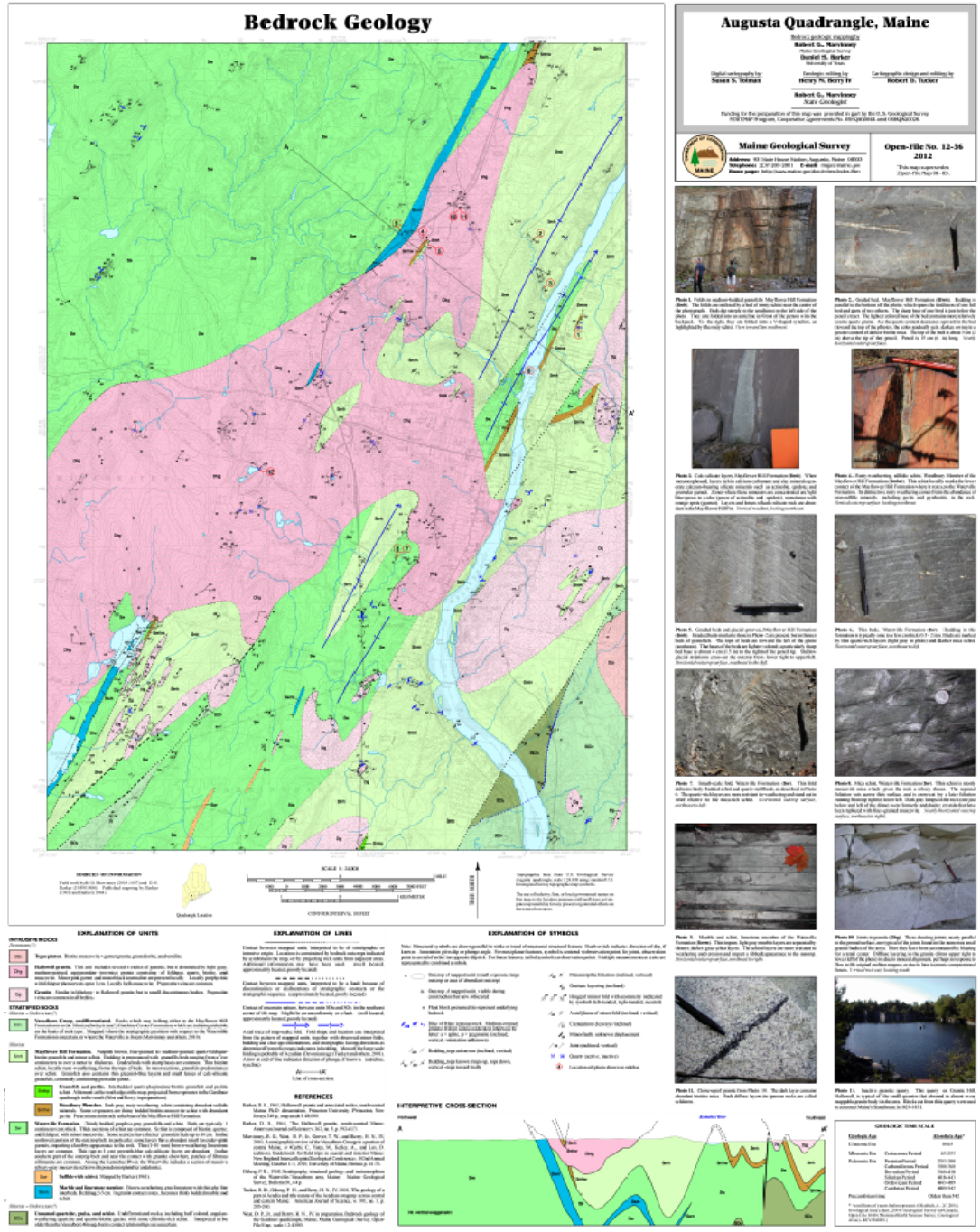
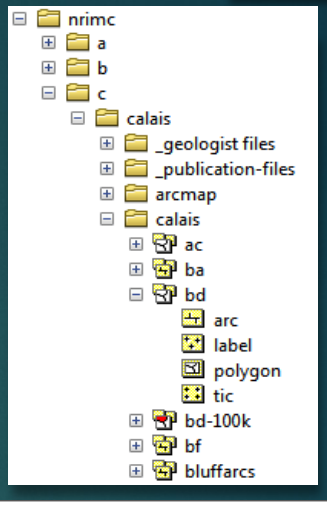


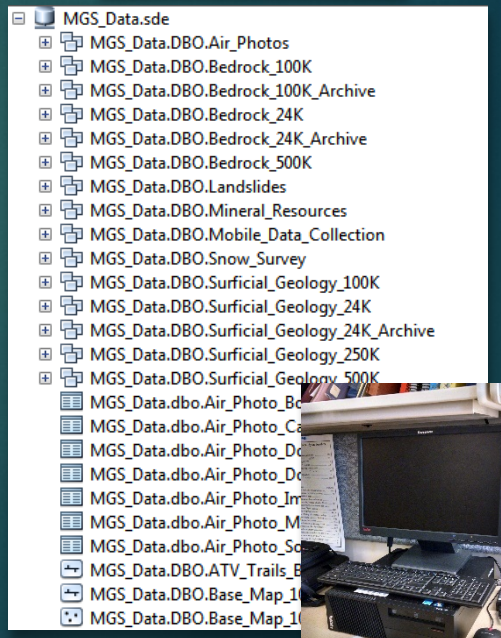
Agenda

- MGS data management history
- Review current MGS database design and key features
- GeMS Implementation Evaluation

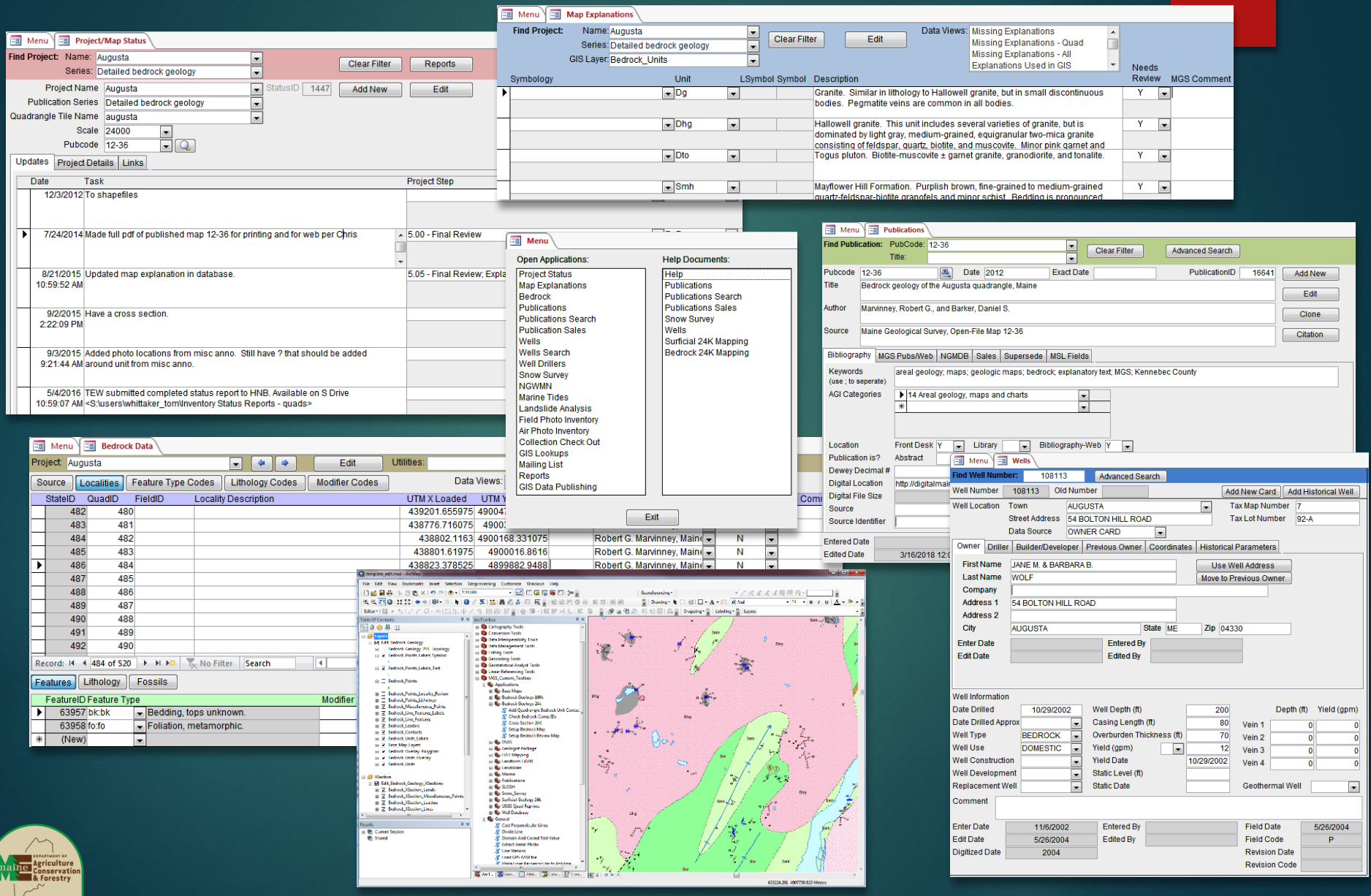
MGS Data Management History

	Spatial Data	Business Data
	Paper	Reports
	Mylar	Tables
1996	Quadrangle based	
	ArcInfo	Text files
	Coverages	Lotus 123
	AML	Excel
	Plot files	
~2002	PDF files	
2005		Access
2014	Multi-map based	
	ArcGIS	Excel
	Enterprise SQL Server GDB	Access
	PDF	
2016		
	ArcGIS	Excel
	File Geodatabase	Enterprise database
	PDF	
2017		
	ArcGIS	
	Local SQL Server Express Geodatabase	
	PDF	
Future		
	Local SQL Server Express Geodatabase	



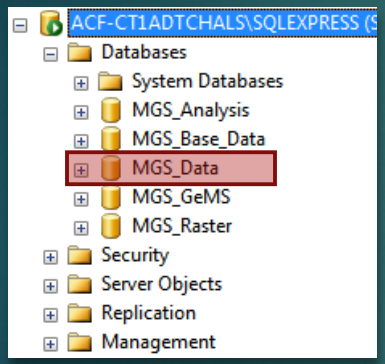


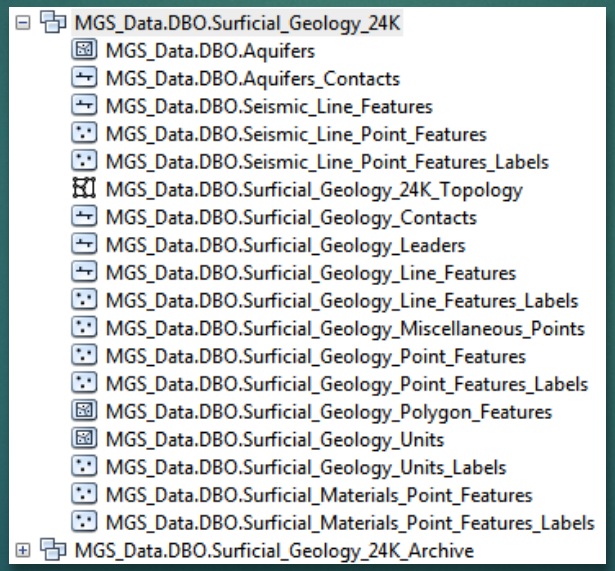
User Interfaces



Statewide Data Storage: Why

- Controlled data management
- Performance
- Discoverability
- Value added, any-scale analysis
- More stable code base and centralized logic

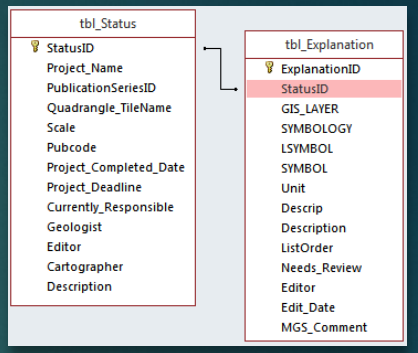




Statewide Data Storage: How

Form example:

- Each table has a foreign key that identifies the quadrangle the records belong to
- Forms are set up to filter by quadrangle



tbl_Explanation

ExplanationID	StatusID	GIS_LAYER	LSYME	SYME	Unit	Descrip	Description	ListOrder	Needs_Revi	MGS_Comm
6920	1302	Bedrock_Units	382		pC#ct	Rocks of the Ch	Twin Bridges facies. Medium- to coarse-		Y	
6922	1327	Bedrock_Units	352		CDbig	Biddeford Plut	Biddeford Pluton. Light gray, medium-gr		Y	
6924	1327	Bedrock_Units	361		Dwb	Webhannet Plu	Webhannet Pluton. Light gray to pink, bi		Y	
6926	1327	Bedrock_Units	93		Sb	Berwick Forma	Berwick Formation. Medium-bedded, m		Y	
6927	1327	Bedrock_Units	615		SOe	Merrimack Gro	Eliot Formation. Generally thin-bedded		Y	
6928	1327	Bedrock_Units	736		SOk	Merrimack Gro	Merrimack GroupKittery Formation. Vari		Y	
6929	1326	Bedrock_Units	352		CDbig	Biddeford Plut	Biddeford Pluton. Light gray, medium-gr		Y	
6930	1326	Bedrock_Units	736		SOk	Merrimack Gro	Merrimack Group. Kittery Formation. Va		Y	
6932	1456	Bedrock_Units	32		DOpg	Passagassawak	Passagassawakeag Gneiss. This unit is a s		Y	
6933	1456	Bedrock_Units	364		DSlsf	Foliated and sh	Foliated and sheared Lincoln Syenite (Lir		Y	
6934	1456	Bedrock_Units	303		DSmp	Mixer Pond Gn	Mixer Pond Gneiss. A heterogeneous un		Y	
6935	1456	Bedrock_Units	15		Obr	Beaver Ridge F	Beaver Ridge Formation. Rusty weatheri		Y	

Menu | Map Explanations

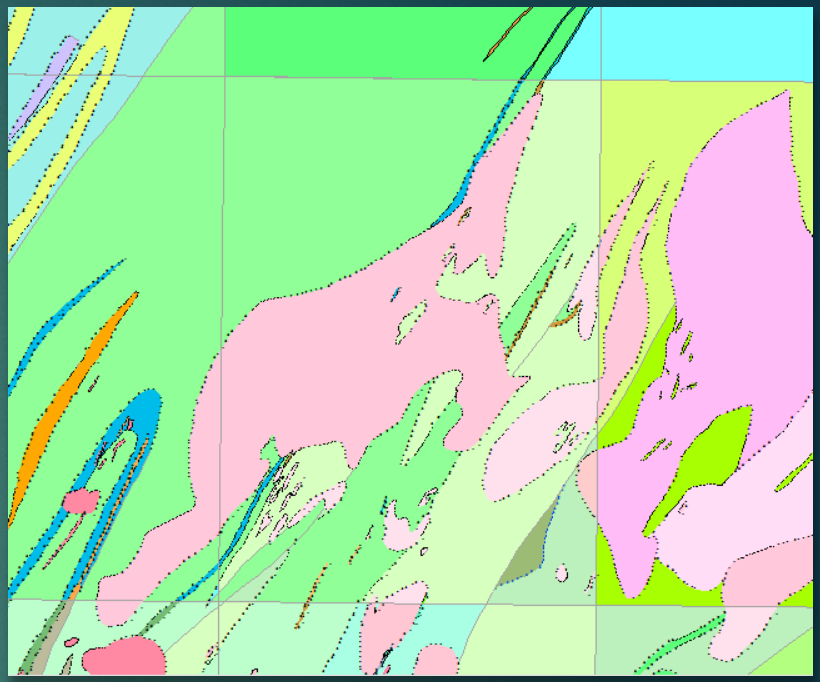
Find Project: Name: Augusta | Series: Detailed bedrock geology | GIS Layer: Bedrock_Units | Clear Filter | Edit | Data Views: Missing Explanations; Missing Explanations - Quad; Missing Explanations - All; Explanations Used in GIS

Symbology	Unit	LSymbol	Symbol	Description	Needs Review	MGS Comment
	Dg			Granite. Similar in lithology to Hallowell granite, but in small discontinuous bodies. Pegmatite veins are common in all bodies.	Y	
	Dhg			Hallowell granite. This unit includes several varieties of granite, but is dominated by light gray, medium-grained, equigranular two-mica granite consisting of feldspar, quartz, biotite, and muscovite. Minor pink garnet and	Y	
	Dto			Togus pluton. Biotite-muscovite ± garnet granite, granodiorite, and tonalite.	Y	
	Smh			Mayflower Hill Formation. Purplish brown, fine-grained to medium-grained quartz-feldspar-biotite granofels and minor schist. Bedding is pronounced	Y	

Statewide Data Storage: How

Map example:

- All bedrock unit polygons for every mapped quadrangle are in the same feature class
- Each feature class has a QUADNAME field that identifies the quadrangle the feature belongs to



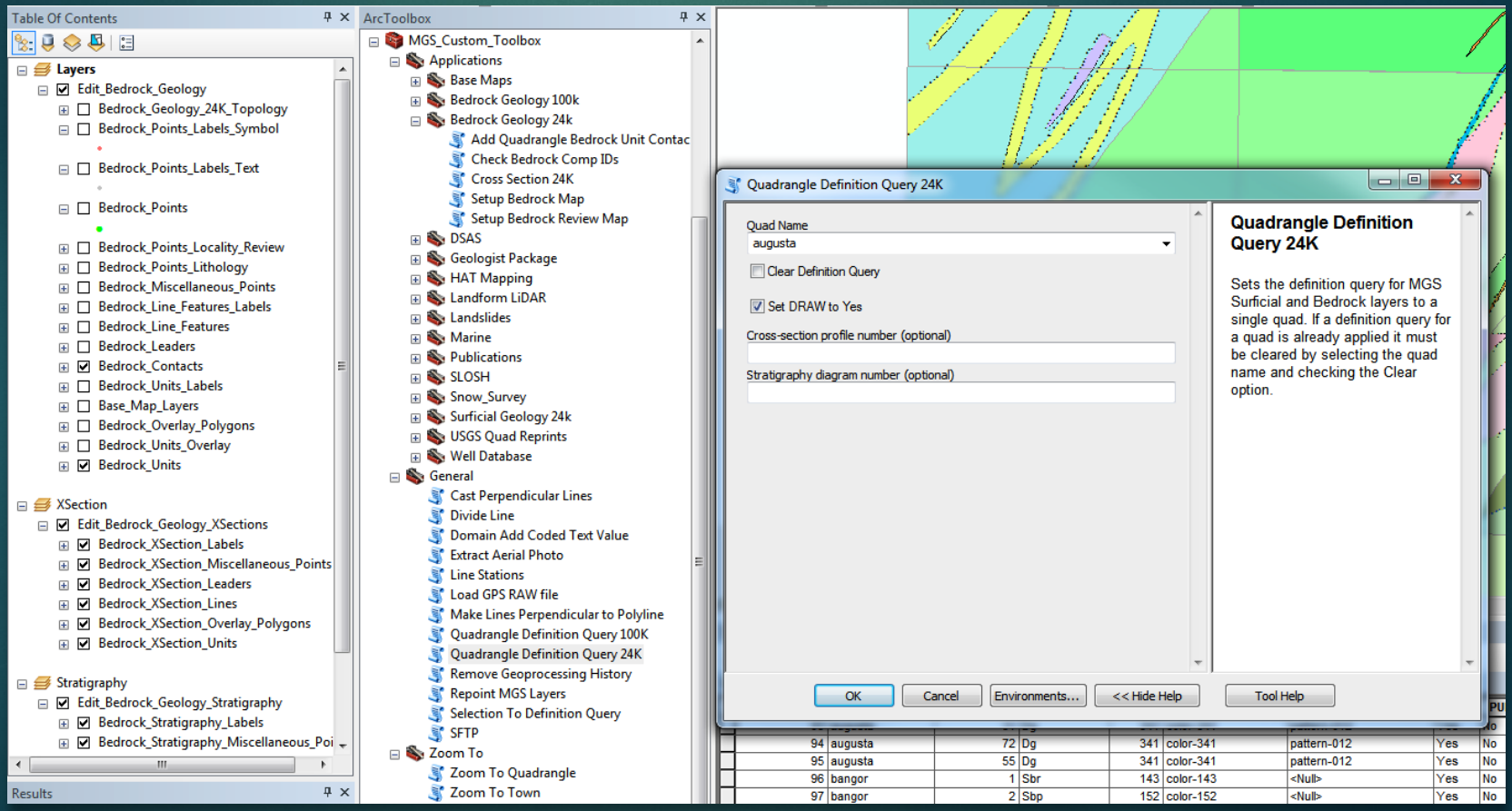
Bedrock_Units

OBJECTID *	QUADNAME	COMPID	UNIT	COLOR	SYMBOLOGY	SYMBOLOGY_OVERLAY	DRAW	PUBLISH_DATA	SOURCE	COMMENTS	SHAPE *
94	augusta	72	Dg	341	color-341	pattern-012	Yes	No	<Null>	<Null>	Polygon
95	augusta	55	Dg	341	color-341	pattern-012	Yes	No	<Null>	<Null>	Polygon
96	bangor	1	Sbr	143	color-143	<Null>	Yes	No	<Null>	<Null>	Polygon
97	bangor	2	Sbp	152	color-152	<Null>	Yes	No	<Null>	<Null>	Polygon
98	bangor	3	Sbp	152	color-152	<Null>	Yes	No	<Null>	<Null>	Polygon
99	bangor	4	Sbl	58	color-058	<Null>	Yes	No	<Null>	<Null>	Polygon
100	bangor	5	Sbk	83	color-083	<Null>	Yes	No	<Null>	<Null>	Polygon
101	bangor	6	Sbp	152	color-152	<Null>	Yes	No	<Null>	<Null>	Polygon
102	bangor	7	Sbl	58	color-058	<Null>	Yes	No	<Null>	<Null>	Polygon
103	bangor	8	Sbr	143	color-143	<Null>	Yes	No	<Null>	<Null>	Polygon
104	bar-harbor	1	-none-	0	color-000	<Null>	Yes	No	Bulletin 38	<Null>	Polygon
105	bar-mills	4	CDgd	363	color-363	<Null>	Yes	No	<Null>	<Null>	Polygon

Statewide Data Storage: How

Map example (continued):

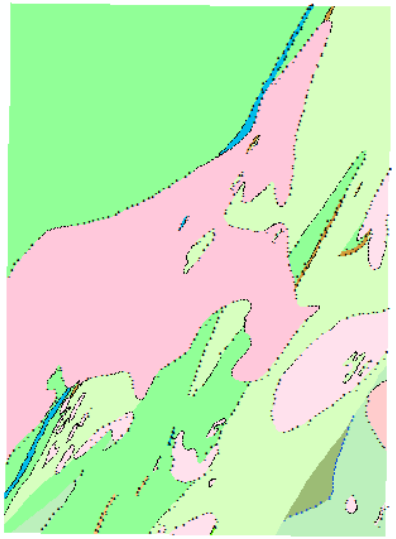
- Python tool automatically sets the Definition Query for every layer in a map document
- QUADNAME = 'augusta' AND DRAW = 'Yes'



Statewide Data Storage: How

Map example (continued):

- After the tool is run only the selected bedrock unit polygons show in the map

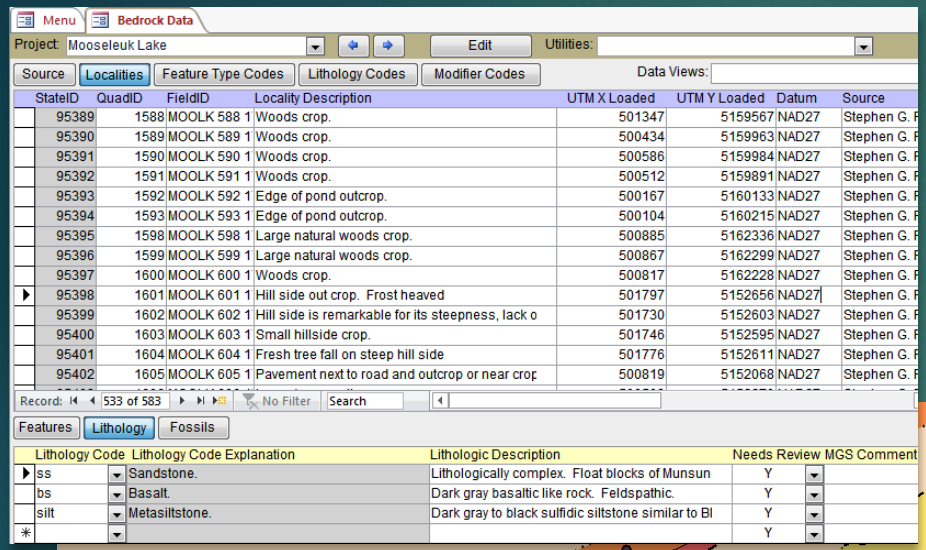


Bedrock_Units

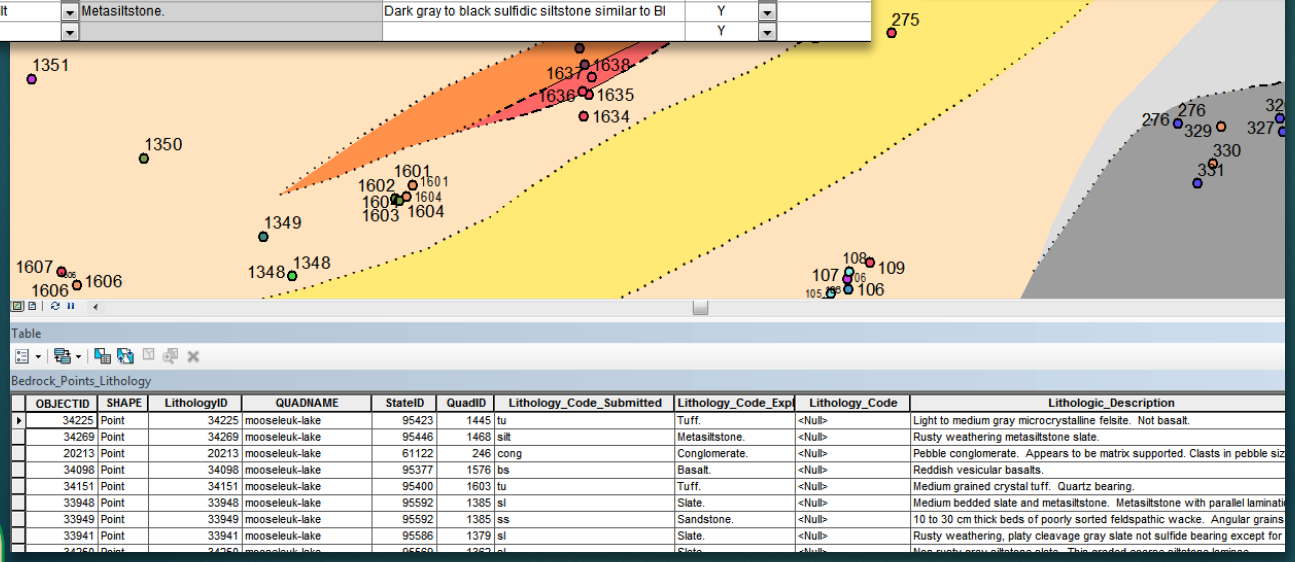
OBJECTID *	QUADNAME	COMPID	UNIT	COLOR	SYMBOLOGY	SYMBOLOGY_OVERLAY	DRAW	PUBLISH_DATA	SOURCE	COMMENTS	SHAPE *
58	augusta	1	Sw	123	color-123	<Null>	Yes	No	<Null>	<Null>	Polygon
41	augusta	2	Sw	123	color-123	<Null>	Yes	No	<Null>	<Null>	Polygon
40	augusta	3	Swm	196	color-196	<Null>	Yes	No	<Null>	<Null>	Polygon
42	augusta	4	Smhw	468	color-468	<Null>	Yes	No	<Null>	<Null>	Polygon
60	augusta	5	Dhg	342	color-342	pattern-012	Yes	No	<Null>	<Null>	Polygon
44	augusta	6	Smh	92	color-092	<Null>	Yes	No	<Null>	<Null>	Polygon
45	augusta	7	Smh	92	color-092	<Null>	Yes	No	<Null>	<Null>	Polygon
66	augusta	9	Smh	92	color-092	<Null>	Yes	No	<Null>	<Null>	Polygon
65	augusta	10	Swm	196	color-196	<Null>	Yes	No	<Null>	<Null>	Polygon
48	augusta	11	Smh	92	color-092	<Null>	Yes	No	<Null>	<Null>	Polygon
62	augusta	13	Dg	341	color-341	pattern-012	Yes	No	<Null>	<Null>	Polygon
61	augusta	15	Sw	123	color-123	<Null>	Yes	No	<Null>	<Null>	Polygon

Statewide Data Storage: Benefits

Create views that mix spatial and business data for use in GIS




```
ALTER VIEW [dbo].[Bedrock_Points_Lithology] AS
SELECT tbl_Bedrock_Lithology.LithologyID AS OBJECTID
    ,Bedrock_Points_evw.SHAPE
    ,tbl_Bedrock_Lithology.LithologyID
    ,Bedrock_Points_evw.QUADNAME
    ,Bedrock_Points_evw.StateID
    ,Bedrock_Points_evw.QuadID
    ,tbl_Bedrock_Lithology_Code.Lithology_Code_Submitted
    ,tbl_Bedrock_Lithology_Code.Lithology_Code_Explanation
    ,tbl_Bedrock_Lithology_Code.Lithology_Code
    ,tbl_Bedrock_Lithology.Lithologic_Description
    ,tbl_Bedrock_Lithology_Code.MGS_Comment
    ,tbl_Bedrock_Lithology_Code.Needs_Review
    ,Bedrock_Points_evw.DRAW
    ,Bedrock_Points_evw.PUBLISH_DATA
    ,Bedrock_Points_evw.created_user
    ,Bedrock_Points_evw.created_date
    ,Bedrock_Points_evw.last_edited_user
    ,Bedrock_Points_evw.last_edited_date
FROM tbl_Bedrock_Lithology
    JOIN Bedrock_Points_evw
        ON tbl_Bedrock_Lithology.StateID = Bedrock_Points_evw.StateID
    LEFT JOIN tbl_Bedrock_Lithology_Code
        ON tbl_Bedrock_Lithology.LithologyCodeID = tbl_Bedrock_Lithology_Code.LithologyCodeID
GO
```

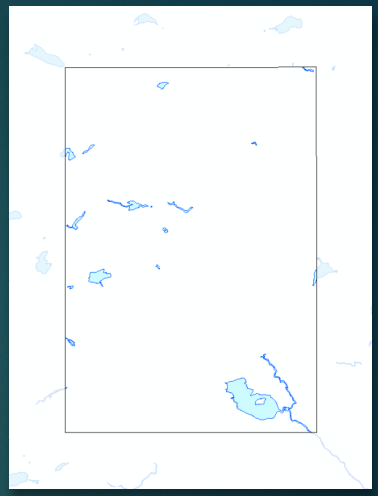


- No joins in ArcMap
- Can do multi-field joins
- Faster draw performance
- No copying data
- Automatic data updates

Statewide Data Storage: Benefits

Perform geoprocessing tasks in the database

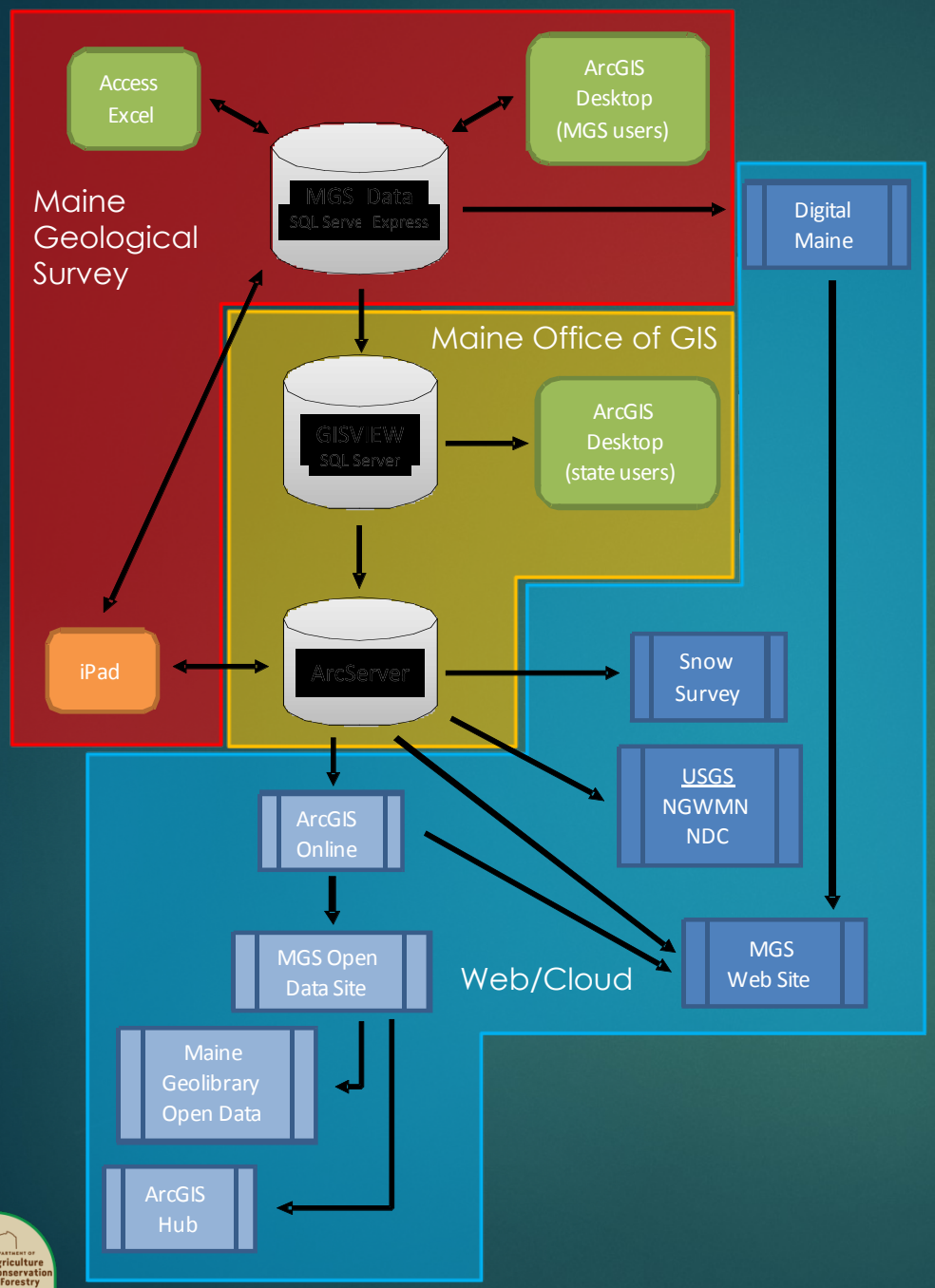
```
import sys, string, os, arcpy, datetime
arcpy.env.overwriteOutput = True  #or 1
arcpy.env.outputZFlag = "Disabled"
arcpy.env.outputMFlag = "Disabled"

quad = arcpy.GetParameterAsText(0)  #sys.argv[1]
scrfgdb = arcpy.env.scratchWorkspace + '/'

showPyMessage(" Selecting quadrangle")
arcpy.MakeFeatureLayer_management(r'Database Connections\MGS_Data.sde\MGS_Data.DBO.Index24','QuadPoly',"TILE_NAME ='" + quad + "'")

showPyMessage(" Clipping lakes and ponds")
arcpy.MakeFeatureLayer_management(r'\\w-a1ts-gisprd2\external\hydrography\nhd\NHD_H_Maine_GDB.gdb\Hydrography\NHDWaterbody','NHDWaterbody_Layer',"FType IN (390, 436,493)")
arcpy.Clip_analysis("NHDWaterbody_Layer","QuadPoly",scrfgdb + "quad_nhdwaterbody","#")

showPyMessage(" Clipping ocean and rivers")
arcpy.MakeFeatureLayer_management(r'\\w-a1ts-gisprd2\external\hydrography\nhd\NHD_H_Maine_GDB.gdb\Hydrography\NHDArea','NHDArea_Layer',"FType IN (445, 460)")
arcpy.Clip_analysis("NHDArea_Layer","QuadPoly",scrfgdb + "quad_nhdarea","#")

showPyMessage(" Union waters")
arcpy.Union_analysis(scrfgdb + "quad_nhdarea #;" + scrfgdb + "quad_nhdwaterbody #",scrfgdb + "quad_water","ALL","#","GAPS")

showPyMessage(" Dissolving polygons")
arcpy.Dissolve_management(scrfgdb + "quad_water",scrfgdb + "quad_water_dissolve","#","#","MULTI_PART","DISSOLVE_LINES")

showPyMessage(" Loading units")
arcpy.AddField_management(scrfgdb + "quad_water_dissolve",'QUADNAME','TEXT','#','#','50','#','NULLABLE','NON_REQUIRED','#')
arcpy.AddField_management(scrfgdb + "quad_water_dissolve",'DRAW','TEXT','#','#','3','#','NULLABLE','NON_REQUIRED','#')
arcpy.AddField_management(scrfgdb + "quad_water_dissolve",'PUBLISH_DATA','TEXT','#','#','3','#','NULLABLE','NON_REQUIRED','#')
arcpy.AddField_management(scrfgdb + "quad_water_dissolve",'UNIT','TEXT','#','#','10','#','NULLABLE','NON_REQUIRED','#')
with arcpy.da.UpdateCursor(scrfgdb + "quad_water_dissolve",('QUADNAME','DRAW','PUBLISH_DATA','UNIT')) as ucursor:
    for urow in ucursor:
        urow[0] = quad
        urow[1] = 'Yes'
        urow[2] = 'No'
        urow[3] = 'wa'
        ucursor.updateRow(urow)
del ucursor
fctarget = r'Database Connections\MGS_Data.sde\MGS_Data.DBO.Surficial_Geology_Units'
arcpy.Append_management(scrfgdb + "quad_water_dissolve",fctarget,"NO_TEST","#")

showPyMessage(" Deleting temporary layers")
arcpy.Delete_management(scrfgdb + "quad_nhdwaterbody","FeatureClass")
arcpy.Delete_management(scrfgdb + "quad_nhdarea","FeatureClass")
arcpy.Delete_management(scrfgdb + "quad_water","FeatureClass")
arcpy.Delete_management(scrfgdb + "quad_water_dissolve","FeatureClass")

arcpy.RefreshActiveView()
```



```
ALTER PROCEDURE [dbo].[uspSurficial_AddWaterUnits](@Quad nvarchar(50)) AS
BEGIN
INSERT INTO Surficial_Geology_Units_evw (QUADNAME,DRAW,PUBLISH_DATA,UNIT,created_user,created_date,SHAPE)
SELECT @Quad AS QUADNAME
    ,'Yes' AS DRAW
    ,'No' AS PUBLISH_DATA
    ,'wa' AS UNIT
    ,UPPER(REPLACE(SUSER_NAME(),'SOM\',''')), GETDATE()
    ,tblUnion.Shape
FROM (
    SELECT GEOMETRY::UnionAggregate(tblWater.SHAPE) AS Shape
    FROM (
        SELECT q.TILE_NAME, w.GNIS_Name, q.shape.STIntersection(w.shape) AS SHAPE
            FROM Index24_evw AS q
                JOIN MGS_Base_Data.dbo.NHDWATERBODY AS w ON q.shape.STIntersects(w.shape) = 1
            WHERE q.TILE_NAME = @Quad
        UNION ALL
        SELECT q.TILE_NAME, w.GNIS_Name, q.shape.STIntersection(w.shape) AS SHAPE
            FROM Index24_evw AS q
                JOIN MGS_Base_Data.dbo.NHDAREA AS w ON q.shape.STIntersects(w.shape) = 1
            WHERE q.TILE_NAME = @Quad
        ) AS tblWater
    ) AS tblUnion
END;
GO
```

- Extremely fast
- Doesn't require ArcGIS or Python

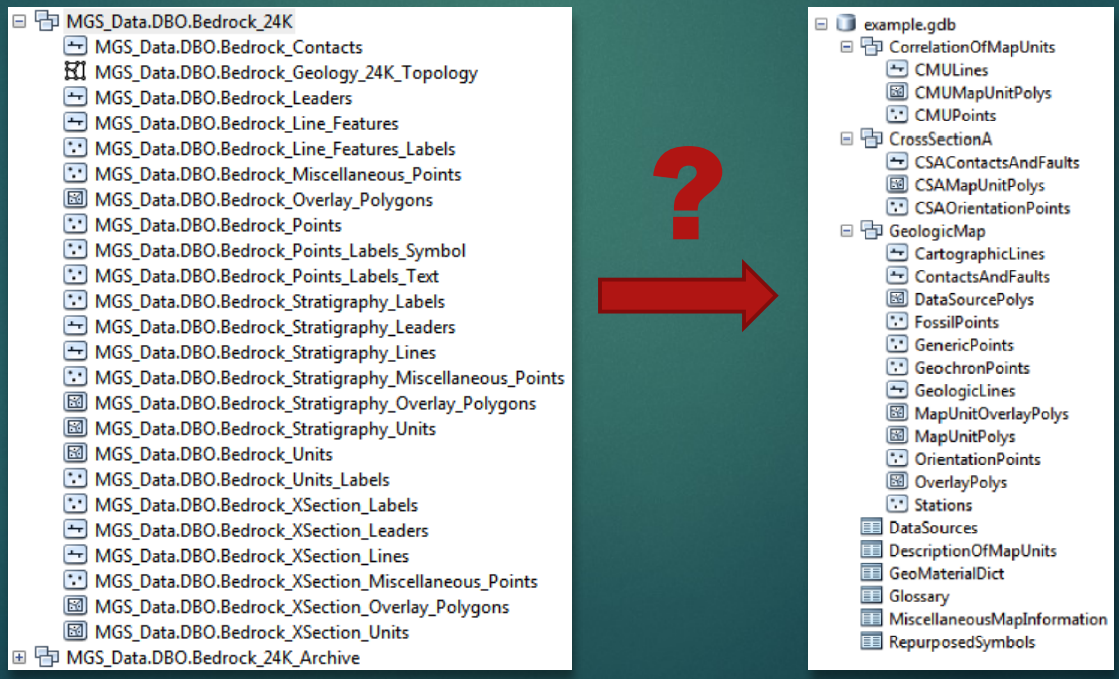
Data Sharing



- Processing data for delivery to other users and systems is extremely easy, fast and can be real-time using flags in the dataset
- ArcServer allows viewing data on any device
- Taking data to the field and editing with mobile devices is seamless, real-time and available connected or disconnected

MGS GeMS Evaluation

- MGS has a tightly integrated system that handles all data management and mapping aspects of the survey which makes moving to a new mapping system difficult and costly
- MGS will not adopt the GeMS single quadrangle mapping tools
- MGS is approaching GeMS as a standardized schema for data transfer and publishing



MGS GeMS Evaluation

Advantages of GeMS to MGS:

- More complete feature-level confidence and source metadata
- Automation of Description of Map Units – paragraph styles
- Glossary
- GeoLex integration
- Opportunity to review and upgrade database design
  - SYMBOLOGY vs Type, Value, Label
  - Capturing Map Text
- Paradigm shift that all objects on/in geologic maps are data

MGS GeMS Evaluation

Disadvantages of GeMS for MGS:

- More metadata entry
- Fine grained nature of source control
- GeoMaterial entry
- Picture and diagram management and storage
- Correlating the upkeep of Python code base with Esri versions
- No annotation or controlled labeling
- Multiple versions of same quadrangle map
- Time and cost to adopt

MGS GeMS Evaluation

Gap Analysis:

Compare MGS schema to GeMS to identify modifications needed to comply with GeMS

Maine Geological Survey - GeMS Migration Plan						
GeMS		MGS Bedrock				
Table/Feature Class	Field	Table/Feature Class	Field	Ex	Upgrade Notes	GeMS View Notes
DataSources	Source*	tbl_Bedrock_Source	Data_Source & Data_Method	Y		concatenate fields
DataSources	Notes	tbl_Bedrock_Source	MGS_Comment	Y		
DataSources	URL	tbl_Bedrock_Source	PublicationID	N	Foreign key to tbl_Publications for linking related publication.	get URL from tbl_Publications.Digital_Location
DataSources	DataSource_ID*	tbl_Bedrock_Source	SourceID	Y		GeMS view will concatenate "DAS" & SourceID

Maine Geological Survey - GeMS Migration P						
GeMS		MGS Surficial				
Table/Feature Class	Field	Table/Feature Class	Field	Ex	Upgrade Notes	GeMS View Notes
DataSources	Source*	tbl_Surficial_Source	Data_Source & Data_Method	N		concatenate fields
DataSources	Notes	tbl_Surficial_Source	MGS_Comment	N		
DataSources	URL	tbl_Surficial_Source	PublicationID	N	Foreign key to tbl_Publications for linking related publication.	get URL from tbl_Publications.Digital_Location
DataSources	DataSource_ID*	tbl_Surficial_Source	SourceID	N		GeMS view will concatenate "DAS" & SourceID

MGS GeMS Evaluation

Gap Analysis:

Maine Geological Survey - GeMS Migration Plan

GeMS		MGS Bedrock				
Table/Feature Class	Field	Table/Feature Class	Field	Ex	Upgrade Notes	GeMS View Notes
MapUnitPolys	MapUnit*	Bedrock_Units	UNIT	Y	don't know how to not include special characters	
MapUnitPolys	IdentityConfidence*	Bedrock_Units	IdentityConfidence	N	use GeMS ExIDConfidenceValues domain	
MapUnitPolys	Label	Bedrock_Units_Labels	TEXTSTRING	Y		Concatenate '?' to Bedrock_Units.UNIT if IdentityConfidence is 'questionable' otherwise use Bedrock_Units.UNIT.
MapUnitPolys	Symbol	Bedrock_Units	SYMBOLOGY	Y		
MapUnitPolys	DataSourceID*	Bedrock_Units	SourceID	N	Foreign key to tbl_Bedrock_Source for linking related source. Sometimes entered in *.SOURCE as alphanumeric.	
MapUnitPolys	Notes	Bedrock_Units	COMMENTS	Y		
MapUnitPolys	MapUnitsPolys_ID*	Bedrock_Units	COMPID	Y		concatenate "MUP" and COMPID

Maine Geological Survey - GeMS Migration P

GeMS		MGS Surficial				
Table/Feature Class	Field	Table/Feature Class	Field	Ex	Upgrade Notes	GeMS View Notes
MapUnitPolys	MapUnit*	Surficial_Geology_Units	UNIT	Y		
MapUnitPolys	IdentityConfidence*	Surficial_Geology_Units	IdentityConfidence	N	use GeMS ExIDConfidenceValues domain	
MapUnitPolys	Label	Surficial_Geology_Units_Labels	TEXTSTRING	Y		concatenate '?' to Surficial_Geology_Units.UNIT if IdentityConfidence is 'questionable' otherwise use Surficial_Geology_Units.UNIT
MapUnitPolys	Symbol	Surficial_Geology_Units	SYMBOLOGY	Y	may want to migrate away from using UNIT in style file and use 'color-###' like bedrock	
MapUnitPolys	DataSourceID*	Surficial_Geology_Units	SourceID	N	Foreign key to tbl_Surficial_Source for linking related source	
MapUnitPolys	Notes	Surficial_Geology_Units	COMMENTS	Y		
MapUnitPolys	MapUnitsPolys_ID*	Surficial_Geology_Units	COMPID	Y	concatenate "MUP" and COMPID	

MGS GeMS Evaluation

Gap Analysis:

Maine Geological Survey - GeMS Migration Plan

GeMS		MGS Bedrock				
Table/Feature Class	Field	Table/Feature Class	Field	Ex	Upgrade Notes	GeMS View Notes
ContactsAndFaults	Type*	Bedrock_Contacts Bedrock_Line_Features	SYMBOLOGY	Y	Consider moving all tbl_Bedrock_Contacts data and tbl_Bedrock_Line_Features data where SYMBOLOGY='%Fault%' to new feature class ContactsAndFaults	pull data from both feature classes
ContactsAndFaults	IsConcealed*	Bedrock_Contacts Bedrock_Line_Features	DRAW	Y		
ContactsAndFaults	LocationConfidenceMeters*	Bedrock_Contacts Bedrock_Line_Features	LocationConfidenceMeters	N		
ContactsAndFaults	ExistenceConfidence*	Bedrock_Contacts Bedrock_Line_Features	ExistenceConfidence	N		
ContactsAndFaults	IdentityConfidence*	Bedrock_Contacts Bedrock_Line_Features	IdentityConfidence	N	use GeMS ExIDConfidenceValues domain	
ContactsAndFaults	Label	Bedrock_Line_Features	TEXTSTRING	Y		
ContactsAndFaults	Symbol	Bedrock_Contacts Bedrock_Line_Features	SYMBOLOGY	Y		
ContactsAndFaults	DataSourceID*	Bedrock_Contacts Bedrock_Line_Features	SourceID	N	Foreign key to tbl_Bedrock_Source for linking related source. Sometimes entered in *.SOURCE as alphanumeric.	
ContactsAndFaults	Notes	Bedrock_Contacts Bedrock_Line_Features	COMMENTS	Y		
ContactsAndFaults	ContactsAndFaults_ID*	Bedrock_Contacts Bedrock_Line_Features	COMPID	Y		concatenate "CAF" and COMPID

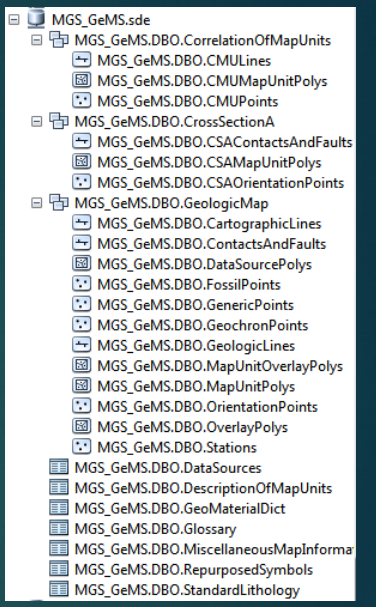
Maine Geological Survey - GeMS Migration P

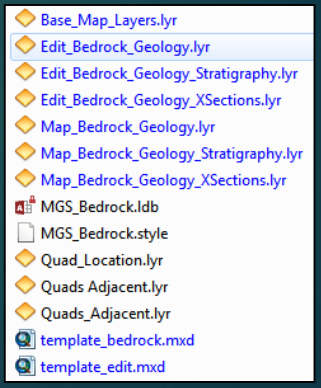
GeMS		MGS Surficial				
Table/Feature Class	Field	Table/Feature Class	Field	Ex	Upgrade Notes	GeMS View Notes
ContactsAndFaults	Type*	Surficial_Geology_Contacts	SYMBOLOGY	Y		
ContactsAndFaults	IsConcealed*	Surficial_Geology_Contacts	DRAW	Y		
ContactsAndFaults	LocationConfidenceMeters*	Surficial_Geology_Contacts	LocationConfidenceMeters	N		
ContactsAndFaults	ExistenceConfidence*	Surficial_Geology_Contacts	ExistenceConfidence	N		
ContactsAndFaults	IdentityConfidence*	Surficial_Geology_Contacts	IdentityConfidence	N	use GeMS ExIDConfidenceValues domain	
ContactsAndFaults	Label				not needed	
ContactsAndFaults	Symbol	Surficial_Geology_Contacts	SYMBOLOGY	Y		
ContactsAndFaults	DataSourceID*	Surficial_Geology_Contacts	SourceID	N	Foreign key to tbl_Surficial_Source for linking related source. Sometimes entered in *.SOURCE as alphanumeric.	
ContactsAndFaults	Notes	Surficial_Geology_Contacts	COMMENTS	Y		
ContactsAndFaults	ContactsAndFaults_ID*	Surficial_Geology_Contacts	COMPID	Y		concatenate "CAF" and COMPID

MGS GeMS Evaluation

Proposed Work Plan:

- ✔ Create new GeMS database on MGS SQL Server
- Update MGS_Data schema with missing components identified in Gap Analysis
- MGS to FGDC Symbology crosswalk
- Update MGS map (.mxd) templates and layer files with new GeMS fields and domains
- Update MS Access forms with new GeMS fields
- Develop views and stored procedure to 'publish' a quadrangle from MGS_Data to MGS_GeMS
- Evaluate which GeMS Python tools are necessary and what tool logic can be moved into MGS_Data





MGS GeMS Evaluation

Before Proceeding with Work Plan:

- ✔ Further learning about GeMS – DMT 2018
- Assess costs to MGS to implement GeMS
  - Already spent the equivalent of 22% of normal 'other positions' StateMap grant state match amount on doing Gap Analysis
  - Explore funding options
- Assess and quantify benefits to MGS
- Evaluate costs and risks of waiting until GeMS is required
- Stay connected to the discussion of how "GeMS compliance" is defined

Summary

- Huge benefits of a tightly integrated, statewide, multi-map geodatabase
- A small(ish) state survey can build a multi-map database in an affordable IT architecture
- MGS is keeping an open mind about GeMS
- There are real benefits of portions of the GeMS schema to MGS
- Trying to manage costs and limit any negative impacts of GeMS implementation

- Biggest hurdle to adoption has been overcome – the acronym!

Thanks!