

Utah UIC Geospatial Integration EIEN Project

ESRI UC, June 2007

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Utah Automated Geographic Reference Center





Utah Automated Geographic Reference Center (AGRC)

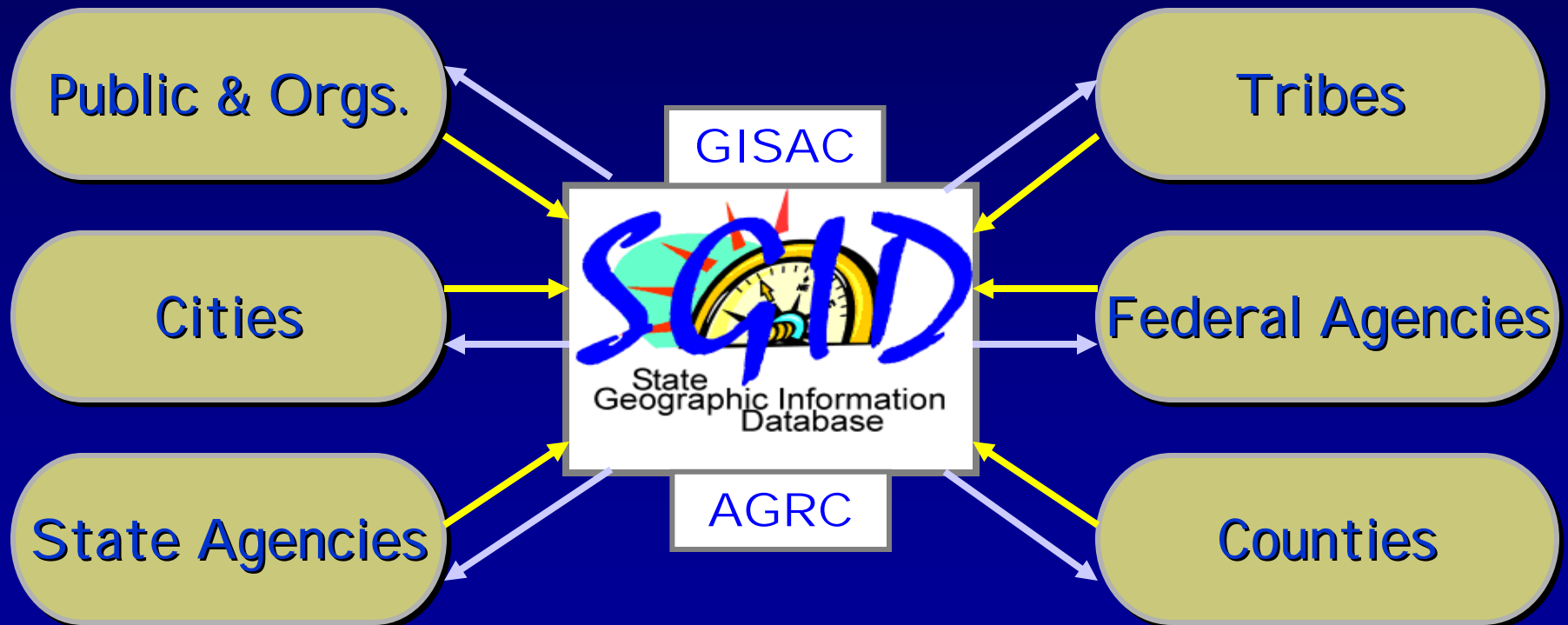
- **AGRC Responsibilities**
 - Facilitate effective GIS-related efforts in Utah
 - Provide stewardship, maintenance, and access for Utah's State Geographic Information Database (SGID)
 - Where ever possible, encourage enterprise GIS solutions
- **AGRC Services**
 - GIS database development
 - GIS applications
 - Spatial Analysis
 - Coordination
 - Training
 - State Geographic Information Database (SGID)



DATA SHARING: Utah's SGID

State Geographic Information Database

A foundation exists for a statewide approach to develop, maintain, and share geographic data





GIS data categories within Utah's State Geographic Information System (SGID)

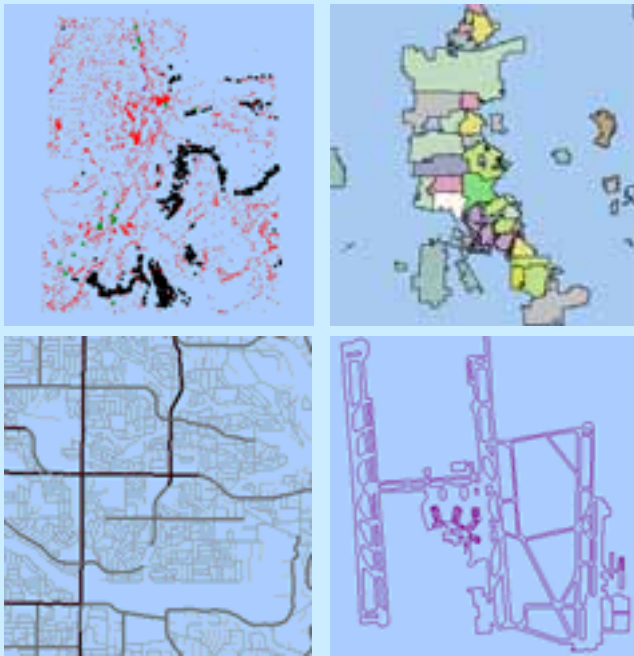
- Aerial Photography
- Climate Data
- Cultural / Historical
- Demographic
- Elevation Contours and Terrain Models
- Environmental / Ecology
- Geology / Soils
- Land Ownership/Use
- Cities & Service Districts
- Place Names
- Political Boundaries
- Satellite Imagery
- Surveyor Reference
- Scanned Maps
- Transportation
- Utilities
- Vegetation
- Water Bodies, Courses, Springs
- Wilderness Areas & Proposals



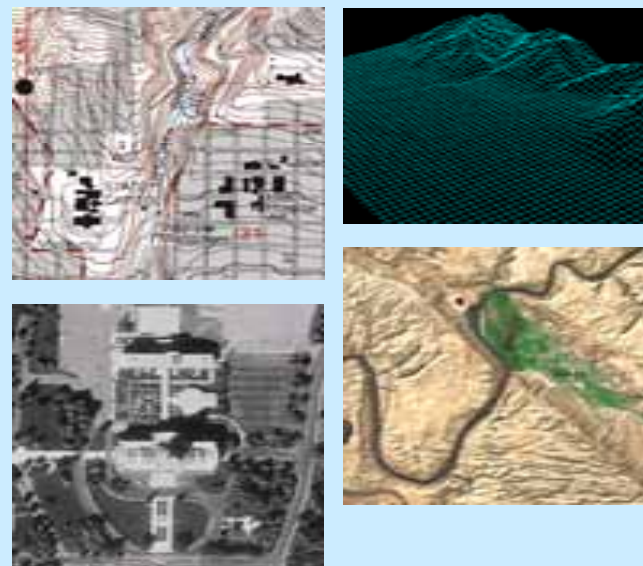
Utah's SGID ArcSDE Data Server

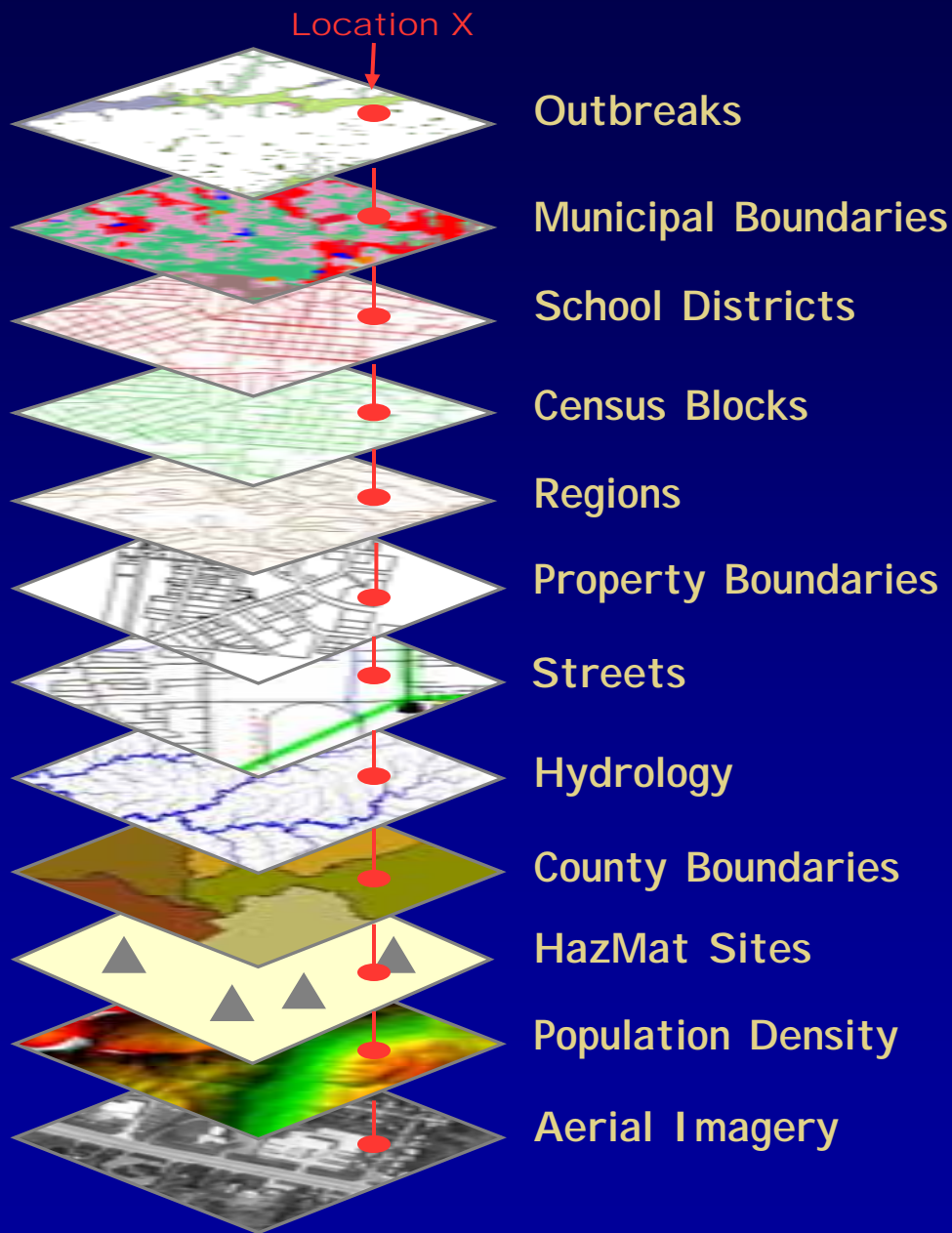
- **Central GIS Repository** (200+ layers)
- **MS SQL Data Server** (remote connections)
- **Remote, Multi-user Editing**

Vector Data



Raster Data





GIS Facilitates Data Integration

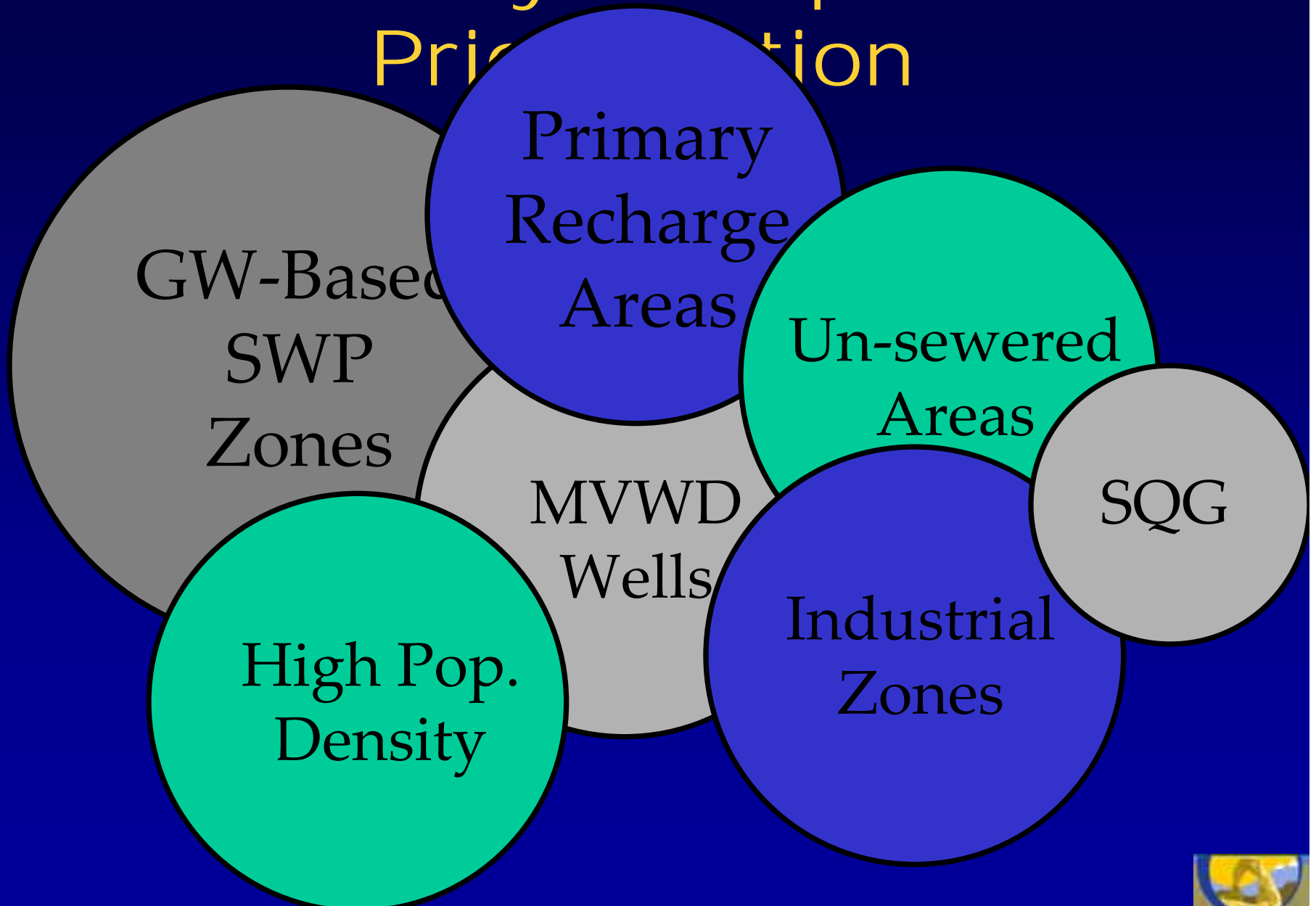
Location can be used as the central organizing and integrating principle for data in multiple databases

Most government data is 'geo-spatial'. It relates directly to features that have a location, or, to individuals / entities that have an address location.

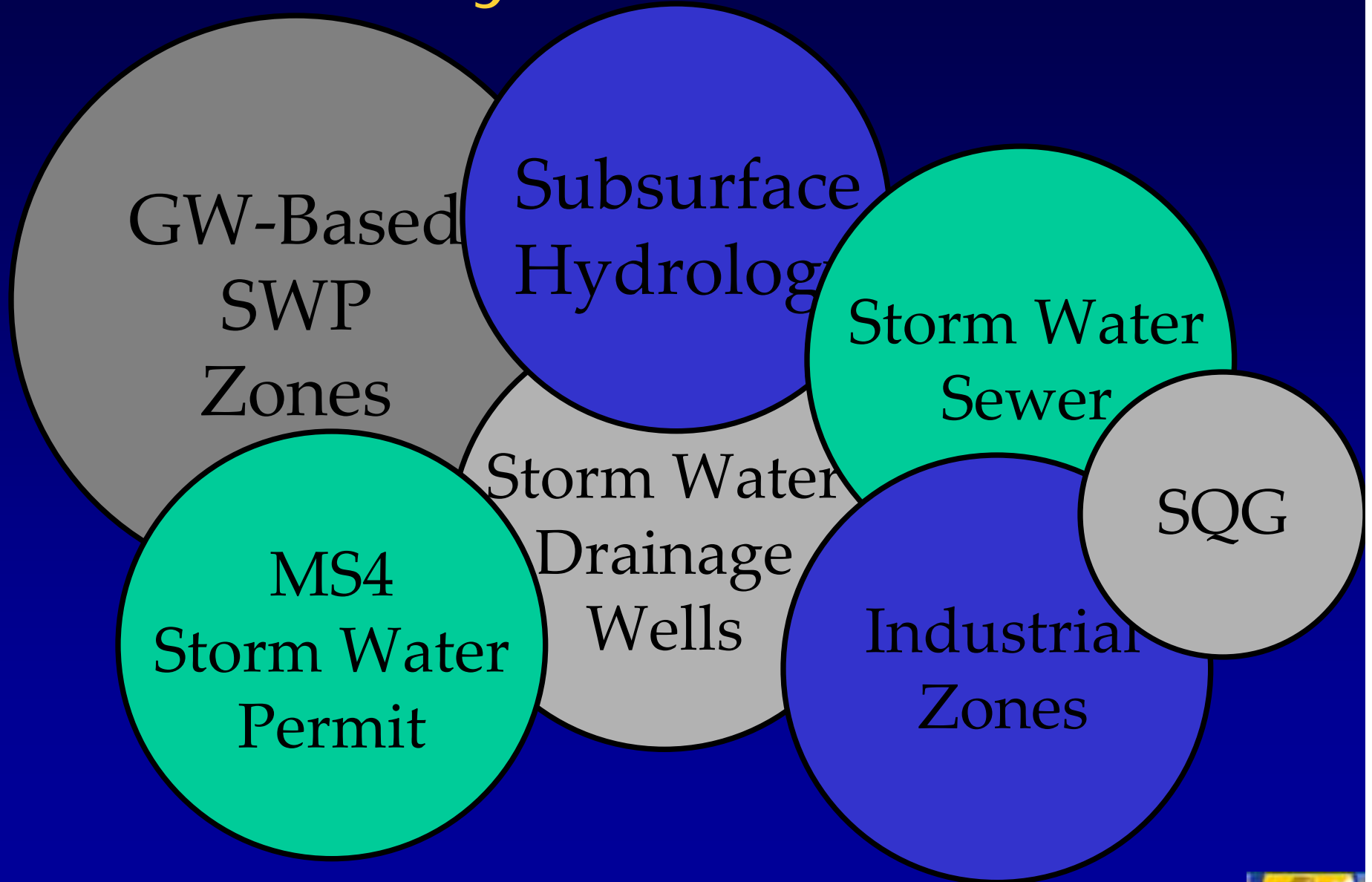
Location is the GCF!



Inventory & Inspection Prioritization



Policy Prioritization



Utah UIC Geospatial Integration EIEN Project

- EPA EIEN Funded (Fall 2005-2007)
- Partnership
 - AGRC
 - Utah DEQ, UIC Program (Candace Cady)
- Goals:
 - Data Sharing via EIEN
 - Data Integration thru GIS
 - Local Data Sharing via Utah's SGID
 - Paperless Utah UIC office



AGRC/UIC 2005 EIEN Grant Proposal

- Objectives
 - Design, implement, & populate new Utah UIC geodatabase
 - Integration of UIC-related GIS features into SGID geodatabase
 - UIC Mobile GIS Workstation
 - Connect UIC Geodatabase to Utah DEQ's EIEN Node
 - UIC Web-Based Applications
 - UIC Automated Report Generation
 - Documentation, Reporting

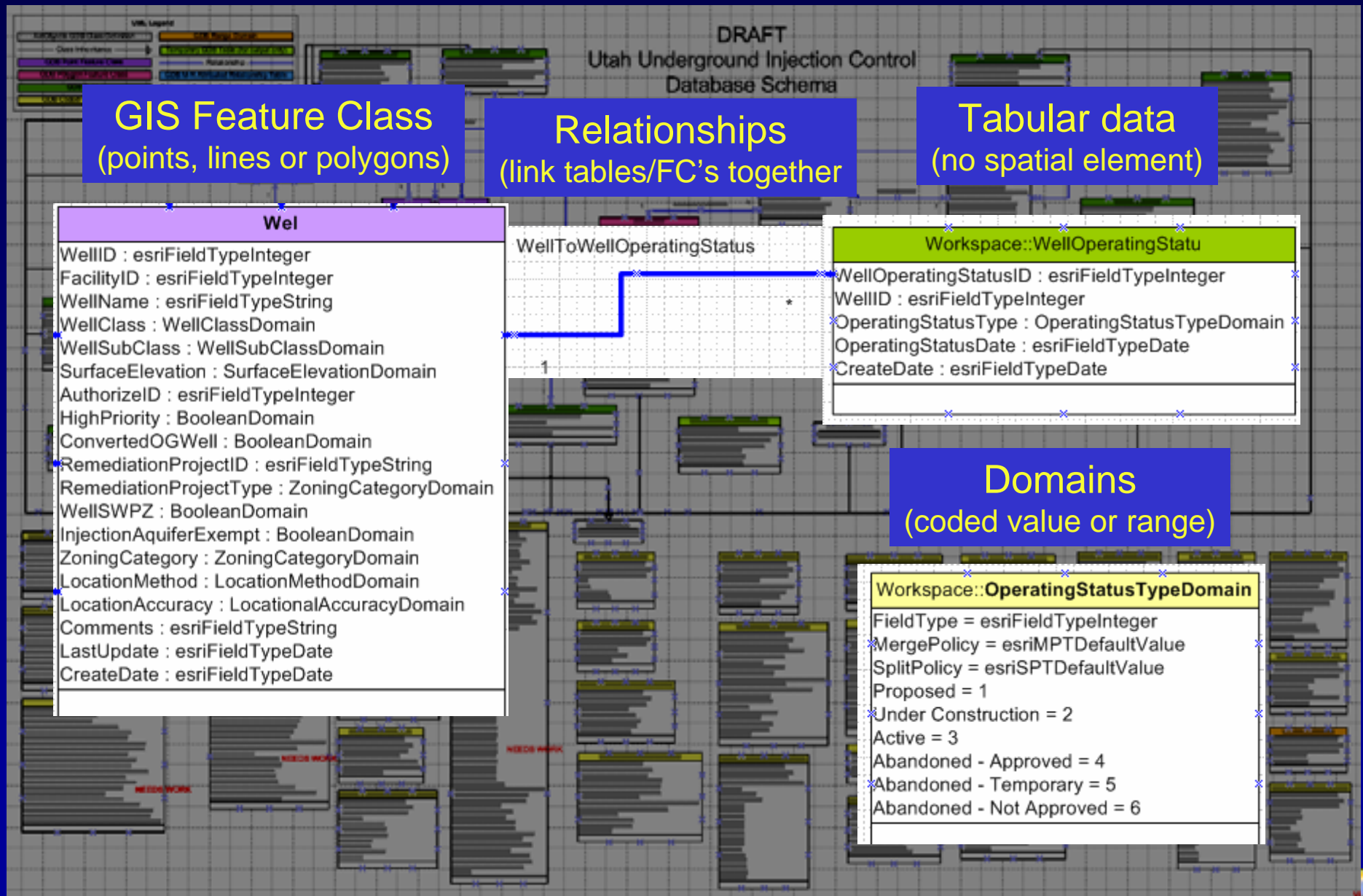


Design, Implement, & Populate UIC Geodatabase

- Needs Analysis & Design
 - Existing requirements, reporting, standards, data
 - Upcoming needs: ICIS requirements
- Build on:
 - National UIC Database standards (class I)
 - Region 10 UIC Access DB (class 5)
 - Utah GW/UIC legacy Sybase data
 - Emphasis on Prioritization & Preventative Elements
- Physical Implementation
 - Represent UIC Data elements as GIS features
 - ArcSDE Enterprise Geodatabase (SQL/SDE server)
 - UML, CASE tools (Visio → GDB)



Utah UIC Geodatabase Model



Utah UIC Geodatabase Model

DRAFT
Utah Underground Injection Control
Database Schema

The image displays three windows from the ArcGIS software interface:

- Schema Wizard (Left):** A dialog box for selecting the UIC file. It includes a logo for 'Case XML or Repository GeoDB Schema', a 'Select the UIC file...' section, and options for where the model is stored: 'Model stored in UIC file' (checked) and 'Model stored in Repository database'. A 'Database Path or Connection String' field contains 'C:\proj\Bentley\UIC\ugdb_m_08.sde'.
- Schema Wizard (Middle):** A dialog box for selecting feature datasets to create. It shows a tree view under 'Workspace' with 'UIC_Program' selected. Underneath, several feature classes are listed, including 'Facility', 'AreaOfReview', 'FacilityTunnel', 'AreaOfReviewTunnel', 'VerticalWellEvent', 'SHAElement', 'AlternateDeposit', 'WellOperation', 'WasteClass', 'Authorize', 'Correction', 'AuthorizeAction', 'ConstructionElement', 'Contact', 'NET', 'EnforcementAction', 'WellOperatingStatus', 'Violation', 'Inspection', and 'FacilityPrecedence'.
- Well Properties (Feature class):** A properties dialog box for a feature class. The 'General' tab is active, showing a list of fields on the left and their properties on the right. The 'Type' is set to 'Long Integer'. The 'Domain and Default value' section shows a domain of 'ZoningCategoryDom'.

Red text 'NEEDS WORK' is visible on the background grid in several locations.

Utah UIC Geodatabase Model

Geodatabase Classes

- UIC_GeoDatabase.mdb
 - UIC_Program
 - AreaOfReview
 - AreaOfReviewToWell
 - Facility
 - FacilityToWell
 - Well
 - AlternateDisposal
 - AquiferRemediation
 - Authorize
 - AuthorizeAction
 - AuthorizeToAreaOfReview
 - AuthorizeToAuthorizeAction
 - AuthorizeToWell
 - BMPElement
 - ConstructionElement
 - Contact
 - Correction
 - EnforcementAction
 - FacilityToAlternateDisposal
 - FacilityToAuthorize
 - FacilityToContact
 - FacilityToInspection
 - Inspection
 - InspectionToCorrection
 - MIT
 - VerticalWellEvent
 - Violation
 - ViolationToEnforcementAction
 - WasteClassI
 - WellOperatingStatus
 - WellOperation
 - WellToAquiferRemediation
 - WellToBMPElement
 - WellToConstructionElement
 - WellToIntegrityTest
 - WellToProfileEvent
 - WellToViolation
 - WellToWasteClassI
 - WellToWellOperatingStatus
 - WellToWellOperation

Geodatabase Domains

DRAFT
Utah Underground Injection Control
Database Schema

Domain Name	Description
ContactTypeDomain	
CorrectiveActionDomain	
DeficiencyDomain	
EnforcementActionTypeDomain	
EventTypeDomain	
EventUnitsDomain	
FacilityTypeDomain	

Domain Properties

Field Type	Long Integer
Domain Type	Coded Values
Split policy	Default Value
Merge policy	Default Value

Coded Values:

Code	Description
2	Class I Geology - Confining Zone
3	Class I Geology - Confining Zone Lithology
4	Class I Geology - Injection Interval
5	Class I Geology - Unconsolidated URPDW Depth

OK Cancel Apply

Utah UIC Geodatabase: ArcMap Editing

Attributes

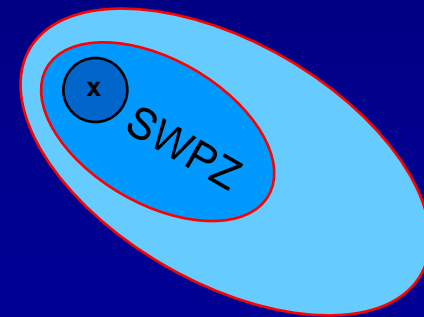
Property	Value
OBJECTID	18
GlobalID	{64F7E556-4BDA-4148-8558-9C939B76D29A}
Facility_FK	{CEA0ECDC-98A7-4DB5-A63A-9D1724D0A990}
Authorization_FK	{CE582706-C243-4C46-B1FF-21E56AD1B411}
WellID	UTU5759B76D29A
WellName	Injection Well No. 4
WellClass	Class V
WellSubClass	5 Aquifer Remediation
SurfaceElevation	4560
HighPriority	No
ConvertedOGWell	No
RemediationProj...	DERR-1200054-ELGG
RemediationProj...	LU5T
WellSWPZ	No
InjectionAquifer...	No
ZoningCategory	Commercial
LocationMethod	Interpolation - Other
LocationAccuracy	1:24000
LegacyDB	No
Comments	<Null>
CreatedOn	2/7/2007 1:02:10 PM
ModifiedOn	2/7/2007 1:02:10 PM
EditedBy	Ccady

1 features

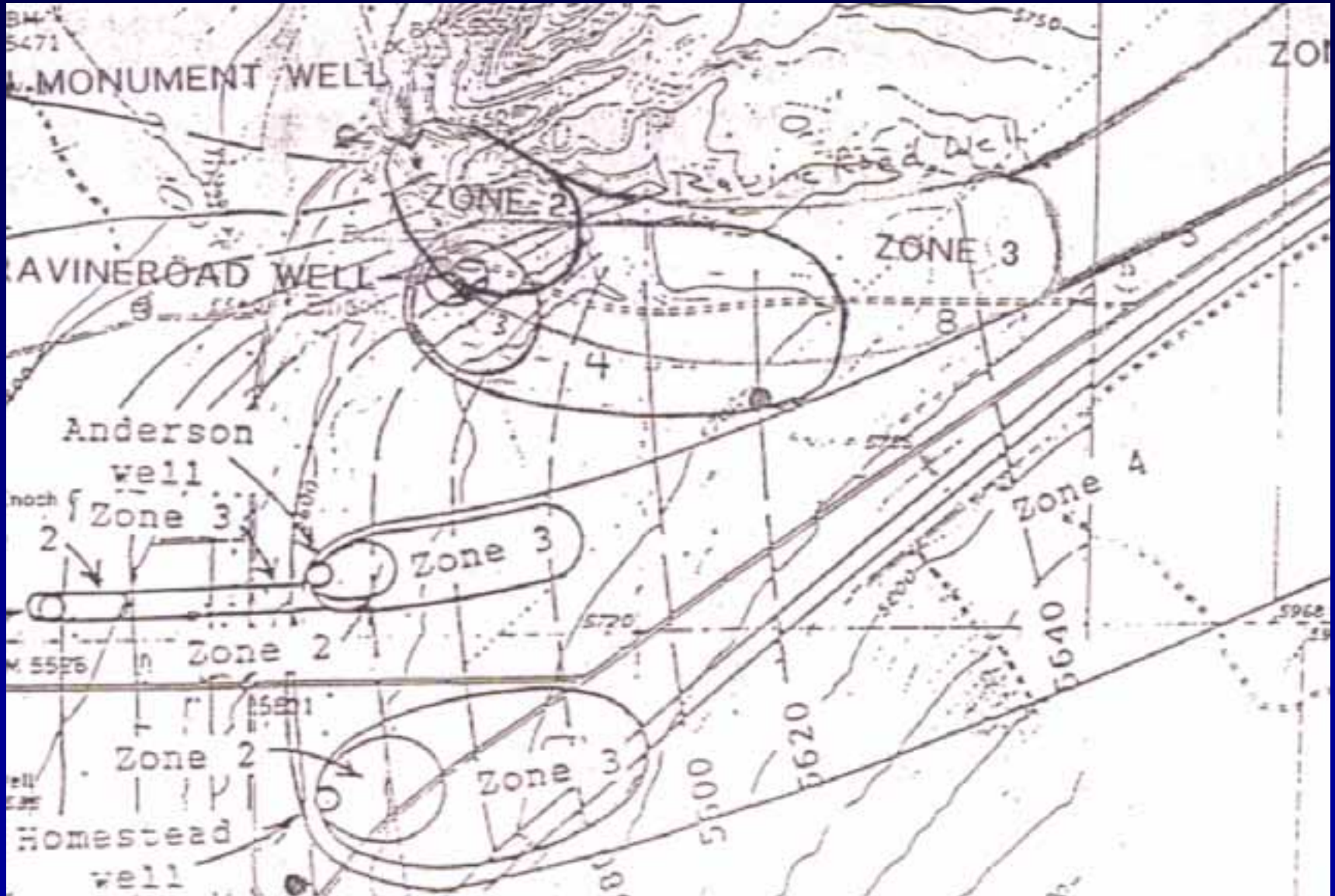


Integration of UIC-related data into geodatabase

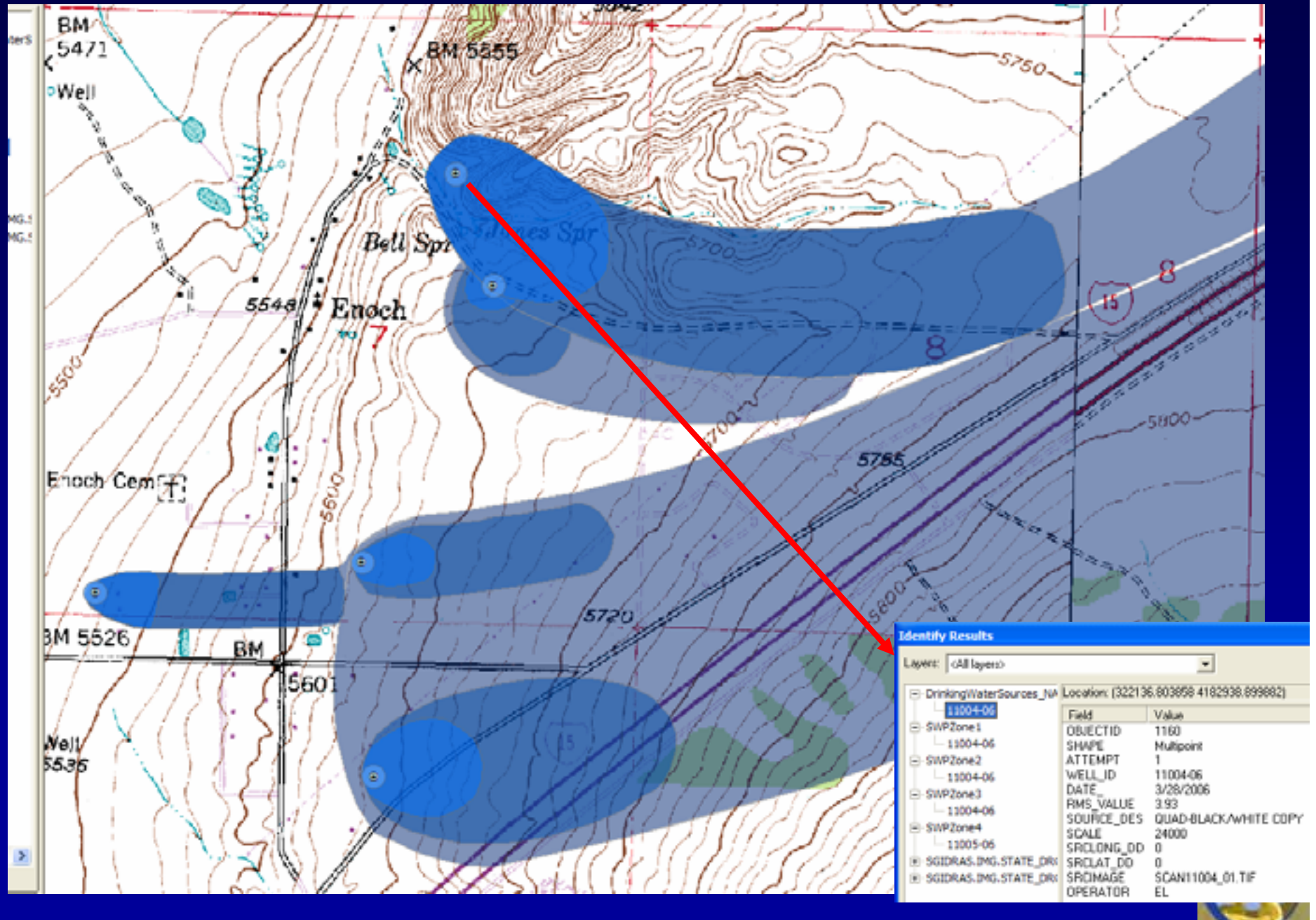
- Scheduled tasks to load, update into SGID &/or DEQ :
 - Drinking Water: SDWIS
 - ✓ – DSHW: LQG, SQG, Permitted Oil
 - ✓ – DERR: CERCLA, RCRA data
 - + – DNR: Water Rights
 - ✓ – OGM: Oil & Gas Wells
 - Water Quality: Storm Water, TMDL
 - ✓ – Framework GIS Layers: Imagery, Transportation, Cultural, Hydrography, Ownership, etc.
- Data Creation:
 - + – Complete SWP Zone GIS Dataset (estimated 2000)
- Integrated Analysis Possibilities...
 - UIC
 - Other DEQ & Related Agencies



Source Water Protection Zone DB



Source Water Protection Zone DB

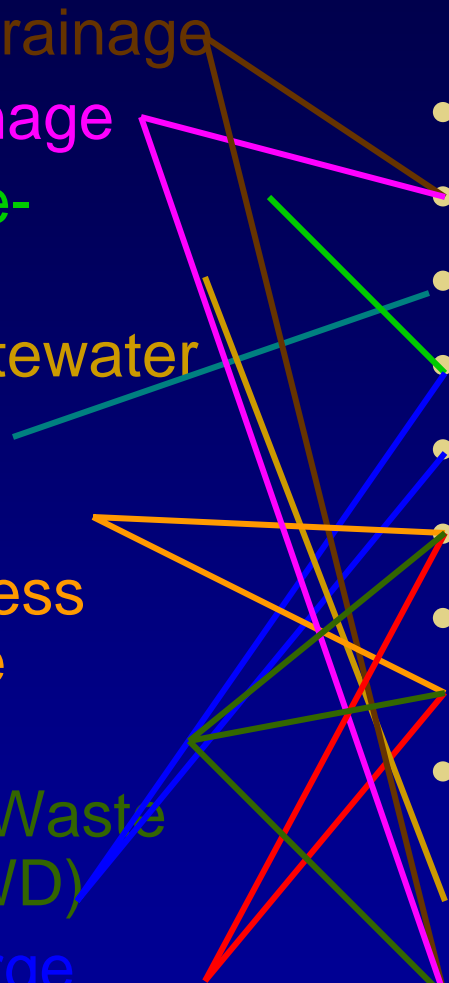


Class V Subclass

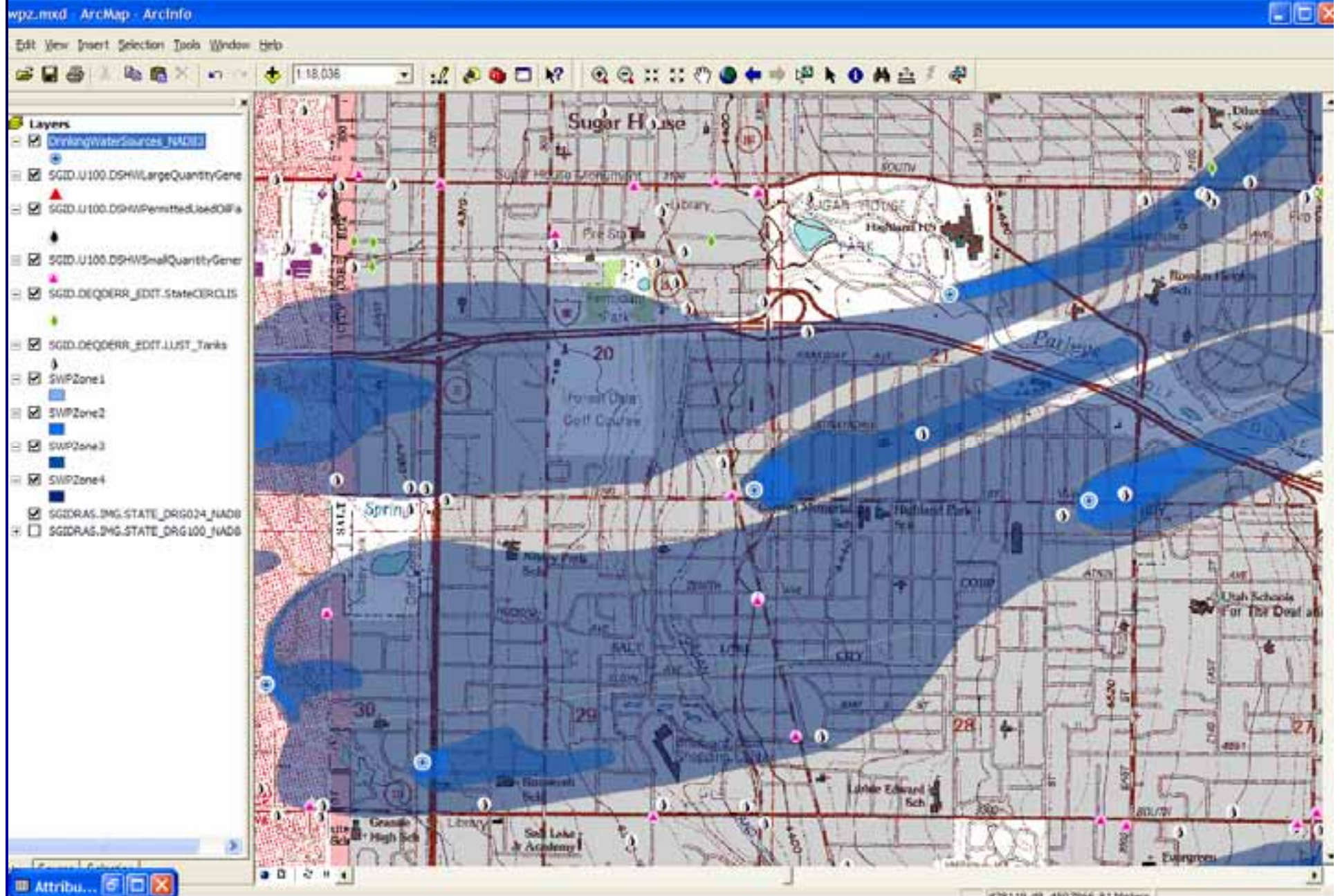
- Storm Water Drainage
- Industrial Drainage
- Geothermal Re-injection
- Domestic Wastewater Disposal
- Mining Backfill
- Industrial Process Water & Waste Disposal
- Motor Vehicle Waste Disposal (MVWD)
- Aquifer Recharge
- Aquifer Remediation-related
-

Agency or Program

- UIC Program (ALL)
- SWP Program (ALL)
- UPDES Storm Water
- Abandoned Mines
- Div Water Rights
- Div Drinking Water
- Div Solid & Hazardous Waste
- Div Environmental Response & Remediation
- Local Health Dept
- Local Planning & Zoning
-

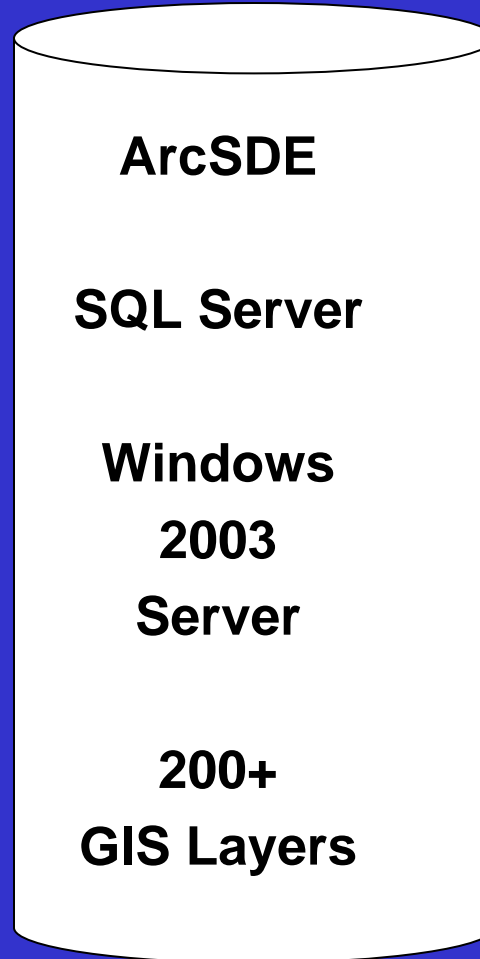


UIC Related Data Integration Results

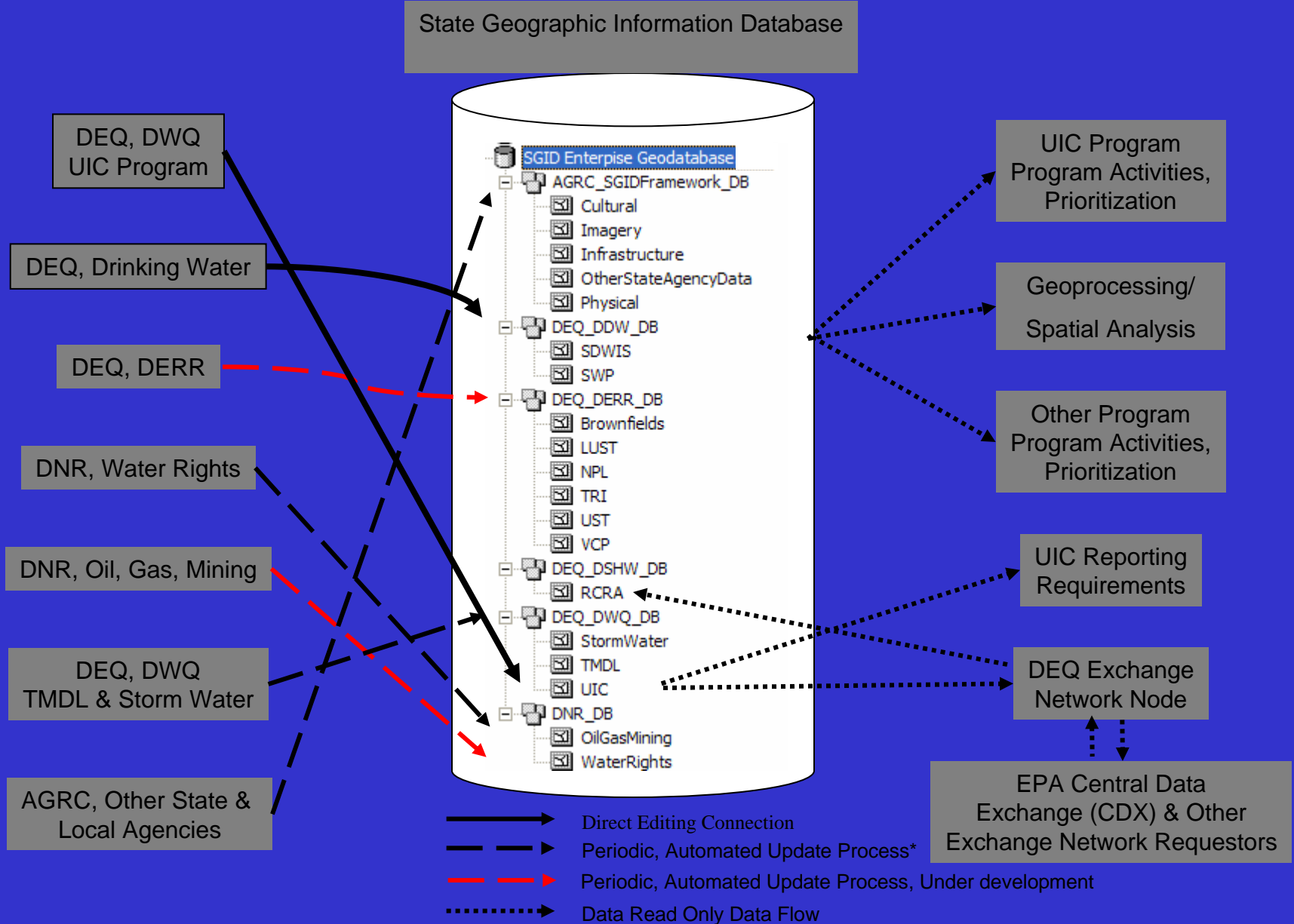


Enterprise Data Integration – Underground Injection Wells

State Geographic Information Database



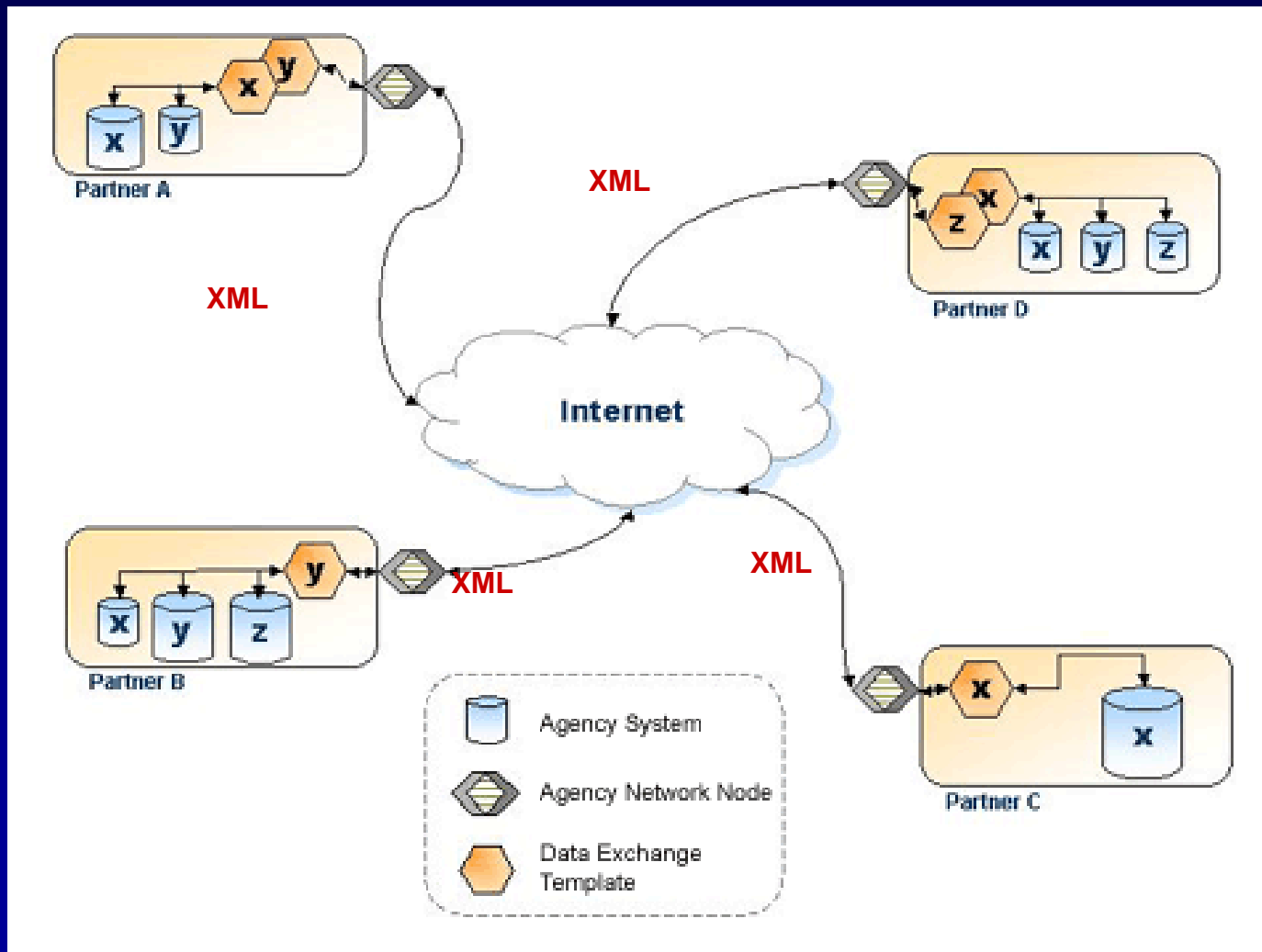
Enterprise Data Integration – Underground Injection Wells



* To be performed via DEQ node when available



National Environmental Information Exchange Network (EIEN)



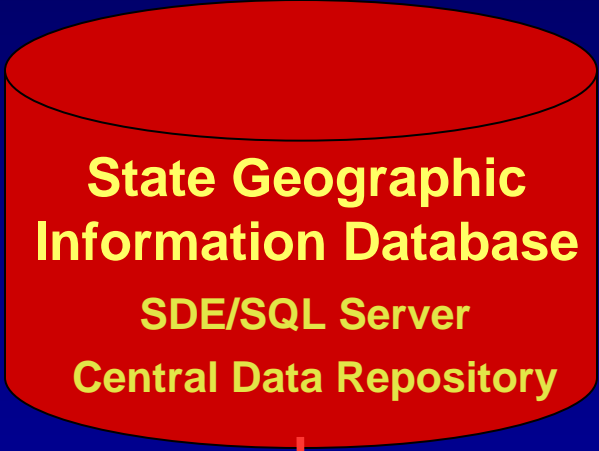
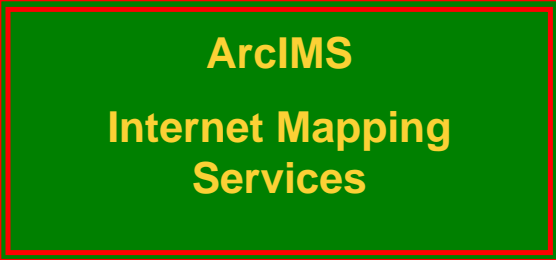
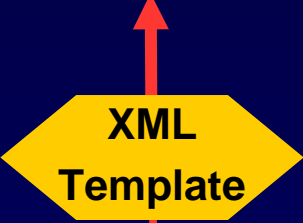
EIEN

- Data Sharing
- Standards-Based
- XML Structure
- Secure Network
- Data Integration
- Integrated Analysis
- Flexible



EIEN PARTNERS

Data Share
Connections
to Utah's SGID



Custom Applications

- UIC Web Applications
 - Browser based query, display, and editing of geographic features and attributes, ArcGIS Server
 - ArcGIS Server website for UIC Operator data submission
 - Draw facility polygon, draw well points, enter attributes,
 - Submit edits to database replica,
 - QA/QC then synch acceptable entries to master
 - Returning users can employ previous entries as defaults
- Automated UIC Reports/Documents Generation
 - ArcGIS → MS Word and MS Excel



UIC EIEN Project Timeline

	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8
UIC DB Design	■							
UIC Data Migration	■							
Related Data Load/Auto Update		■	■	■				
UIC Mobile GIS Workstation						■		
Connect GIS Server to EIEN				■	■		■	■
UIC Web-based Applications						■	■	
UIC Automated Reporting								■
Grant Documentation, Reports								■

- UIC & UIC Related Data in centralized geospatial format
- UIC becomes paperless, mobile office
- UIC data connected to EIEN for data sharing, reporting
- Geospatial DB – EIEN Node connection proof of concept



Questions, Comments?

