Geospatial Data Solutions:
Site and Corridor Siting Projects

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Agenda

- GIS-based Corridor Routing
  - Definition
  - Major Components
  - Uses and Functionality
- Geospatial Data Sources
- Data Accuracy / Applicability
  - Accuracy / Date
  - Projection / Datums
- Benefits of the GIS-based Process
  - Quantitative and Defendable
  - Customizable
  - Reproducible
  - Additional Use

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Definition

- Based on a well documented and defined process that is outlined in a Siting Plan.
- A systematic, quantitative approach to identifying macro and alternate corridors and alternate and preferred routes.
- Uses ArcGIS software to integrate geospatial datasets.
- Provides the basis for development of the required alternatives reporting.

Example Work Process Flow for Pipeline Route Selection

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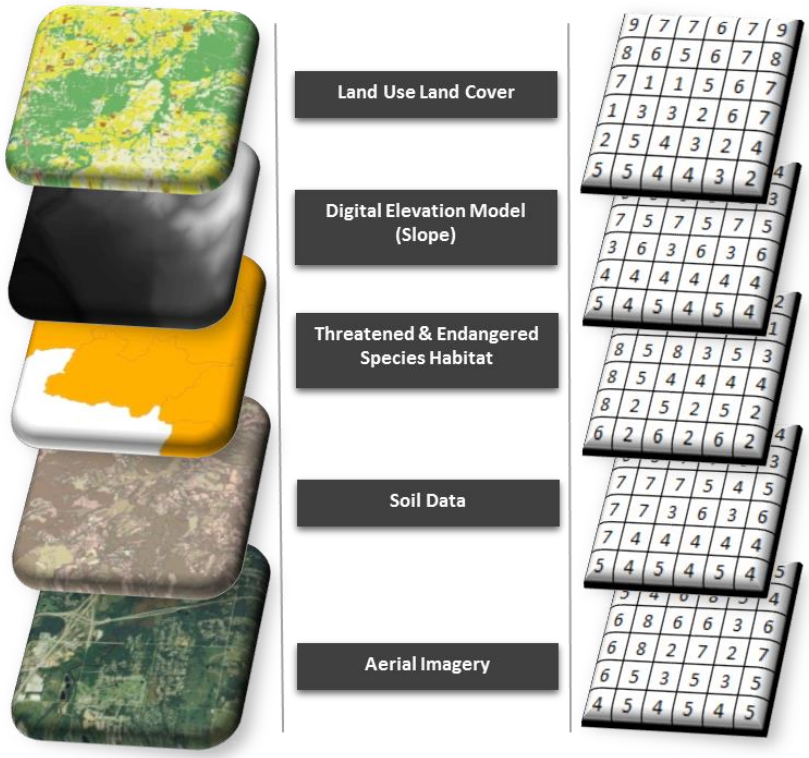
Major Components: Siting Plan

- A plan is produced by the Siting Team to logically identify and define items important to selecting a corridor.
- These items include:
  - Opportunities and Constraints
  - Geographic Features
  - Scoring Methodologies and Criteria Weights
  - Preferred Data Resolution / Raster Cell Size / ROW Width
  - Standardized Scenarios for Down Select Process

This plan is the procedure by which the GIS Model is developed.

Major Components: GIS Model



- Developed based on a standardized and well tested process.
- Routing scenarios are defined early in the process by the Siting Team.
- Criteria are based upon the State and Federal regulatory requirements and the business case needs.
- Geospatial data is converted into a raster format and classified based on the criteria scores and relative weights defined in the Siting Plan.
- Avoidance and exclusion areas are scored such that they are removed from consideration.

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Uses and Functionality

- Used to identify and optimize linear corridor routes.
  - Transmission
  - Pipelines
  - Fiber Optic
  - Access Roads
- Provides the alternatives analysis required for FERC Resource Report 10 and NEPA alternatives analysis.
- Solicits and incorporates information from all stakeholders.
- Produces a reproducible model that is defendable.
- It reduces project delays by providing best available knowledge.

National Geospatial Data Sources

- Aerial Imagery – USDA National Agriculture Imagery Program (NAIP)
- Elevation – USGS Digital Elevation Model (DEM)
- Economic - US Bureau of Economic Analysis (BEA)
- Emergency Services – US Fire Administration (USFA)
- Flood Plain Information - Federal Emergency Management Agency (FEMA)
- Land Use/Land Cover - Multi-Resolution Land Characteristics Consortium (MRLC)
- Population and Demographic - US Census Bureau, TIGER data
- School - National Center for Education Statistics (NCES)
- Soil – USDA Natural Resource Conservation Service (NRCS)
- Streams, Rivers and Waterbodies - USGS National Hydrography Dataset (NHD)
- Transportation Networks - US Department of Transportation (USDOT)
- Topographic Maps - USGS
- Wetlands – US Fish and Wildlife Service, National Wetlands Inventory (NWI)

Texas GIS Data Sources

Natural Resource Information Systems

- https://tnris.org/data-download/

Railroad Commission

- http://www.rrc.state.tx.us/

General Land Office

- http://www.glo.texas.gov/land/land-management/gis/

Commission on Environmental Quality

- http://www.tceq.state.tx.us/gis/

Parks and Wildlife Department

- http://tpwd.texas.gov/gis/data

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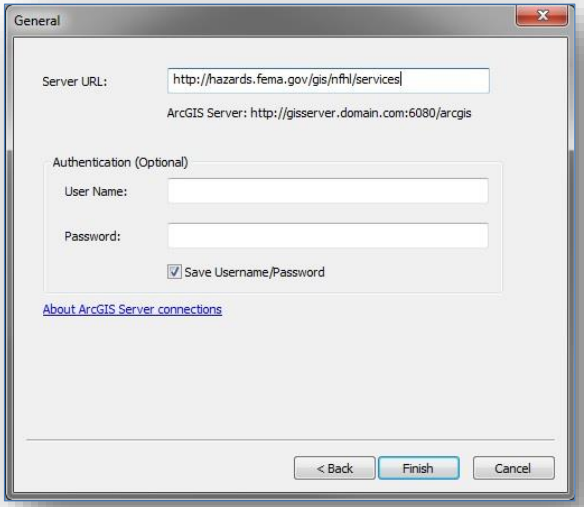
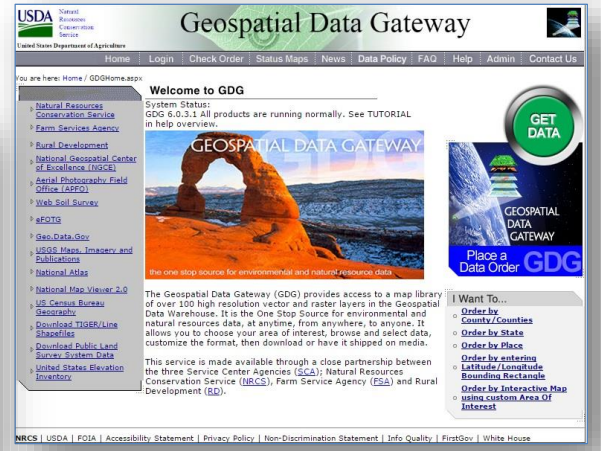
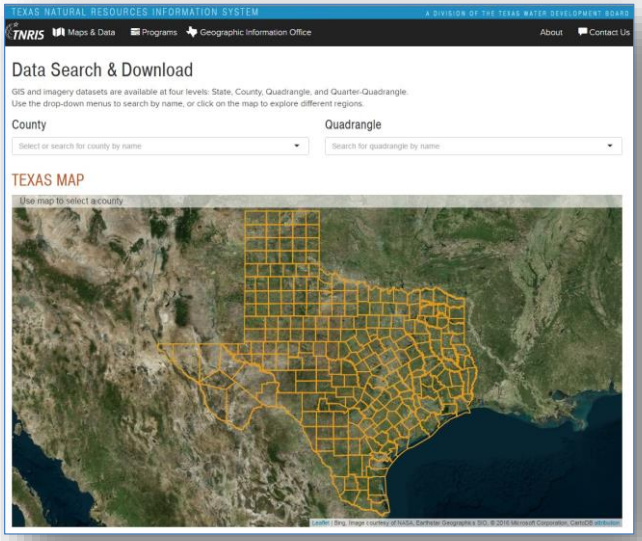
Accessing the Data

- Geospatial data can be incorporated into your ArcMap in a variety of ways:
  - Downloaded from a public repository (e.g. Data Gateway or TNRIS)
  - Added directly into ArcMap via an ArcGIS server.







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Data Accuracy and Date

- Accuracy / Use Limitations
  - Publicly available data “usually” provides information on the accuracy (e.g. +/- 10 meters) or use limitations.
- Date
  - Very important to identify the date of the data to determine its applicability for your project.

Railroad Commission of Texas:
The data sets provided by this system are continually being updated and refined and are provided as a public service for informational purposes only. They are not intended to be used as an authoritative public record for any geographic location and have no legal force or effect. Users are responsible for checking the accuracy, completeness, currency and/or suitability of these data sets themselves.

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Natural Gas Underground Storage Facilities

Shapefile

Tags
There are no tags for this item.

Date

Summary
U.S. underground natural gas storage fields as of November 2015. Approximate county centroids are used for map location.
Source: EIA-191, Monthly Underground Gas Storage Report.

Description
There is no description for this item.

Credits
There are no credits for this item.

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Extent

West	-152.360300	**East**	-76.293115
North	61.069287	**South**	28.746060

Scale Range

Maximum (zoomed in)	1:5,000
Minimum (zoomed out)	1:150,000,000

ArcGIS Metadata ▶

Topics and Keywords ▼

Projection / Datums

- Important for field collection and GIS applications
  - Always identify and/or define the projection and datum.
    - Projections are used to portray the Earth on a flat surface.
    - Datums are a reference system for describing a point on the Earth's surface.
  - The difference in datums can result in significant errors.
    - NAD27 – NAD83 (1986) = 33ft to 700ft difference
    - NAD83 to WGS84 = ~4ft difference
  - When combining data from different sources, it is important to transform all information to a common datum.

https://en.wikipedia.org/wiki/Sith

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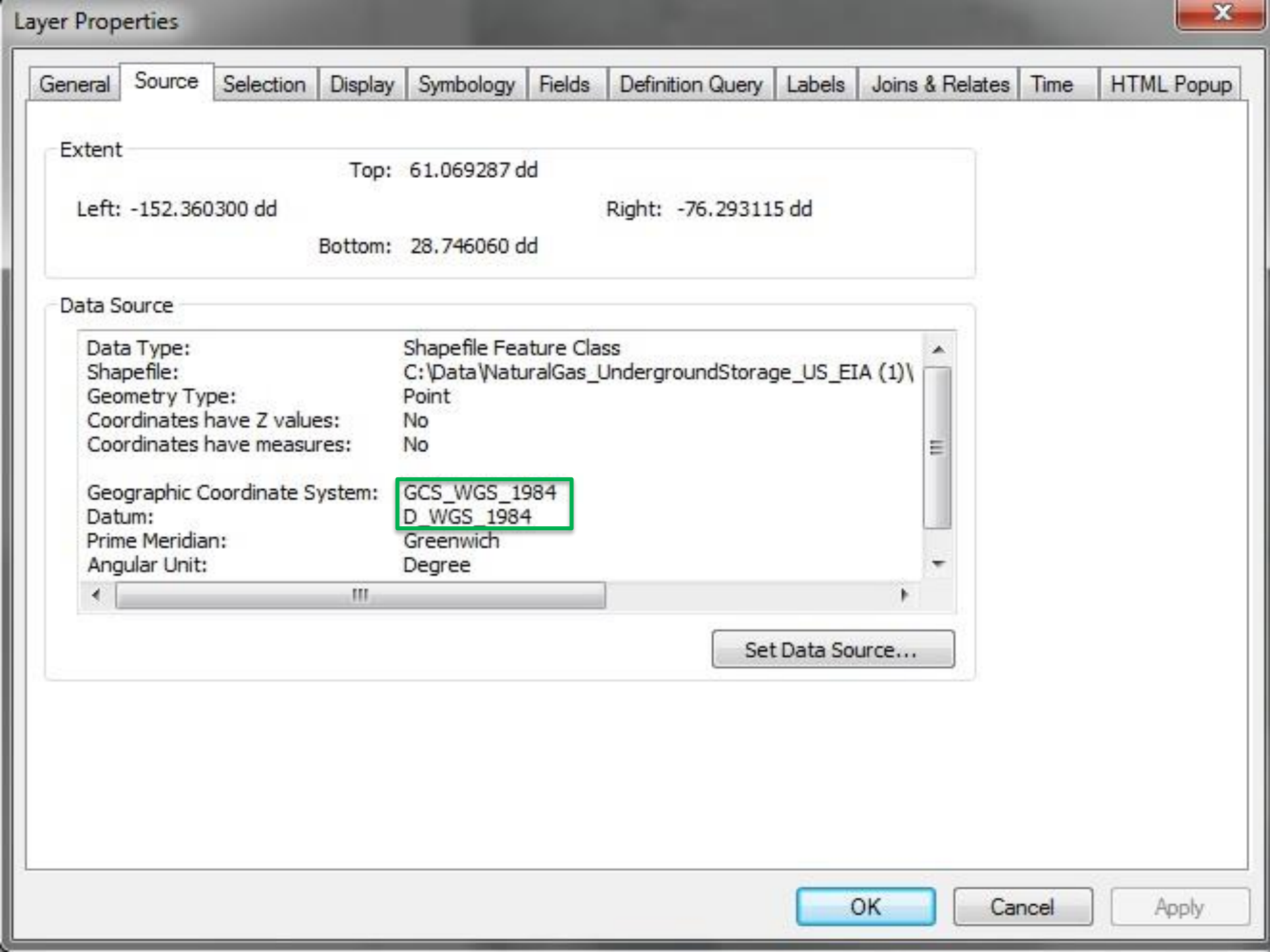
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General
Source
Selection
Display
Symbology
Fields
Definition Query
Labels
Joins & Relates
Time
HTML Popup
Extent
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Left: -152.360300 dd
Right: -76.293115 dd
Bottom: 28.746060 dd
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Shapefile: C:\Data\NaturalGas_UndergroundStorage_US_EIA (1)\
Geometry Type: Point
Coordinates have Z values: No
Coordinates have measures: No
Geographic Coordinate System: GCS_WGS_1984
Datum: D_WGS_1984
Prime Meridian: Greenwich
Angular Unit: Degree
Set Data Source...
OK
Cancel
Apply

Benefits of the GIS-based Process

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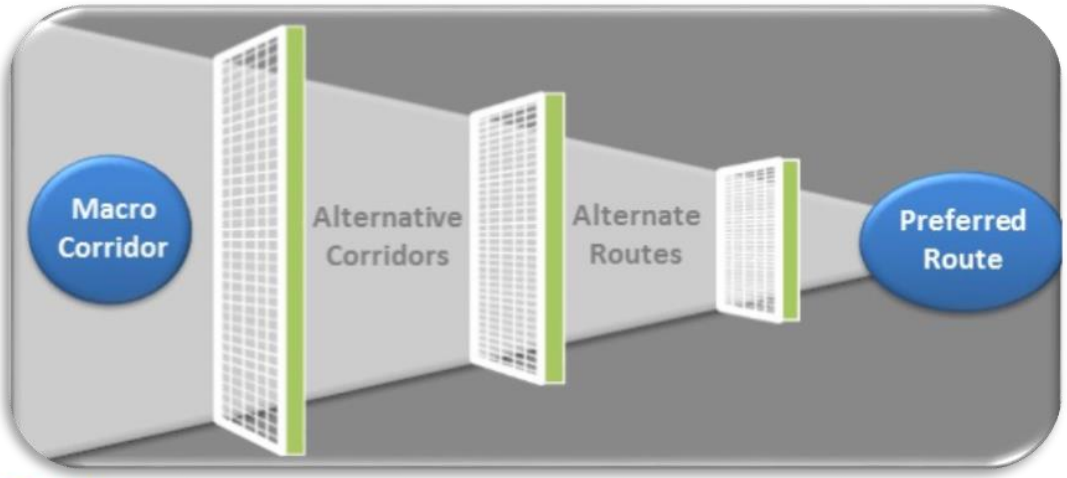
Quantitative and Defendable

- Corridors and routes are based on mathematical analyses of relevant data.
- Each down select phase is based on the following:
  - individual criteria scores,
  - the relative weights for each criteria defined by the Siting Team using the well documented modified Delphi approach,
- The highest rated routes based on the cumulative scores for each scenario are moved forward to the next phase.
- A team reviews the selected routes at each phase to ensure the business case is met.
- The mathematical and down select process is transparent and well documented in the Siting Plan.



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Customizable

- A GIS-based system allows users to customize the process, such as:
  - Project Types (e.g. transmission, fiber optic, pipeline, access roads, etc.)
  - Geography
    - Can be used for any location where geospatial data is available or can be created.
  - Routing Scenarios (e.g. cross country, paralleling existing ROWs, etc.)
  - Project Size
    - Can be custom scaled for any size of project.
  - Process Adjustments
    - The ability to make route adjustments early helps to avoid many potential costly late project modifications (e.g. construction, endangered species and permitting challenges).
    - Criteria weights and constraints are determined by the siting team and can be adjusted as needed.

Reproducible

- The Siting Plan and final report documents all of the major proponents of the GIS model, including all adjustments and assumptions.
- The process is quantitative, therefore each down select is numerically based and defendable.
- Supports quick responses to agency and public comments and questions.

The entire process, from development of the Siting Plan to selection of the preferred route, is documented and quantitatively defined.

Additional Uses

- Supports entire project
  - The GIS system supports analysis and figure development from conception to permitting.
  - GIS model can also be used to identify extra work space, access points and roads for linear projects.
- Siting Plan and GIS model provide the justification and basis for any required alternatives analysis.
  - FERC Resource Report 10
  - NEPA alternatives analysis
  - Individual state permit requirements (e.g. Ohio and Florida)

Thank you!

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