

# **Appendix I: Data Management Plan**

# **Data Management Plan**

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**HOUSTON-GALVESTON AREA COUNCIL**

Community & Environmental Planning Department

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*under the authorization of the Texas Clean Rivers Act*

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## **Introduction**

The Data Management Plan (The Plan) outlines the standard policies and procedures for data management within the Community and Environmental Planning (C&E) Department. The Plan covers the management of both tabular (non-geographic) and spatial (geographic) datasets. Its primary purpose is to ensure the efficient access and maintenance of these datasets within the C&E Geospatial/Geographic Information Systems (GIS) environment.

GIS technology provides a systematic means to capture, manipulate, analyze, store and display spatially referenced data. GIS supports a wide variety of applications ranging from site assessments, environmental planning, urban planning, and spatial analysis to support organizational strategies. In general, GIS supports the overall departmental goals of guiding regional planning, enhancing the quality of the region's natural environment, and public education through outreach programs. The C&E GIS team supports various programs within the C&E department through data development, spatial analysis, geospatial applications development, cartography in support of departmental goals.

The Plan is considered a dynamic working document which responds to changing technology, funding, staffing, and project requirements. Consequently, the Plan is reviewed on an annual basis and amended as necessary.

## **Geospatial Services**

The following section explains the geospatial services provided by the H-GAC C&E GIS team as it relates to the sharing of data, development of geospatial applications, cartography, and underlying GIS resources. The C&E GIS team is responsible for the development of data and sharing of many publicly viable datasets, developing geospatial applications, cartography, and coordination of maintenance of underlying geospatial hardware and software for C&E.

The C&E GIS team maintains a centralized geospatial warehouse (C&E SDE), an online mapping platform for web-based geospatial applications (Mapping Server), and an FTP download site (Data Clearinghouse). The C&E SDE utilizes ESRI's ArcSDE software running on a Microsoft SQLServer RDBMS. The mapping server uses ESRI's ArcGIS Server platform running on .NET. The Data Clearinghouse is an FTP server that provides C&E with storage space where it can post publicly available datasets for downloading. The C&E SDE, Mapping Server, and Data Clearinghouse platforms are installed by the H-GAC Data Services department (Data Services), with Data Services maintaining only the lower-level technology components such as the physical hardware, software installation, and low-level server and RDBMS functions. All upgrades and maintenance is coordinated by the C&E GIS Manager. All geospatial content stored in the C&E SDE, the Data Clearinghouse, and Mapping Server, are the responsibility of the C&E GIS staff, which resides within the C&E Socio-Economic Modeling program. A detailed schematic of the geospatial technical architecture and how the various systems are interconnected can be found in the *System Architecture* section below.

**Data Sharing**

The C&E SDE serves as the primary internal repository for geospatial data, metadata, and other information relevant to the activities and goals of the C&E department. All GIS users within C&E and some users from other H-GAC departments are provided *Editor* or *Viewer* access to data in the C&E SDE. The majority of users outside the core C&E GIS team have only viewer access to data in the C&E SDE. Other specific users that maintain data in the C&E SDE have editor access to the datasets. All user access privileges are assigned by the C&E GIS Manager based upon business needs, GIS skills, and role within the organization. No users outside of the C&E department have editor level access to any GIS data in the C&E SDE, and in some instances there are datasets that are viewable by only C&E GIS users. Instructions for connecting to the C&E SDE are provided to authorized users.

Datasets determined to be viable for publication to the public are exported to the Data Clearinghouse website, thereby allowing the general public widespread access to this information via the internet. Members of the public may view metadata and download any of the datasets that are posted to the Data Clearinghouse. In some instances these datasets are used in web-based mapping applications and can be accessed online via the Mapping Server's services directory, or accessible via the Data Clearinghouse for downloading. All public C&E GIS data, applications, cartographic products, and the C&E map services directory can be accessed via our C&E GIS page at <http://www.h-gac.com/go/cegis>, and a screen shot of the website can be found in Appendix 7.

**Geospatial Applications**

The C&E department has made a strategic decision to incorporate internet-based mapping applications into its deliverables for many programs and projects. Before, the results of most projects consisted of a large-format map printed on a plotter up to 48"x36" in diameter. This form of cartography although still useful in many settings, did not allow programs to communicate results to the public or external organizations that had an interest in our analysis results. By taking results from C&E projects and coupling this with base map data and imagery, C&E has been able to share the results of projects to a far greater audience, and has create opportunities whereby map layers published on the C&E mapping server can be utilized in other organizations mapping applications.

Currently there are three platforms upon which C&E provides internet-based mapping solutions. The first platform is based on the Adobe Flex programming environment, and all mapping applications developed using this platform run inside standard internet browsers that support the Flash technology, such as Internet Explorer. This platform is intended to provide users with a graphics rich user interface whereby the map can be navigated, layers turned on/off, and information obtained on each feature. In some instances, features have links to additional resources such as photos of monitoring stations, external websites, and detailed reports. This mapping application environment allows the users to make full use of their computers internet browser window, and serves as a simple online GIS.

The second platform utilizes the capabilities of the ArcServer platform to allow users to directly access map layers published on the mapping server. This method of delivery is called 'streaming' and allows end users read-only access to individual map layers and geoprocessing tools published on the server. Typical users of this method of delivery are other GIS users using desktop GIS, whereby they can connect directly to our ArcServer platform for read-only access and view our map layers. Other instances whereby users may utilize this method is where they are including our map layers in their own mapping applications.

The third and final platform involves developing applications for mobile devices or tablets. The C&E department has developed both native (installed) applications for the Apple iOS platform, as well as server-side scripted applications which utilize the free ESRI ArcGIS for Mobile Devices viewer app, which runs on iOS, Android, or Windows phone devices. In both instances, map layers used in these applications are delivered from the C&E ArcServer platform.

As previously mentioned, access to all the above forms of applications and data sharing methods can be accessed via our C&E GIS page at <http://www.h-gac.com/go/cegis>.

### **Mapping and Cartographic Products**

The C&E department produces a variety of static cartographic maps for the region as a result of project activities and for general usage. To facilitate the sharing of these maps in an electronic format, C&E has implemented a Map Book as part of their C&E GIS page. Maps can be downloaded in multiple formats. The C&E Map Book can be accessed via our C&E GIS page at <http://www.h-gac.com/go/cegis>.

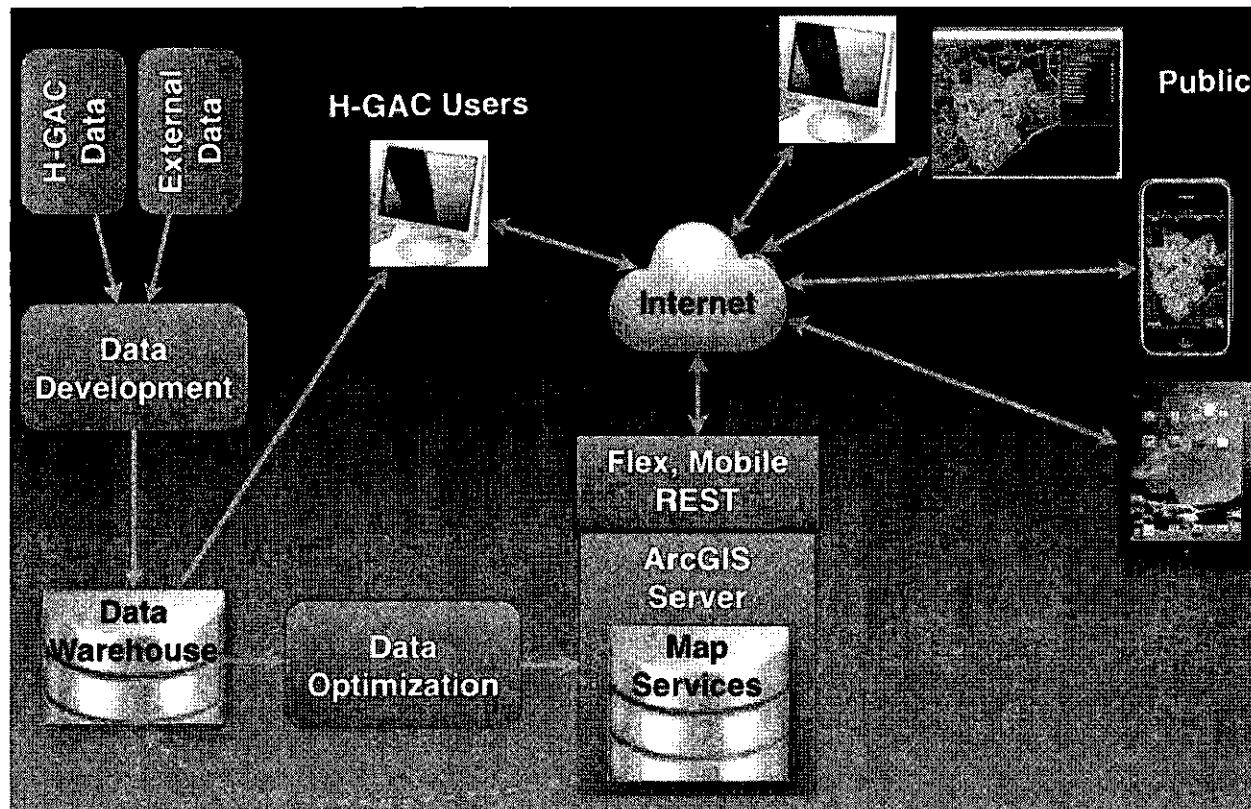
### **System Resources**

#### System Architecture

The C&E department uses an integrated architecture to support the development, analysis, and dissemination of spatial information. The diagram below illustrates this system architecture at a high level. The goal of the overall system is to allow for a streamlined workflow to develop/maintain data, optimize the data for use in online applications, and the consumption of applications via multiple platforms.

Currently the C&E GIS platform supports sharing of geospatial data via the ArcServer mapping server platform. This allows end users internally or externally to consume map layers and geoprocessing tools via GIS desktop, mobile, tablet, or 3<sup>rd</sup> party applications.

In some instances, applications are configured with public feedback and volunteer GIS workflows that allow the C&E GIS team to obtain information for the public on various geographic features in the region. This public feedback loop allows C&E to investigate feedback and verify its validity prior to incorporating the information into the data warehouse.



Hardware

The configuration of the hardware used by staff that performs GIS and data Management work is a distributed network” This network consists of several PC's which are connected to central file servers. The department also uses a central web mapping server for online mapping applications.

A complete listing of departmental hardware is found in Appendix 3.

Software

The C&E department relies upon the H-GAC Data Services department (Data Services) for all of its end user workstation configuration, installation, and maintenance. Each workstation for users comes with the Microsoft Office software package which includes Outlook (e-mail), Word (word processing), Excel (spreadsheets), PowerPoint (presentations), and in some instances Access (desktop database) should the user require desktop database capabilities. Each workstation is pre-configured and setup to operate within the H-GAC internal network, and has access to central servers for file storage. In some instances, certain personnel have addition non-standard software installed by Data Services as it is required for their responsibilities.

The C&E GIS staff utilizes ESRI’s ArcGIS 10 platform for all geospatial analysis and mapping needs. In addition, as needed, the staff also utilizes the SAS software platform for further analysis and data development as deemed necessary. The ESRI ArcGIS 10 platform includes integrated Python programming capabilities, which allows for the creation of programming



scripts or batch programs to improve efficiency and documentation of processes. The Python programming language is an Open Source platform, and is freely distributable.

The centralized SDE is also provided by ESRI, and provided for a centralized geospatial database where GIS staff can store geospatial data for either read-only or editable access by GIS users in the C&E department. The C&E GIS staff maintains access privileges to the SDE datasets, and assigns individual users to various SDE access groups to grant approved access to data in the SDE. The SDE is considered the central warehouse whereby GIS users can go to for geospatial data to use in their analysis or mapping projects.

The software products currently used to accomplish the department's data management objectives are listed in Appendix 4.

### Programming Languages

Programming services will be provided on an as needed and resource available basis. All programming efforts will follow a standard procedure from needs assessment, program planning, development and testing, to refinement and documentation. The principal programming languages to be used in task automation and project customization will depend on the nature of the need and the current state of the technology. At this time, all web-based GIS applications are developed using the ESRI ArcGIS Server platform, and user interface components to that platform are developed using the Adobe Flex API. Automated data development and analysis workflows utilize the Python programming language and the SAS programming platform as needed.

### Data

Department staff members will be consulted annually to determine priority needs for data management. Based on this consultation, specific data sets will be acquired or further developed for the various program areas represented in the department. The current list of department-specific data sets is shown in Appendix 5.

A separate database lists all datasets regularly obtained from external sources, contact information, as well as the frequency of the datasets availability, and its cost. This database is developed using Microsoft Access, and is available to the C&E GIS team for tracking when updates to dataset may be available.

### Personnel

The Data Management staff will be responsible for the maintenance and development of the C&E SDE, mapping server, geospatial applications, C&E GIS page, and Data Clearinghouse. These data management responsibilities cover a wide range from original data creation, acquisition and integration, data archiving and distribution. Additional responsibilities include enhancing the geographic extent, feature attributes, and metadata of the datasets.

The C&E GIS team is comprised of 3 full-time GIS professionals, one of which is the GIS Manager, and 2 full-time GIS Interns. The C&E GIS team supports all programs within the C&E department, which include Clean Rivers/Water Quality, Sustainability, Economic Development, Solid Waste, Ped/Bike, Socio-Economic Modeling, and special project. The C&E GIS team is part of the Socio-Economic Modeling program within C&E.

H-GAC's Data Services Department plays an indirect role in the implementation and maintenance of The Plan. The Data Services Department is responsible for managing the underlying hardware and network upon which C&E stores GIS data and implements GIS-based applications.

### Training

Training for all users of the system is a critical part of The Plan. C&E staff directly responsible for data management will attend conferences, seminars, and software/hardware training courses as needed. H-GAC users of the system will be trained and/or receive technical support by the C&E GIS Manager and other C&E subject matter experts.

### Budget

Budgetary requirements to sustain data management efforts will be reviewed annually.

## **Data Maintenance, Manipulation, and Use**

### **Quality Assurance/Quality Control**

QA/QC is designed to standardize screening, documentation, entry, output, analysis, correction, and updating of data in the system. QA/QC will document those responsible for data and system maintenance.

### **Data Limitations**

Prior to the integration of data within the C&E SDE and posting to the Data Clearinghouse, a review of the data set will be completed to determine predefined data limitations such as missing values, different sampling frequencies, multiple measurements, analytical uncertainty, censored or unavailable data, and duplicated data with existing data sets. After review of the data set, a report will be generated which records any errors detected and any corrections that may be necessary.

### **Data Development Protocol**

The C&E GIS staff works to update existing dataset, acquire new data, and perform geospatial analysis in support of various C&E programs. All new data generated from the result of an analysis is a candidate to be stored not only in the SDE as a new dataset, but also as a layer with a mapping application should the need arise. All data development and analysis is done internally to C&E, and at times leverages outside resources such as consultants, other non-profits whom H-GAC is partnering with, as well as with other H-GAC departments to obtain necessary data. Two datasets that the C&E department uses regularly outside the C&E SDE are the Data Services StarMap road centerline dataset, and the Data Services aerial imagery database.

The C&E GIS staff uses a hybrid approach to conducting geospatial analysis. Much of the analysis being performed may need to be re-processed at a later date as new versions of datasets become available, or as inputs to the analysis models are updated themselves. Thus to minimize the time spend re-running analysis models, the C&E GIS staff utilizes the ESRI ArcGIS platform in conjunction with SAS and Python to develop repeatable and documented workflows. This approach saves more time than interactive methods whereby a user must remember the process to follow, and then execute each step in the analysis independently.

Documentation related to data management efforts such as system evolution, structure, and procedures for use will be compiled and made available for the end user. Documentation will be made available online and in hard copy format.

### **Data Input**

Standard conventions for data input will be determined on a per project and or individual data set basis. To ensure Year 2000 Compliance, all data sets with date/time fields will include a four-digit year (YYYY). Either of the following formats will be used: International Standard Date notation where the date field is represented as MM/DD/YYYY (Month/Day/Year), or an ordinal format where the date field is represented as YYYYDDD.

### Data Dictionary and Metadata

A list of all C&E data available in either the C&E SDE or other tabular formats can be found in Appendix 5. Metadata for each dataset in the C&E SDE is stored with the datasets, and can be viewed by GIS users via their GIS desktop software. Any data provided for public download via the Data Clearinghouse also has a metadata html page that can be viewed via internet browsers.

### Data Conversion

Data to be imported into the C&E SDE from hard copy, digital or by manual data entry, will follow a uniform conversion protocol to comply with the structure of current data sets. The type of data being converted will determine the protocol. All data is stored in ESRI geodatabase format within the C&E SDE, and when posted to the Data Clearinghouse the data is stored in the ESRI File Geodatabase file format, unless there is a specific requirement to provide the data in another format such as Shapefile or GIS Coverage.

### Coordinate Systems

The Texas Stateplane Coordinate System, North American Datum 1983 (NAD83) will be the standard for geographic data at H-GAC. This coordinate system is based on the Cartesian coordinate system, or rectangular coordinates. When receiving geographic data from other sources the data will be transformed into the Stateplane Coordinate System to ensure compatibility with current data sets.

When publishing mapping services for use in web-based GIS mapping applications, the Web Mercator Auxiliary Sphere projection is used for all Data Frame projections. However, the underlying GIS data within these mapping services still use the Texas Stateplane Coordinate System, North American Datum 1983 (NAD83) projection.

### **Data Validation**

#### Data Quality Control

When data are received from any source, documentation will be created to include the source name, date received, format of data and a brief description of the contents. Data will be loaded onto the system from the media received and a review of the data will be made along with any corrections being made to the source documentation. An analysis will be made in order to determine the means of data entry into the system whether it is only a stand-alone database, a number of linked tables, or a geographic database. The data will be converted to the appropriate format for integration with the current system whether it is a conversion into MS Access, Excel, SAS, or ESRI ArcGIS. The data will be visually examined to determine its validity and accuracy. If the data is invalid it will be corrected (if possible) otherwise the data will be incorporated into the C&E SDE, and then if applicable, posted to the Data Clearinghouse and used in conjunction with existing data. A QA/QC report of all procedures and a detailed description of how the data was incorporated into the current system (from the date received to the date of integration) will be generated.

### Equipment Quality Control

All printers, workstations, and server hardware and operating systems are maintained by the Data Services department, unless otherwise noted in Appendix 3.

### **Genealogy**

Upon receipt of data from outside sources, all data will be screened for integrity and completeness. After the preliminary evaluation of the data, a log of the data source, type and completeness is created and maintained with the associated data. A description of the data and the responsible personnel are documented.

### **Migration/Transfer**

A copy of every C&E generated GIS dataset will be housed in the C&E SDE which C&E GIS staff manage the contents and structure of datasets. The underlying hardware and network connections for the C&E SDE are maintained by the Data Services Department. Datasets that are of public interest will be placed in the Data Clearinghouse for public access. Transfer from the C&E SDE to the Data Clearinghouse will occur on an as needed basis following department QA/QC measures and is handled by the C&E GIS team.

### **Data Security & Access**

Data placed on the Data Clearinghouse will be available to those with Internet browsing and/or FTP capability. Data requests for non-public data from other agencies and the general public will be evaluated on an individual basis. When the data requests are received, a preliminary evaluation of the deliverable will be determined and a timeline and cost if applicable will be provided to the requesting agency or individual.

GIS and tabular data will be secure through directory permissions. H-GAC will employ Firewall or Proxy Server Technology to filter and severely restrict access to internal networks and database systems. Virus protection will be implemented to ensure system and data integrity.

### **Archives/Backup**

Each week the C&E GIS team runs a schedule backup program to store a copy of all C&E SDE datasets on a portable hard drive with resides in a secure location within the H-GAC office. In addition, Data Services backs up and archives C&E SDE data and server configuration at regular intervals.. A backup will be performed daily and the tapes will be maintained for 8 weeks before they will be recycled. Every six month, a complete system backup will be performed and the tapes will be archived and kept for five years off-site for security.

### **Disaster Recovery**

In the event of a disaster, the C&E department will have access to all C&E SDE data which is stored on the portable hard drive. The C&E GIS team will restore or provide needed data to GIS users from this portable hard drive until such as time that Data Services can restore the C&E SDE onto either a new server or a temporary server.

## Appendices

### Appendix 1 Data Source Information Sheet

Data Title:

Source Agency:

Contact:

Title:

Address

Phone:

Data Description:

Data source:

Date created:

Accuracy:

Media:

Data items:

Description of data:

Format (specify what software)

Map:

Tabular:

Image:

Text:

Retrieval Procedure:

Command(s):

**Appendix 2 Data Log Sheet**

Date received: \_\_\_\_\_

Report Prepared by: \_\_\_\_\_

Source Name and Phone: \_\_\_\_\_

Format: \_\_\_\_\_

Media: \_\_\_\_\_

Check the following steps to determine the validity of the data:

1. What is the extent of the geographic area? \_\_\_\_\_

\_\_\_\_\_

2. Structure (Circle One)    Vector                      Raster

3. Scale? \_\_\_\_\_

4. Projection and Datum? \_\_\_\_\_

1. Do any of the key fields have missing values? If so which parameters have missing values? Yes \_\_\_ No \_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Any known duplicate records? Yes \_\_\_ No \_\_\_

## **Appendix 3 Hardware**

### FTP Server

Windows 2000 Server

### Mapping Application Servers

#### *Production Server (NTCEIS01)*

Model: HP Proliant BL460c G6 Blade  
CPU: Quad-Core Intel Xeon X5560 (2.80 GHz, 8M Cache)  
Memory: 8GB  
Hard Drive: 300GB  
OS: Windows 2008  
Internet Address: 204.65.99.189  
Domain URL: <http://arcgis02.h-gac.com>  
Serial #: USE936RV4S  
Purchased: January 2010

#### *Development/Backup Server (NTIS04)*

Model: HP Proliant DL 380 G3  
CPU: Single Intel Xeon 2800  
Memory: 1GB  
Hard Drive: C = 16 GB, D=66 GB  
OS: Windows 2000 SP 4  
Internet Address: 204.65.99.240  
Domain URL: <http://arcgis.h-gac.com>  
Serial #: D313LDN1L122  
Purchased: April 2003

### Printers & Plotters

HP1055CM Plotter - Used by C&E staff for large format printing of maps and schematics.

HP2500CM and LaserJet 4M Printers. C&E maintains both printers.

### Global Positioning System (GPS) Units

The C&E Department possesses two GPS units.

### Scanning Equipment

HP Scanjet 7400c. The CEP Department owns one network-accessible HP scanner.

### Fax Equipment

Brother Intellifax 4750e. The C&E Department owns one fax machine.

### Portable Storage Devices

Lacie 300GB external hard drive (USB, Firewire)



## **Appendix 4 Software**

### Office Productivity Software

Microsoft Office Pro (2007) - Word, Excel, Access, PowerPoint, publisher, InfoPath and Outlook.

Internet Explorer (ver 7) – Primary Development Tool

### Graphics and Desktop Publishing

Macromedia Fireworks 4

Adobe Illustrator (ver 8.01) – Graphics

Adobe Photoshop (ver 5.0) – Graphics

Corel Draw (ver 7.0) - Graphics

Quark Express (ver 5.0) - Desktop Publishing.

Paintshop Pro (ver 4.12)

Camtasia Studio (ver 7.0) – Screen capture and video tutorial production

### Programming

Visual Basic (ver 6.0) – Web Mapping Development Tool.

MS Active Server Pages (ver 2.0) – Web Database Development Tool.

Adobe Flex Builder (ver 4.0) – Web-based GIS application development tool

SAS (ver 9.3) – Data development and analytics.

### Geographic Information Systems (GIS)

ESRI ArcGIS (ver 10, SP3) – Computer mapping and database manipulation capable of using ArcView, ArcInfo, and ArcEditor licenses as needed.

ESRI ArcGIS Server (ver 10, SP3) – Internet Mapping Application Server.

ESRI ArcSDE (ver 10, SP3) – Spatial data warehouse.

### Data Management

Access (2007, 2010) - Relational Database.

SQL Server(2000) - Relational Database.

### Operating Systems

Windows XP - PC working environment/Operating System

Windows 7 - PC working environment/Operating System

Windows 2003 & 2008 - Server Operating Systems

**Appendix 5 Data List**C&E Spatial Data Warehouse (SDE) Datasets

<b>Dataset Name</b>	<b>Type</b>
AustCAD_Parcels_Coverage_2005	Polygon
AustCAD_Parcels_Coverage_2005_pts	Point
AustCAD_Parcels_Coverage_2006	Polygon
AustCAD_Parcels_Coverage_2006_pts	Point
AustCAD_Parcels_Coverage_2007	Polygon
AustCAD_Parcels_Coverage_2007_pts	Point
AustCAD_Parcels_Coverage_2008	Polygon
AustCAD_Parcels_Coverage_2008_Pts	Point
Austin County	Polygon
AUSTIN_COUNTY_PARCEL_INFO_2005	Table
AUSTIN_COUNTY_PARCEL_INFO_2006	Table
AUSTIN_COUNTY_PARCEL_INFO_2007	Table
Austin County Parcel Info 2008	Table
Austin County Parcel Values 2006	Table
Austin County Parcel Values 2007	Table
Austin County Parcel Values 2008	Table
BrazCAD_Parcels_Coverage_2005	Polygon
BrazCAD_Parcels_Coverage_2005_pts	Point
BrazCAD_Parcels_Coverage_2006	Polygon
BrazCAD_Parcels_Coverage_2006_pts	Point
BrazCAD_Parcels_Coverage_2007	Polygon
BrazCAD_Parcels_Coverage_2007_pts	Point
BrazCAD_Parcels_Coverage_2008	Polygon
BrazCAD_Parcels_Coverage_2008_Pts	Point
Brazoria County	Polygon
BRAZORIA_COUNTY_PARCEL_INFO_2005	Table
BRAZORIA_COUNTY_PARCEL_INFO_2006	Table
BRAZORIA_COUNTY_PARCEL_INFO_2007	Table
Brazoria County Parcel Info 2008	Table
Brazoria County Parcel Values 2005	Table
Brazoria County Parcel Values 2006	Table
Brazoria County Parcel Values 2007	Table
Brazoria County Parcel Values 2008	Table
Brazoria County Political	Polygon
Brownfield Site Inventory	Point
Brownfield Site Inventory ATTACH	Table
Chambers County	Polygon
Chambers County Political	Polygon
Clean Rivers Public Feedback	Point
Clean Rivers Public Feedback ATTACH	Table
Colorado County	Polygon

<b>Dataset Name</b>	<b>Type</b>
CRP Project Areas	Polygon
FBendCAD Parcels Coverage 2005	Polygon
FBendCAD Parcels Coverage 2005 pts	Point
FBendCAD Parcels Coverage 2006	Polygon
FBendCAD Parcels Coverage 2006 pts	Point
FBendCAD Parcels Coverage 2007	Polygon
FBendCAD Parcels Coverage 2007 pts	Point
FBendCAD Parcels Coverage 2008	Polygon
FBendCAD Parcels Coverage 2008 Pts	Point
Fort Bend County	Polygon
Fort Bend County Parcel Info 2006	Table
Fort Bend County Parcel Info 2007	Table
Fort Bend County Parcel Info 2008	Table
Fort Bend County Parcel Values 2006	Table
Fort Bend County Parcel Values 2007	Table
Fort Bend County Parcel Values 2008	Table
GalvCAD Parcels Coverage 2005	Polygon
GalvCAD Parcels Coverage 2005 pts	Point
GalvCAD Parcels Coverage 2006	Polygon
GalvCAD Parcels Coverage 2006 pts	Point
GalvCAD Parcels Coverage 2007	Polygon
GalvCAD Parcels Coverage 2007 Pts	Point
GalvCAD Parcels Coverage 2008	Polygon
GalvCAD Parcels Coverage 2008 Pts	Point
Galveston Bay Estuary Program Watersheds	Polygon
Galveston County	Polygon
GALVESTON COUNTY PARCEL INFO 2005	Table
GALVESTON COUNTY PARCEL INFO 2007	Table
Galveston County Parcel Info 2008	Table
Galveston County Parcel Values 2005	Table
Galveston County Parcel Values 2007	Table
Galveston County Parcel Values 2008	Table
Galveston County Political	Polygon
Grimes County	Polygon
Gulf Of Mexico	Polygon
Harris County	Polygon
Harris County FCD Sub Watersheds	Polygon
Harris County FCD Watersheds	Polygon
HARRIS COUNTY PARCEL INFO 2005	Table
HARRIS COUNTY PARCEL INFO 2006	Table
HARRIS COUNTY PARCEL INFO 2007	Table
Harris County Parcel Info 2008	Table
Harris County Parcel Values 2005	Table
Harris County Parcel Values 2006	Table

<b>Dataset Name</b>	<b>Type</b>
Harris County Parcel Values 2007	Table
Harris County Parcel Values 2008	Table
Harris County Zones 58	Polygon
HCAD Parcels Coverage 2000	Polygon
HCAD Parcels Coverage 2000 pts	Point
HCAD Parcels Coverage 2003	Polygon
HCAD Parcels Coverage 2003 pts	Point
HCAD Parcels Coverage 2005	Polygon
HCAD Parcels Coverage 2005 pts	Point
HCAD Parcels Coverage 2006	Polygon
HCAD Parcels Coverage 2006 pts	Point
HCAD Parcels Coverage 2007	Polygon
HCAD Parcels Coverage 2007 Pts	Point
HCAD Parcels Coverage 2008	Polygon
HCAD Parcels Coverage 2008 Pts	Point
HGAC 13 County Airports	Point
HGAC 13 County Airports ParcellIDs	Table
HGAC 13 County BlockGroups 1990	Polygon
HGAC 13 County BlockGroups 2000	Polygon
HGAC 13 County BlockGroups 2010	Polygon
HGAC 13 County Blocks 2000	Polygon
HGAC 13 County Blocks 2010	Polygon
HGAC 13 County Brownfield Sites	Point
HGAC 13 County Bus Routes	Polyline
HGAC 13 County Bus Stops	Point
HGAC 13 County Transit Centers Parks and Rides	Point
HGAC 13 County Census PL Data 2010 Block Groups	Table
HGAC 13 County Census PL Data 2010 Blocks	Table
HGAC 13 County Census PL Data 2010 Counties	Table
HGAC 13 County Census PL Data 2010 Places	Table
HGAC 13 County Census PL Data 2010 School Districts	Table
HGAC 13 County Census PL Data 2010 Tracts	Table
HGAC 13 County Census Places 2000	Polygon
HGAC 13 County Census Places 2000 Clipped	Polygon
HGAC 13 County Census Places 2000 Pts	Point
HGAC 13 County Census Places 2010	Polygon
HGAC 13 County Census Places 2010 Clipped	Polygon
HGAC 13 County Census Places 2010 Pts	Point
HGAC 13 County Census Urban Areas 1990	Polygon
HGAC 13 County Census Urban Areas 2000	Polygon
HGAC 13 County Census Urban Areas 2009	Polygon
HGAC 13 County Census Urban Areas 2010	Polygon
HGAC 13 County Census Zip Codes 2010	Polygon
HGAC 13 County Citizen Collection Stations	Point

<b>Dataset Name</b>	<b>Type</b>
HGAC 13 County City Boundaries	Polygon
HGAC 13 County City Boundaries Clipped	Polygon
HGAC 13 County City Ordinance Areas	Polygon
HGAC 13 County Closed Landfill Inventory	Point
HGAC 13 COUNTY COASTAL VIGNETTE	Raster
HGAC 13 County Coastline	Polygon
HGAC 13 County Coastline Boundary	Polygon
HGAC 13 County CRP Monitoring Stations 2008	Point
HGAC 13 County CRP Monitoring Stations 2010	Point
HGAC 13 County CRP Monitoring Stations 2011	Point
HGAC 13 County CRP Monitoring Stations 2012	Point
HGAC 13 County CRP Monitoring Stations 2013	Point
HGAC 13 County CRP Monitoring Stations Historical	Point
HGAC 13 County Dams	Point
HGAC 13 County Districts	Polygon
HGAC 13 County Election Precincts 2010	Polygon
HGAC 13 County Farmland	Polygon
HGAC 13 County Federal Aid Roads	Polyline
HGAC 13 County G1M	Polygon
HGAC 13 County G3M	Polygon
HGAC 13 County G5M	Polygon
HGAC 13 County Grocery Stores	Point
HGAC 13 County Household Hazardous Waste Facilities	Point
HGAC 13 COUNTY LAND COVER 10 CLASS 2008	Raster
HGAC 13 COUNTY LAND COVER 10 CLASS ROADS 2008	Raster
HGAC 13 COUNTY LAND COVER 3X3 MODE FILTERED 2008	Raster
HGAC 13 COUNTY LAND COVER MERGED 6 CLASS 2008	Raster
HGAC 13 County Landfills	Point
HGAC 13 County Libraries	Point
HGAC 13 County Libraries Parcel Xref	Table
HGAC 13 County Major Rivers	Polyline
HGAC 13 County Major Roads	Polyline
HGAC 13 County Metropolitan Statistical Area	Polygon
HGAC 13 County OSSF Permits	Point
HGAC 13 County Parks	Point
HGAC 13 County Parks Features	Table
HGAC 13 County Parks Parcels	Table
HGAC 13 County Parks Natural Areas Awards	Point
HGAC 13 County Pipelines	Polyline
HGAC 13 County Plats	Polygon
HGAC 13 County Political	Polygon
HGAC 13 County Political Boundary	Polygon
HGAC 13 County Railroads	Polyline
HGAC 13 County Raster Extent	Polygon

<b>Dataset Name</b>	<b>Type</b>
HGAC 13 County Recycle Centers	Point
HGAC 13 County School Districts Census 2010	Polygon
HGAC 13 County School Districts TEA 2010	Polygon
HGAC 13 County Service Area Boundaries	Polygon
HGAC 13 County Soils	Polygon
HGAC 13 County Solid Waste Facilities 2002	Point
HGAC 13 County Solid Waste Facilities 2004	Point
HGAC 13 County Solid Waste Facilities 2008	Point
HGAC 13 County Solid Waste Facilities 2009	Point
HGAC 13 County State Parks	Polygon
HGAC 13 County Superfund NPL Sites	Polygon
HGAC 13 County Superfund NPL Sites Pts	Point
HGAC 13 County TIRZs	Polygon
HGAC 13 County Tracts 1990	Polygon
HGAC 13 County Tracts 2000	Polygon
HGAC 13 County Tracts 2010	Polygon
HGAC 13 County Water	Polygon
HGAC 13 County Water Detailed	Polygon
HGAC 13 County Watershed Project Monitoring Sites	Point
HGAC 13 County Zip Codes 2000	Polygon
HGAC 13 County Zip Codes 2002	Polygon
HGAC 13 County Zip Codes 2005	Polygon
HGAC 15 County Aquifer Recharge Zones	Polygon
HGAC 15 County Basins	Polygon
HGAC 15 County Bio Monitoring Sites	Point
HGAC 15 County Census Zip Codes 2010	Polygon
HGAC 15 County City Boundaries	Polygon
HGAC 15 County City Boundaries Clipped	Polygon
HGAC 15 County Coastline	Polygon
HGAC 15 County Coastline Boundary	Polygon
HGAC 15 COUNTY CRP Impairments	Table
HGAC 15 County CRP Lakes	Polygon
HGAC 15 County CRP Stream End Points	Point
HGAC 15 County CRP Streams	Polyline
HGAC 15 County DEM 10m	Raster
HGAC 15 County Major Rivers	Polyline
HGAC 15 County Major Roads	Polyline
HGAC 15 County Political	Polygon
HGAC 15 County Political Boundary	Polygon
HGAC 15 County School Districts TEA 2010	Polygon
HGAC 15 County Soils	Polygon
HGAC 15 County Wastewater Outfalls	Point
HGAC 15 County Wastewater Outfalls Historical	Point
HGAC 15 County Wastewater Outfalls Info	Table

<b>Dataset Name</b>	<b>Type</b>
HGAC 15 County Water	Polygon
HGAC 15 County Watershed Insets	Polygon
HGAC 15 County Watershed Signs	Point
HGAC 15 County Watersheds	Polygon
HGAC 15 County Zip Codes 2000	Polygon
HGAC 15 County Zip Codes 2002	Polygon
HGAC 8 County Bikeway Needs	Polyline
HGAC 8 County Bikeway Network	Polyline
HGAC 8 County Bikeways	Polyline
HGAC 8 County BlockGroups 2000	Polygon
HGAC 8 County BlockGroups 2010	Polygon
HGAC 8 County Blocks 2000	Polygon
HGAC 8 County Blocks 2010	Polygon
HGAC 8 County Census Places 2000	Polygon
HGAC 8 County Census Places 2000 Clipped	Polygon
HGAC 8 County Census Places 2000 Pts	Polygon
HGAC 8 County Census Places 2010	Polygon
HGAC 8 County Census Places 2010 Clipped	Polygon
HGAC 8 County Census Places 2010 Pts	Polygon
HGAC 8 County Census Urban Areas 2000	Polygon
HGAC 8 County Census Urban Areas 2009	Polygon
HGAC 8 County Census Urban Areas 2010	Polygon
HGAC 8 County Census Zip Codes 2010	Polygon
HGAC 8 County City Boundaries	Polygon
HGAC 8 County City Boundaries Clipped	Polygon
HGAC 8 County City Ordinance Areas	Polygon
HGAC 8 COUNTY COASTAL VIGNETTE	Raster
HGAC 8 County Coastal Vignette 50 25	Polygon
HGAC 8 County Coastline	Polygon
HGAC 8 County Coastline Boundary	Polygon
HGAC 8 County Comprehensive Plan 2010 pts	Point
HGAC 8 County Eco Types	Polygon
HGAC 8 County Forecast Cities_h	Table
HGAC 8 County Forecast Cities_v	Table
HGAC 8 County Forecast Counties_h	Table
HGAC 8 County Forecast Counties_v	Table
HGAC 8 County Forecast G025M_h	Table
HGAC 8 County Forecast G1_h	Table
HGAC 8 County Forecast G10K_h	Table
HGAC 8 County Forecast G10K_v	Table
HGAC 8 County Forecast G1M_h	Table
HGAC 8 County Forecast G1M_v	Table
HGAC 8 COUNTY FORECAST LU G1 H	Table
HGAC 8 County Forecast RAZ_h	Table

<b>Dataset Name</b>	<b>Type</b>
HGAC 8 County Forecast RAZ v	Table
HGAC 8 County Forecast Region v	Table
HGAC 8 County Forecast TAZ h	Table
HGAC 8 County Forecast TAZ v	Table
HGAC 8 County Forecast Tracts h	Table
HGAC 8 County Forecast Tracts v	Table
HGAC 8 County Forecast Zip Codes h	Table
HGAC 8 County Forecast Zip Codes v	Table
HGAC 8 County G025M	Polygon
HGAC 8 County G1	Polygon
HGAC 8 County G10	Polygon
HGAC 8 County G1M	Polygon
HGAC 8 COUNTY LAND COVER 10 CLASS 2008	Raster
HGAC 8 COUNTY LAND COVER 10 CLASS ROADS 2008	Raster
HGAC 8 COUNTY LAND COVER 3X3 MODE FILTERED 2008	Raster
HGAC 8 COUNTY LAND COVER MERGED 6 CLASS 2008	Raster
HGAC 8 County Livable Centers	Point
HGAC 8 County Major Rivers	Polyline
HGAC 8 County Major Roads	Polyline
HGAC 8 County PedBike Improvement Areas	Polyline
HGAC 8 County PedBike Improvement Locations	Polyline
HGAC 8 County Pedestrian Pathways	Polyline
HGAC 8 County Political	Polygon
HGAC 8 County Political Boundary	Polygon
HGAC 8 County Railroads	Polyline
HGAC 8 County Raster Extent	Polygon
HGAC 8 County RAZ	Polygon
HGAC 8 County School Districts TEA 2010	Polygon
HGAC 8 County Soils	Polygon
HGAC 8 County TAZ	Polygon
HGAC 8 County Tracts 1970	Polygon
HGAC 8 County Tracts 1980	Polygon
HGAC 8 County Tracts 2000	Polygon
HGAC 8 County Tracts 2010	Polygon
HGAC 8 County Water	Polygon
HGAC 8 County Water Detailed	Polygon
HGAC 8 County Zip Codes 2000	Polygon
HGAC 8 County Zip Codes 2002	Polygon
HGAC 8 County Zip Codes 2005	Polygon
HGAC 8 County Zoning 2010 pts	Point
HGAC Bastrop Bayou Sub Watersheds	Polygon
HGAC CRP Watersheds	Polygon
HGAC LAND COVER 10 CLASS 2008	Raster
HGAC LAND COVER 10 CLASS ROADS 2008	Raster



<b>Dataset Name</b>	<b>Type</b>
HGAC LAND COVER 3X3 MODE FILTERED 2008	Raster
HGAC LAND COVER MERGED 6 CLASS 2008	Raster
HGAC Sea Level Rise 10Ft	Polygon
HGAC Sea Level Rise 15Ft	Polygon
HGAC Sea Level Rise 1Ft	Polygon
HGAC Sea Level Rise 20Ft	Polygon
HGAC Sea Level Rise 25Ft	Polygon
HGAC Sea Level Rise 30Ft	Polygon
HGAC Sea Level Rise 35Ft	Polygon
HGAC Sea Level Rise 3Ft	Polygon
HGAC Sea Level Rise 5Ft	Polygon
HGAC Sea Level Rise All Levels	Polygon
HGAC Sea Level Rise Current Sea Level	Polygon
Hurricane Dolly Observations	Point
Hurricane Dolly Track	Polyline
Hurricane Ike High Water Measurements	Point
Hurricane Ike Observations	Point
HURRICANE IKE SALT BURN GULF COAST	Raster
Hurricane Ike Storm Surge Model i48 gl2	Polygon
HURRICANE IKE STORM SURGE MODEL I48 GL2 RASTER	Raster
Hurricane Ike Track	Polyline
LibCAD Parcels Coverage 2007	Polygon
LibCAD Parcels Coverage 2007_pts	Point
LibCAD Parcels Coverage 2008	Polygon
LibCAD Parcels Coverage 2008_Pts	Point
Liberty County	Polygon
LIBERTY COUNTY PARCEL INFO 2007	Table
Liberty County Parcel Info 2008	Table
Liberty County Parcel Values 2007	Table
Liberty County Parcel Values 2008	Table
Matagorda County	Polygon
Matagorda County Political	Polygon
METRO LRT Lines	Polyline
METRO LRT Stations	Point
Model Buildings	Point
Model Buildings Rural	Point
Model Parcels	Polygon
Model Parcels Rural	Polygon
Model Parcels Acct Nums	Table
Model Parcels Acct Nums Rural	Table
Model Parcels Addresses	Table
Model Parcels Addresses Rural	Table
Model Parcels Forecast	Table
MontCAD Parcels Coverage 2005	Polygon

<b>Dataset Name</b>	<b>Type</b>
MontCAD Parcels Coverage 2005 pts	Point
MontCAD Parcels Coverage 2006	Polygon
MontCAD Parcels Coverage 2006 pts	Point
MontCAD Parcels Coverage 2007	Polygon
MontCAD Parcels Coverage 2007 pts	Point
MontCAD Parcels Coverage 2008	Polygon
MontCAD Parcels Coverage 2008 Pts	Point
Montgomery County	Polygon
MONTGOMERY COUNTY PARCEL INFO 2006	Table
MONTGOMERY COUNTY PARCEL INFO 2007	Table
Montgomery County Parcel Info 2008	Table
Montgomery County Parcel Values 2006	Table
Montgomery County Parcel Values 2007	Table
Montgomery County Parcel Values 2008	Table
Montgomery County Zones 4	Polygon
NLCD IMPERVIOUSNESS 2001	Raster
NLCD IMPERVIOUSNESS 2006	Raster
NLCD IMPERVIOUSNESS CHANGE 2006	Raster
NLCD LAND COVER 2001	Raster
NLCD LAND COVER 2001 HGAC 13 COUNTY	Raster
NLCD LAND COVER 2001 HGAC 13 COUNTY EXTENT	Raster
NLCD LAND COVER 2001 HGAC 13 COUNTY RECLASSIFY	Raster
NLCD LAND COVER 2001 SAN BERNARD WATERSHED	Raster
NLCD LAND COVER 2006	Raster
NLCD LAND COVER 2006 RECLASSIFIED 10 CLASS	Raster
NLCD LAND COVER CHANGE 2006	Raster
NLCD TREE CANOPY 2001	Raster
NOAA Surge MOM Galveston Bay	Polygon
NOAA Surge MOM Matagorda Bay	Polygon
San Jacinto County	Polygon
SEM User Input Point	Point
SEM User Input Polygon	Polygon
SEM User Input Polyline	Polyline
Texas 113th Congressional Districts	Polygon
Texas State House Districts 2012	Polygon
Texas State Senate Districts 2012	Polygon
Texas Census BlockGroups 1990	Polygon
Texas Census BlockGroups 2000	Polygon
Texas Census BlockGroups 2010	Polygon
Texas Census Blocks 2000	Polygon
Texas Census Blocks 2010	Polygon
Texas Census School Districts 2010	Polygon
Texas Census Tracts 1990	Polygon
Texas Census Tracts 2000	Polygon

<b>Dataset Name</b>	<b>Type</b>
Texas_Census_Tracts_2010	Polygon
Texas_Census_Urban_Areas_2009	Polygon
Texas_Coastal_Bathymetry	Point
Texas_Coastal_Vignette_50_25	Polygon
Texas_Coastline	Polygon
Texas_COG_Boundaries	Polygon
Texas_Counties_Coastline	Polygon
Texas_Counties_Political	Polygon
Texas_Highways	Polyline
Texas_Impairment_Streams_2008	Polyline
Texas_Impairment_Waterbodies_2008	Polygon
Texas_Major_Rivers	Polyline
Texas_Map_Extent	Polygon
Texas_Stream_Team_Monitoring_Sites	Point
Texas_Zip_Codes_2005	Polygon
The_Woodlands_Pathways	Polyline
TMDL_Project_Areas	Polygon
TMDL_Project_Areas_Mask	Polygon
TMDL_Watersheds	Polygon
US_State_Boundaries	Polygon
USFWS_Wetlands_2009	Polygon
USFWS_Wetlands_2010	Polygon
USFWS_Wetlands_2011	Polygon
USFWS_Wetlands_2012	Polygon
USGS_HUC_10_Watersheds	Polygon
USGS_HUC_12_Sub_Watersheds	Polygon
USGS_HUC_6_Basins	Polygon
USGS_HUC_8_Sub_Basins	Polygon
USGS_River_Basins	Polygon
USGS_Stream_Gauges_2009	Point
USGS_Stream_Gauges_2010	Point
USGS_Stream_Gauges_2012	Point
USGS_Sub_Watershed_Study_Areas	Polygon
WalkCAD_Parcels_Coverage_2005	Polygon
WalkCAD_Parcels_Coverage_2005_pts	Point
WalkCAD_Parcels_Coverage_2006	Polygon
WalkCAD_Parcels_Coverage_2006_pts	Point
WalkCAD_Parcels_Coverage_2007	Polygon
WalkCAD_Parcels_Coverage_2007_pts	Point
WalkCAD_Parcels_Coverage_2008	Polygon
WalkCAD_Parcels_Coverage_2008_Pts	Point
Walker_County	Polygon
WALKER_COUNTY_PARCEL_INFO_2005	Table
WALKER_COUNTY_PARCEL_INFO_2006	Table

<b>Dataset Name</b>	<b>Type</b>
WALKER_COUNTY_PARCEL_INFO_2007	Table
Walker County Parcel Info 2008	Table
Walker County Parcel Values 2005	Table
Walker County Parcel Values 2006	Table
Walker County Parcel Values 2007	Table
Walker County Parcel Values 2008	Table
WallCAD Parcels Coverage 2007	Polygon
WallCAD Parcels Coverage 2007 Pts	Point
WallCAD Parcels Coverage 2008	Polygon
WallCAD Parcels Coverage 2008 Pts	Point
Waller County	Polygon
WALLER_COUNTY_PARCEL_INFO_2007	Table
Waller County Parcel Info 2008	Table
Waller County Parcel Values 2007	Table
Waller County Parcel Values 2008	Table
Wharton County	Polygon
World_Country_Boundaries	Polygon

#### C&E Non-Spatial Data

Ambient Surface Water Quality Monitoring

Wastewater Self-reporting Data

Parcel-Based Land Use, Attributes, and Valuation (9 counties)

Census Data

**Appendix 6 Data Dictionary**

<p><b>Data Dictionary</b></p> <p><b>Houston-Galveston Area Council</b></p> <p><b>Community and Environmental Planning Department</b></p>
--

<b>General Information</b>		
Thematic Layer Name		
Feature Class		
Topology		
Table Name		
Data Source		
Report Prepared by		
Phone	Fax	E-Mail

<b>Attribute Table</b>				
Variable	Begin Column	Item Name	Alternate Name	Item Definition

<b>Data History</b>	
Source Agency	
Originating Date	
Originating Scale	

<b>Status Information</b>
Percentage Complete
Planned Completion Date
Geographic Extent
Planned Enhancements
Known problems or limitations

<b>Maintenance Information</b>
Maintaining Office/Division/Section
Contact Name
Contact Telephone Number
Type of updates performed
Frequency of Updates

<b>Data Format Information</b>
Data Format
Software/Version
Number of features/records
Total File Size

<b>Projection</b>
Geographic Projection:
Spheroid:
Zone:
Datum:
Units:
Fips Zone:
Quadrant:
X Shift:
Y Shift:
1st Standard Parallel:
2nd Standard Parallel:
Central Meridian:
Lat. of Projection Origin:
False Easting:
False Northing:

<b>Additional Documentation</b>
Quality Assurance Quality Control
Attribute Reports Available
Additional Documentation Available

Appendix 6 H-GAC C&E GIS Website & Data Clearinghouse



Houston-Galveston Area Council

Search

A-Z Site Index

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- COMMUNITY & ENVIRONMENTAL »
- PUBLIC SAFETY & SECURITY »
- HUMAN SERVICES »
- COOPERATIVE PURCHASING »
- REGIONAL DATA & GIS SERVICES »

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**SECTION CONTENTS**

GIS Web Mapping Services

Map Book

**GIS WEB MAPPING SERVICES**

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[View Metadata](#)

[Socioeconomic Forecasting Data](#)  
 Land use, economy, and population research and data for the region

[Land Use & Land Cover Data](#)  
 Land Use/Land Cover GIS data

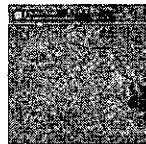
[Water Quality Data](#)  
 Water Quality GIS data

**CONTACT US**

CEGIS@mgac.com  
 (713) 627-3200

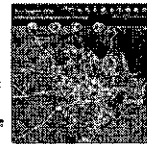
- Bill Bass, Chief GIS Specialist
- Li Zhou, GIS Analyst
- Preen Khwacunjo, GIS Analyst

**Parks Score Tool**



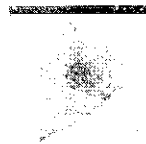
The Parks Score tool shows locations of parks in the H-GAC 13 county region, as well as results of a regional analysis related to the locations of the parks.

**Eco-Logical GIS**



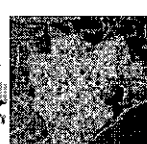
Use this tool to determine impacts on environmental resources in the region.

**Regional Census ACS Data Portal**



View the region's 2010 Census and ACS demographic data for counties, tracts and places.

**Regional Land Use Information**



View and query current and forecasted land use and

socioeconomic data for the H-GAC 8-county region.

**Regional Bikeway Viewer**



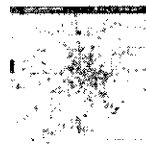
The Regional Bikeway Viewer is an interactive map of existing and planned bikeways in the Houston-Galveston region.

**Water Resources Information Map**



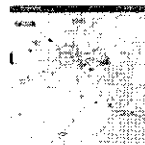
Locate Monitoring Stations and access Water Quality Data for the region.

**Closed Landfill Inventory**



Use this web-based mapping tool to locate closed landfills in the 13-county region.

**Recycle Centers Mapping Tool**



Find recycling centers within our 13 county region using our Recycling Centers Mapping Tool.