GEOTEX ENVIRONMENTAL SOLUTIONS
Consultants:

Brady Nock : Group Manager

Rachael Weissman : GIS Analyst

Mark Wilson : GIS Analyst / Webmaster / Graphic Designer

Amy Woods: GIS Analyst

February 22, 2012

Mapping Wastewater Spill Data Associated with Streams on the Recharge Zone of the Southern (San Antonio) and Barton Springs Segments of the Edwards Aquifer

Author: Prepared by GEOTEX ENVIRONMENTAL SOLUTIONS

Prepared For: Greater Edwards Aquifer Alliance

TABLE OF CONTENTS

Summary

The Edwards Aquifer, located within 12 counties in Central Texas, is a natural karst aquifer that has provided life to South Central Texas for over 12,000 years and currently serves approximately 1.7 million Texans. The Aquifer can be broken down into four different zones: the contributing zone, the recharge zone, the transition zone, and the artesian zone. The focus of this project will be looking at the Recharge Zone which spans 1,250 miles and allows large quantities of water to flow into the aquifer due to the fractured and fragmented limestone geology.

Although the Edwards Aquifer hasn't changed in the last several thousand years, the environment around the aquifer has been altered to fit the needs of the people of South Central Texas, including adding man-made structures, such as pipelines, that if leaked into the ground water system could potentially harmful to not only humans, but also to the environmentally sensitive ecosystem that surrounds it.

The recharge zone is characterized by its unique limestone surface which is cracked and split, allowing surface runoff to enter into and recharge the aquifer. However it is the geology of the recharge zone which makes it vulnerable to pollution and wastewater.

Purpose

By looking at the quantity of wastewater that is accidentally spilled into the recharge zone, the GeoTex Environmental Solutions team can examine and assess the vulnerability of streams related to these spills. We will produce maps which will explore the relationship between the locations, dates, and volumes of wastewater spills in terms of their proximity to streams and other recharge features. An interactive map component will also be made and available to the public in an effort to heighten awareness of this issue throughout South Central Texas.

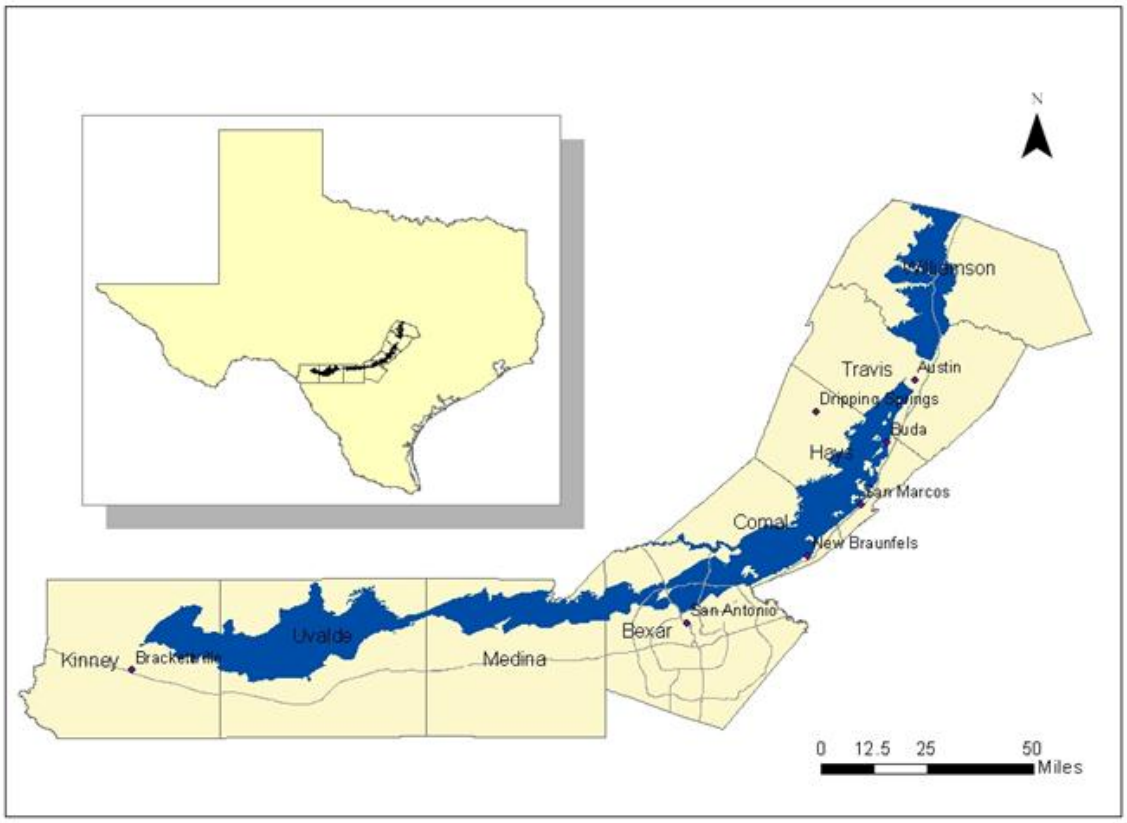
A similar project was released by the California State Water Resource Control Board which plots sewage discharge from sewer systems as reported by local California agencies to the online California Integrated Water Quality System. The project shows the location of the spill as well as the amount spilled, source of the spill, and the name of the responsible or reporting agency. The map containing all the information was also made available for online viewing by it's local community. By looking at this similar project, GeoTex Environmental Solutions can model our work around this professional standard of mapping waste water spills to fit the needs of our own community.

Scope

The extent of the study area focuses on the Edwards Aquifer, located in the Edwards Plateau region of Texas. More specifically, the project will be focusing on the recharge zone of the Edwards Aquifer. The Edwards Aquifer recharge zone spans over seven Central Texas counties (Travis, Hays, Comal, Bexar, Medina, Uvalde, and Kinney) and has an area of 1,250 square miles.

The project will focus on sewage spills that have happened within the past 5 years (2006-present) over the recharge zone of the Edwards Aquifer.

Recharge Zone of the Edwards Aquifer



GeoTex Environmental Solutions
02-17-2012
GCS_North_American_1983

Data

List of data needed:

- State and County Boundaries (TPWD)
- Edwards Aquifer Zones (EAA)
- Texas Streams (Major and Minor) (TWDB)
- Major Roads (Census)
- Major Texas Cities (TNRIS)
- Edwards Aquifer Recharge Features (CAPCOG)
- Wastewater spill data (EAA, TCEQ, MUDS)

For the project, some easily obtained data will need to be downloaded from the Internet, such as shapefiles of Texas counties, the Edwards Aquifer, Texas streams, Cities, major roads, etc. In order to complete the project, wastewater (sewage) spill data will need to be collected.

The data that will be downloaded from the internet will come from the Edwards Aquifer Authority website (www.edwardsaquifer.org) and the Texas Water Development Board website (www.twdb.state.tx.us). Because all of the agencies listed above have downloadable shapefiles on their website, which are free to the public, obtaining such data should be very simple.

The data that is needed regarding waste water spills will be more difficult to obtain. Because of the passing of EAA Rules 713.E in 2008, all spills with a volume greater than 500 gallons must be reported to the Edwards Aquifer Authority. However, spills with a volume less than 500 gallons are also desirable for this project. Since having accidents (such as wastewater spills) can damage one's reputation and image, municipal utility districts and waste water treatment plants are likely to be hesitant in the sharing of such information.

Data will be collected by contacting the Edwards Aquifer Authority, the Texas Commission on Environmental Quality, as well as every utility district and waste water treatment plant that provides service over the recharge zone of the Edwards Aquifer. If the utility districts refuse to give the information needed we will send a Freedom of Information Act (FOIA) request to the utility in order to get the data.

We will develop a script to simplify how we request data. This specific format will guide our conversations with the various municipal utility districts and agencies. As the information we are seeking is public, we will file a Freedom of Information Act (FOIA) request if entities are uncooperative. Our clients (GEAA) have experience with FOIA requests, and will help us in developing them.

Methodology

All wastewater spills will be put into a table which will contain fields uniquely identifying each spill. Each spill will be categorized by specific attributes; ideally, at least lat/long coordinates, volume, and date of spill. What attributes we have will be dependant upon the quality of data we can collect.

We will then import this table into ArcGIS. We will project the wastewater spill data along with a dataset of streams, overlaid on a shapefile of the Edwards Aquifer. Once our GIS database is established, we can begin to develop the interactive website.

The result of our analysis will be an interactive map capable of being integrated into the existing Greater Edwards Aquifer Alliance (GEAA) website. As our client has requested the interactive map be in an open-source format, we anticipate using Google Maps / Google Earth to display our data. We will likely use techniques for exporting .shp files into .kml files, which are compatible with Google Earth.

We will then develop a working website which correctly renders the wastewater spills with attribute data, along with streams and recharge features.

Budget

GOETEX ENVIRONMENTAL SOLUTIONS

Date 2/21/2012
Invoice # 001

GEOTEX ENVIRONMENTAL SOLUTIONS
4003 Verona Cove
AUSTIN, TX 78749
Phone 512 289 3522
geotex-environmental-solutions@googlegroups.com

TO GEAA
GREATER EDWARDS AQUIFER ALLIANCE
1809 Blanco Road
San Antonio, TEXAS 78212
Phone 210 310 6294
Customer ID GEAA01

WORK	HOURS/EQUIPMENT/SOFTWARE	Unit Price	Line Total
GIS Project Manager	45 hrs	$40.00	$1,800.00
Data Collection	135hrs 10 hrs/week * 4 weeks* 4 consultants	$28.00	$3,780.00
Data Analysis	100hrs 10 hrs/week*2 weeks*4 consultants	$30.00	$3,000.00
GIS Web Developer	75hrs 10hrs/week* 8 weeks*1 consultants	$43.00	$3,225.00
Travel Expenses	150 miles @ $0.52 cents/mile	$78.00	$78.00
Equipment Costs	Supplies ($200 per workstation x 4) Maintenance ($200 per workstation x 4) Depreciation ($8000 {total value of computers} / (equip life in months) x 2.5 months equipment will be used for project	$800.00 $800.00 $555.56	$2,155.56
Data and Software	Purchased ESRI license for 10 weeks	$5,208.33	$5,208.33
		Total	$19,246.89

Quotation prepared by: GEOTEX ENVIRONMENTAL SOLUTIONS _____

To accept this quotation, sign here and return: _____

Thank you for your business!

GEAA – GEOTEX TIMETABLE - 2012

Final Deliverables

- Detailed Final report
- Professional Poster
- Spreadsheet containing wastewater spill data
- CD containing:
    - Metadata
    - Report
    - Poster
    - Powerpoint Presentation
- Interactive Aquifer Map (GoogleMap)
- Hard copy Aquifer Map

The final delivery for this project will be an interactive map that shows the wastewaster spills across the Edwards Aquifer Recharge Zone. There will be callout bubbles that shows additional data about the wastewater spill, such as, date of spill and volume of spill. Instructions on updating the GoogleMaps page will be provided to the client.

We will provide the client a spreadsheet containing all wastewaster spill data that is collected thoughout the project. We will also provide wastewaste spill shapefiles for the client to receive at the end of the project.

Conclusion

By collecting information from TCEQ, EAA, and Multiple Utility Districts, the GeoTex Environmental Solutions team will produce a geographic database of wastewater spills within the karst recharge zone of the Edwards Aquifer. In addition to the hard copy map, we will create an interactive map which can be integrated into the GEAA website. We hope this project will be useful in educating the public on the extent and impact of wastewater pollution in South Central Texas.

References

The Edwards Aquifer Website. 2012. Introduction.
www.edwardsaquifer.net. (last accessed 21 February 2012)

Schuler, Mike. 2010. Interactive Map Plots Wastewater Spills.
http://gcaptain.com/interactive-plots-wastewater-spills/?11985
(Last accessed 21 February 2012)

Participation

- Brady Nock
  - Project Manager
- Rachael Weissman
  - GIS Analyst
- Mark Wilson
  - GIS Analyst / Webmaster / Graphic Designer
- Amy Woods
  - GIS Analyst