



Long-Term Environmental Monitoring Web Portal

Clint Smith, GRA

Department of Civil, Construction, and Environmental Engineering - The University of Alabama

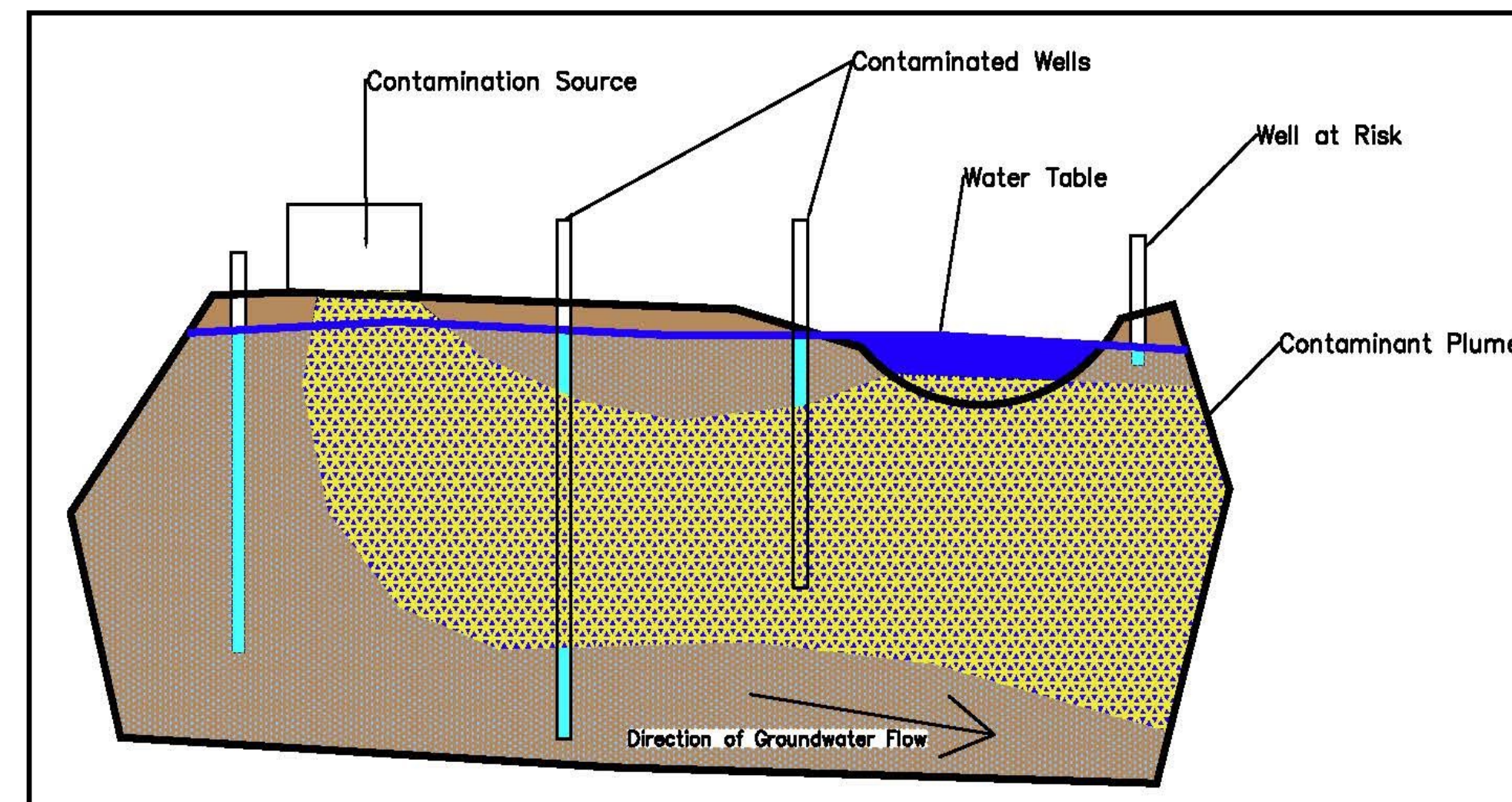
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Introduction:

An online long-term monitoring web portal allows all of the historic and future data pertaining to an environmental site to be:

- Stored in one location
- Analyzed by multiple users
- Displayed in a user-friendly manner by graphs or tables



Increasing attention is being given to long-term monitoring of environmental sites because often times the best available solution is for natural attenuation and degradation, which may take decades.

Natural attenuation and degradation may be the best option for the site because:

- Site's size (if the site is very large)
- Location (if the site is under extensive infrastructure)
- Other possible reasons

Long-term monitoring practices require:

- Numerous monitoring points for monitoring and control of contaminant
- Strict schedules for sampling and reports
- Individual thresholds that if exceeded trigger remedial action

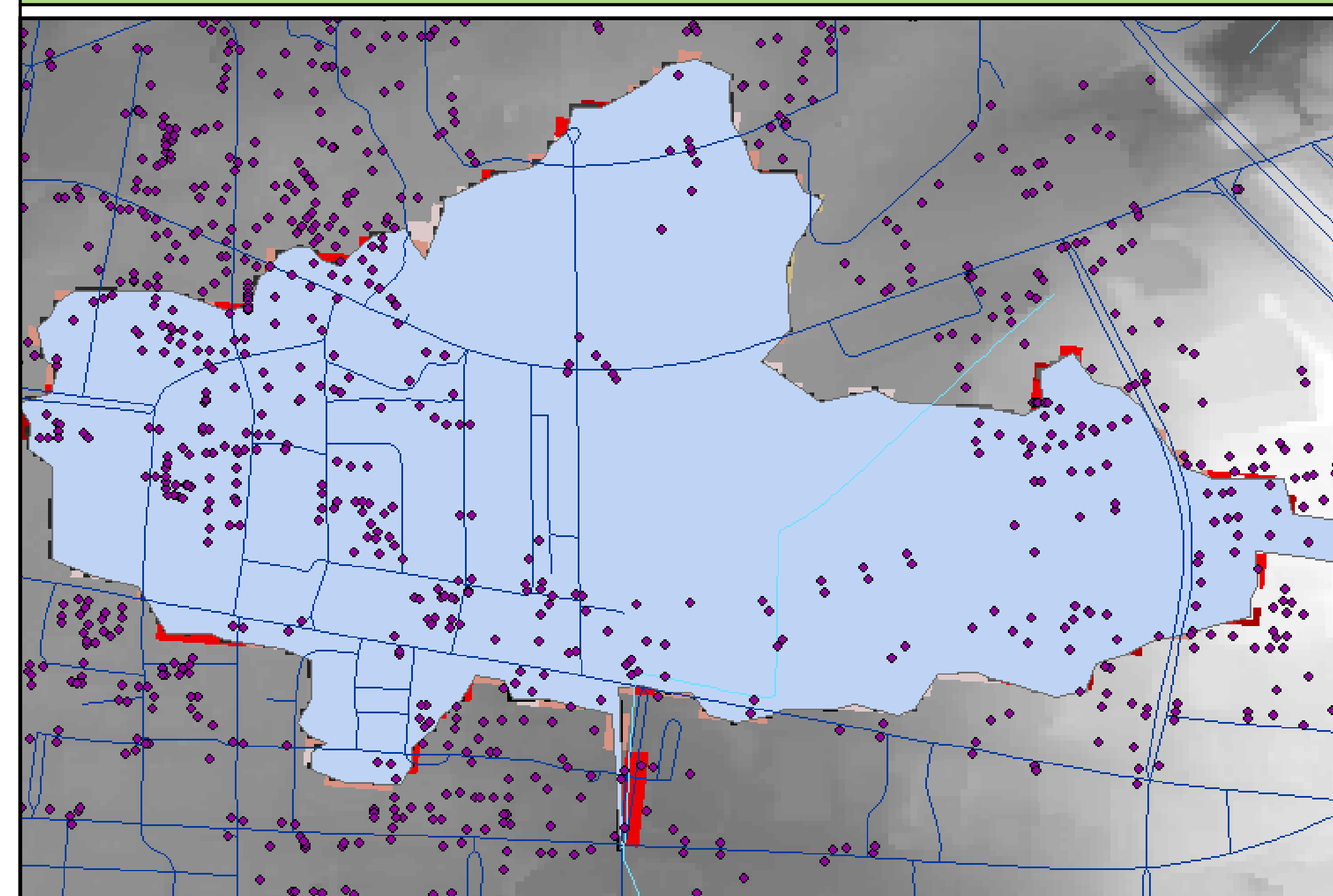
This project is being done to provide a fast and efficient method of storing and retrieving information for engineers, consultants, and other related parties. There are many different kinds of data that relate to long-term monitoring of environmental sites such as documentation, geographic information, and attribute data. The online portal provides access to information and design decisions that may have been made years before the current custodian of the site was involved in the project.

Objectives:

The objectives of the Long-Term Environmental Monitoring Web Portal include:

- Standardize practice of long-term environmental site management
 - Auto-generate required reports for site
 - House all related data in one location for future use
- Develop online database template for environmental site monitoring
 - Create error checking routines to ensure consistency and accuracy

Methodology:



A fictitious site, seen left, where the purple points are monitoring wells and the blue polygon is the site extents. Using ArcMap 10.5, the monitoring wells are displayed using their longitude and latitude. The red boxes are symbolizing outfalls where water is at the ground surface so then the water could be pumped and treated at these areas.

Document and data management is a very important factor in environmental site

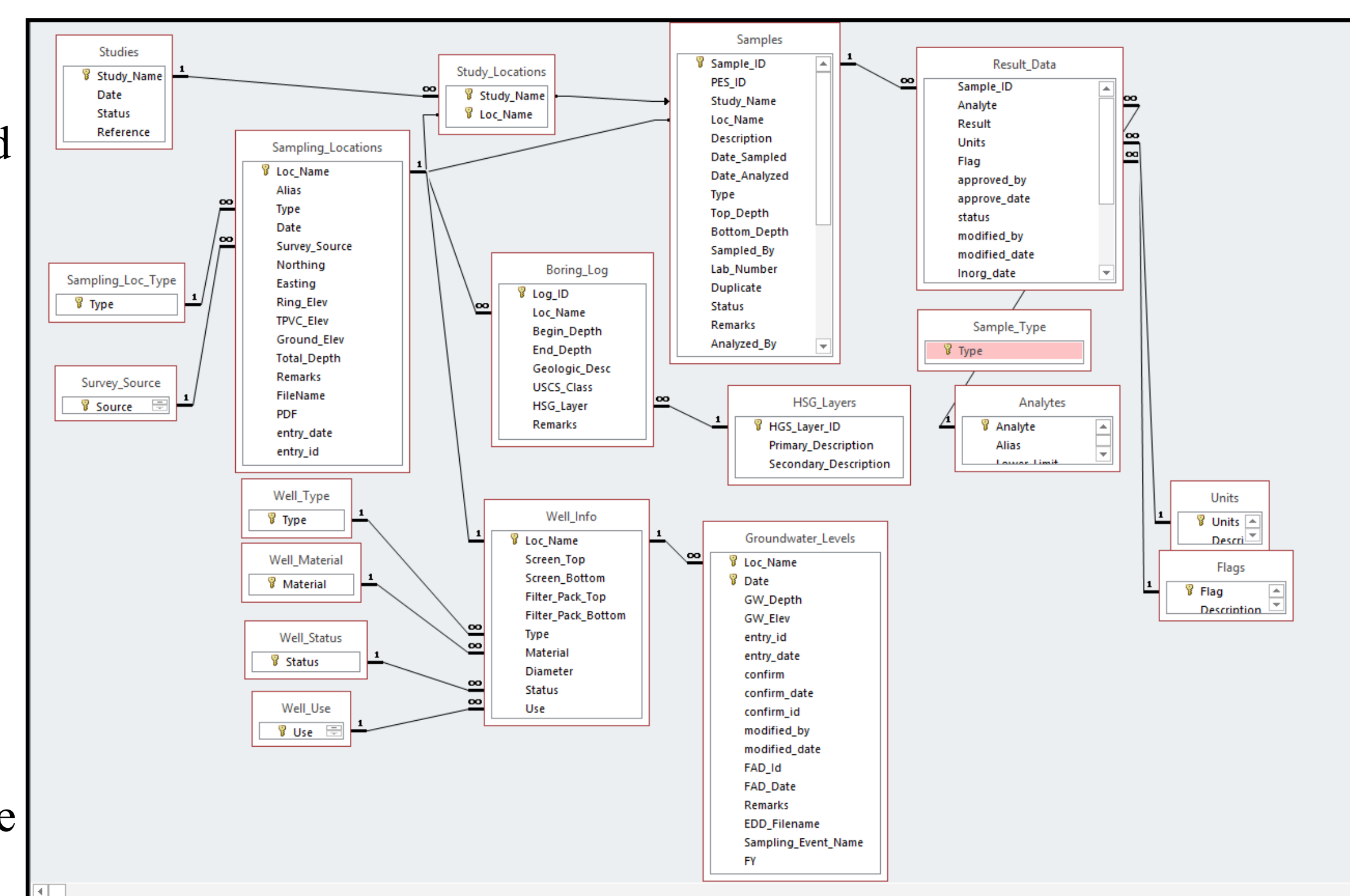
Southwest Treatment Area Corrective Measures Implementation Plan	Dec-11 Work Plan	Southwest Area
Southwest Treatment Area Corrective Measures Implementation Plan - Revised	Sep-12 Work Plan	Southwest Area
Status Report on Addendum 10 - PH 12 Area Monitoring Plan	Nov-02 Report	PH12
Storm Drain Structure Condition Assessment	Mar-05 Work Plan	Select Drains on CB
TCE Trends Through April 2010	Mar-11 Work Plan	Whole Site
Third Quarter Status Report (2010)	Oct-10 Report	Whole Site
Third Quarter Status Report (2011)	Dec-11 Report	Whole Site
Well PZ-27 Construction and Lithology	Nov-13 Boring Log	PZ 27
Well PZ-28 Construction and Lithology	Nov-13 Boring Log	PZ 28
Well PZ-29 Construction and Lithology	Nov-13 Boring Log	PZ 29

monitoring. A document management system was implemented

to be able to give the documents a location, understandable name, type of document, and associated date

(seen above). Document types include work plans, reports, boring logs, environmental covenants, field notes, or agreements. All of the documents would be attributed to a specific point, like a well, or polygon, such as an outfall area or the entire plume. The main portion of an online monitoring portal will be the database that houses all of the data, users, and logs of use of data.

An example database schema can be seen right. This schema can be followed to see how data can be would be uploaded, viewed, and exported within an online database.



Acknowledgements:

Spencer Livingston | Developer | CAPS

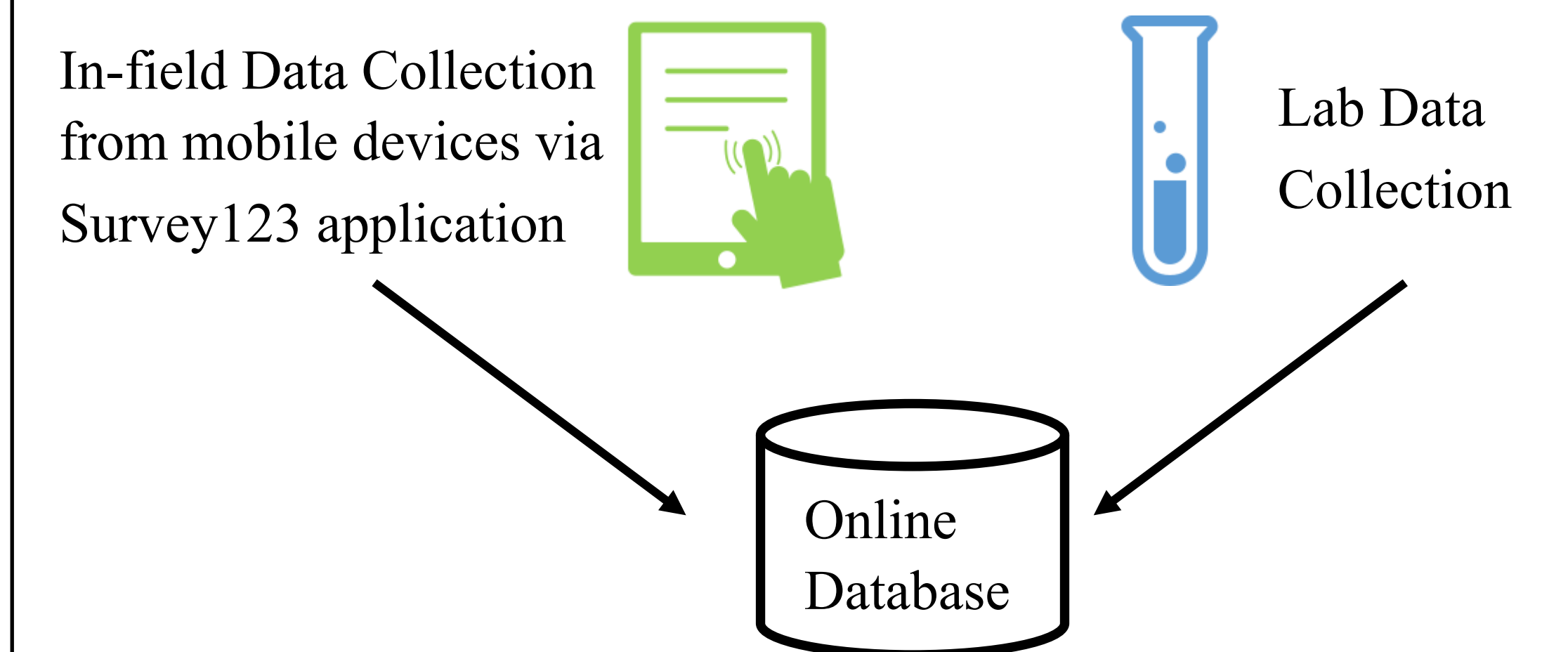
Dr. Andrew Graettinger | Professor | The University of Alabama

Dr. Randy Smith | Associate Professor | The University of Alabama

Alabama Department of Transportation

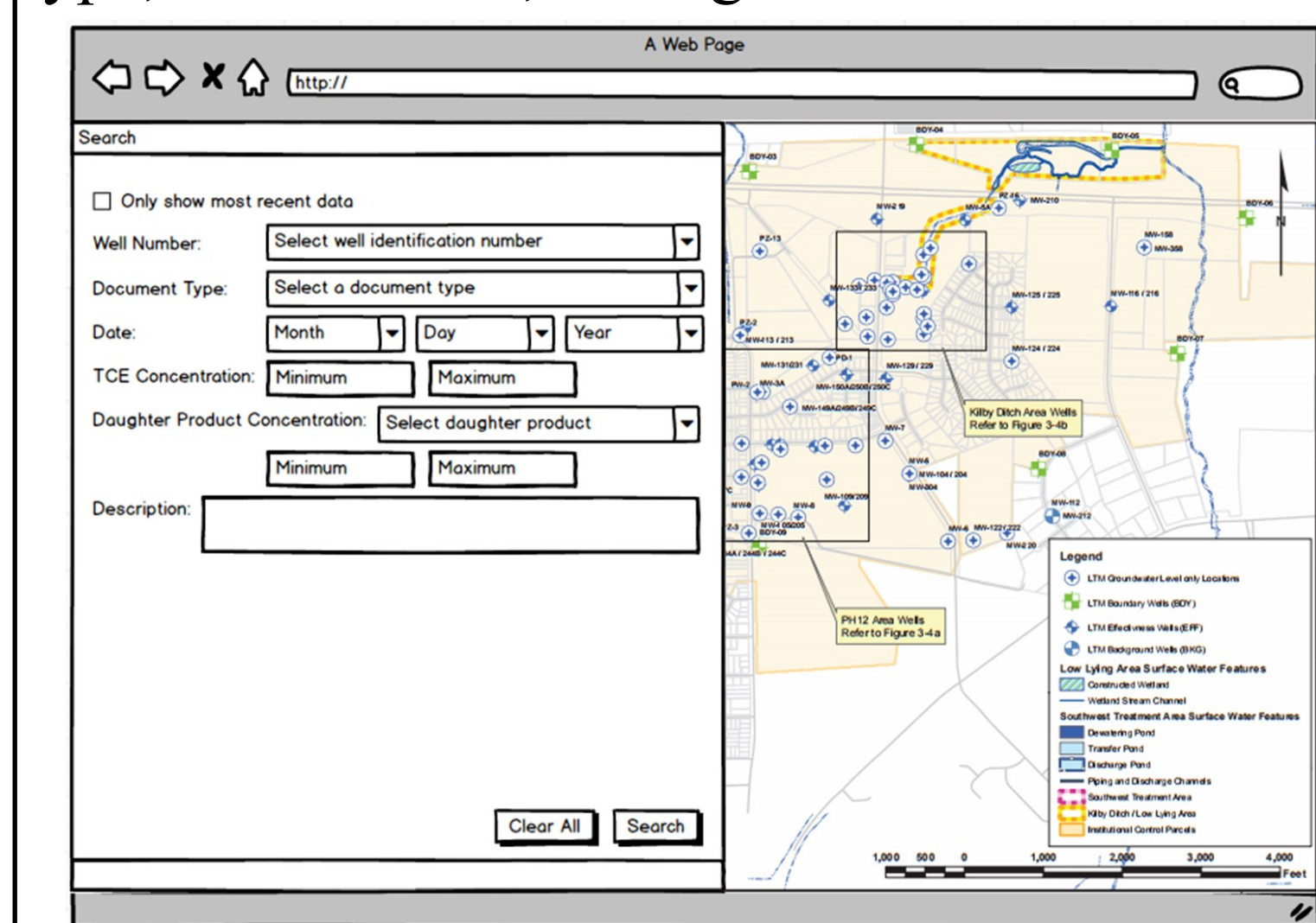
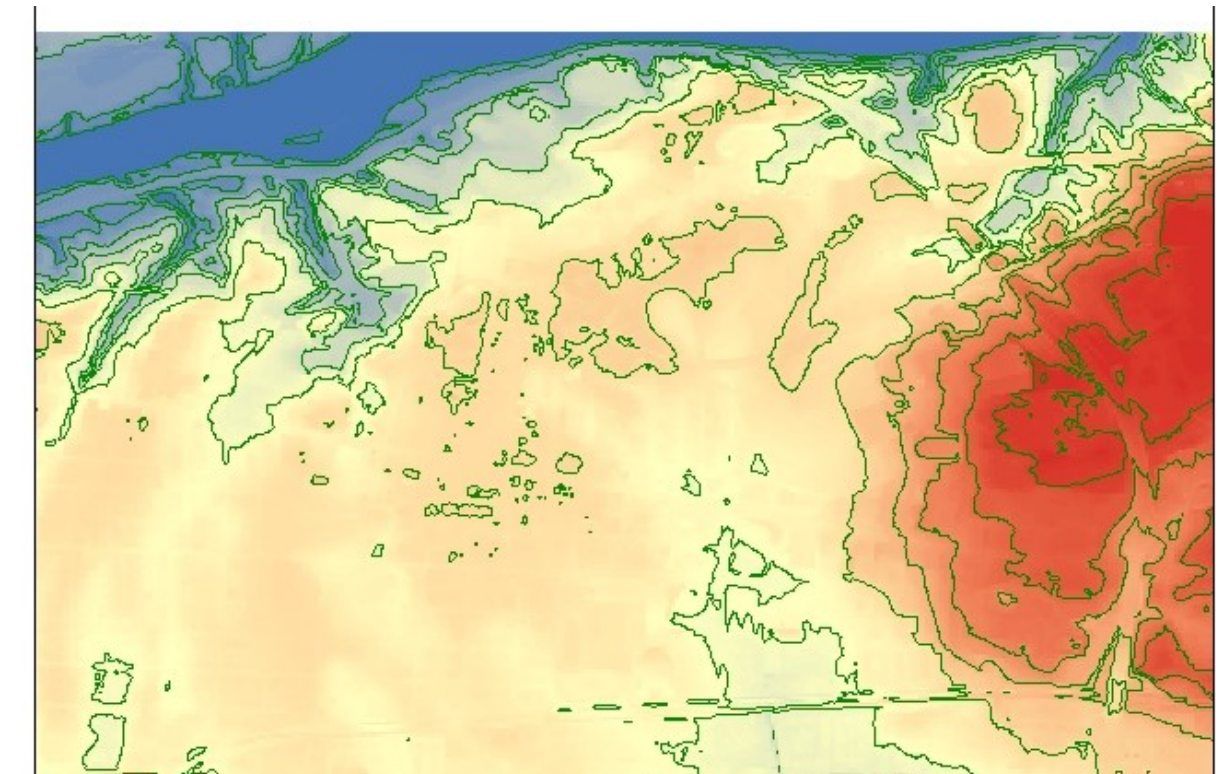
Innovative Use of Technology:

The online long-term monitoring portal will automatically receive data from remote devices such as mobile phones and tablets by using applications such as Survey123 and data from the lab that tests samples taken from wells.



Results and Conclusions:

The online long-term environmental monitoring portal is capable of producing contour maps (seen right), tables (bottom right), and graphs. The table shown represent wells that need to be sampled. The online portal will incorporate a dashboard (bottom left) that allows the user to specify what the desired table or graph should contain. The dashboard shown allow the user to search by date range, document type, well number, among other factors.



OUT OF DATE SAMPLE LOCATIONS

Report date: 11/02/18
Location type: Monitoring Well
Maximum record count: 50
Actual record count: 50
(Showing samples older than 2 years)

Well Number	Last Sample Date
WEL 100	2018-01-01
WEL 101	2018-01-01
WEL 102	2018-01-01
WEL 103	2018-01-01
WEL 104	2018-01-01
WEL 105	2018-01-01
WEL 106	2018-01-01
WEL 107	2018-01-01
WEL 108	2018-01-01
WEL 109	2018-01-01
WEL 110	2018-01-01
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WEL 143	2018-01-01
WEL 144	2018-01-01
WEL 145	2018-01-01
WEL 146	2018-01-01
WEL 147	2018-01-01
WEL 148	2018-01-01
WEL 149	2018-01-01
WEL 150	2018-01-01

Future Work:

- Receive data from in-field sampling events automatically to be stored in database
- Publish tool in a web format to be easily available for use to anyone with access
- Add functionality to create custom graphs and tables
- Develop user alert system for alarming contaminant levels and sampling notification time with random number generator
- Create user guide for end-user to know how to upload, edit, and manage data effectively