Texas Stream Team Datamap and Site Automation

Web Geo Consulting Co.

Emma Moffat, Project Manager

Hiram Zagala, Assistant Project Manager

Ella Rader, GIS Analyst

Noah Lindsey, GIS Analyst

Client: The Meadows Center for Water and the Environment

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Introduction

The Texas Stream Team is a volunteer-driven environmental monitoring program that collects surface water quality data from over 350 active sites across Texas. This project aims to **decrease processing time** and **increase data accuracy** for the uploaded data through:

- **Data automation**
- **Validation**
- **Visualization**

Problem Statement

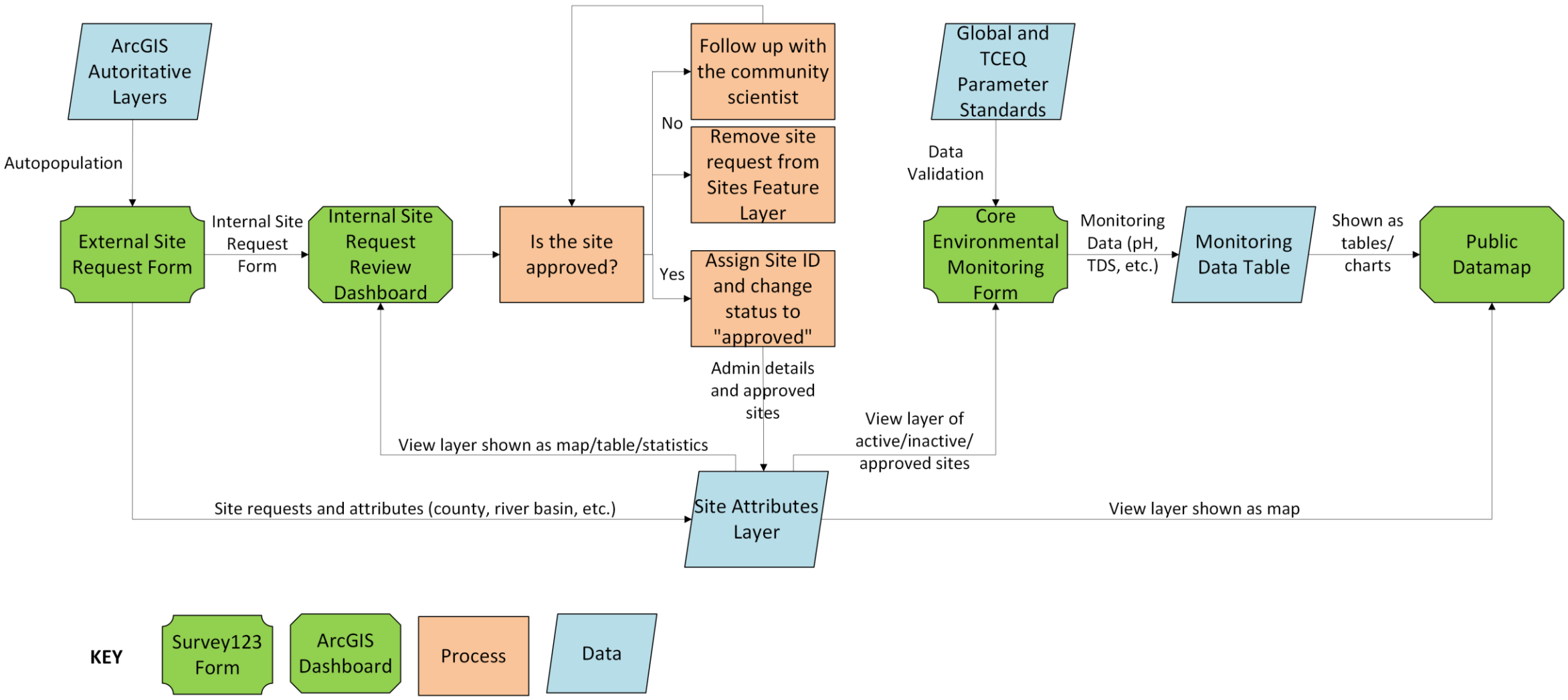
- Texas Stream Team oversees **350+ active monitoring sites** across Texas
- They **collect water quality data** submitted by community scientists, which is used to guide conservation efforts
- **Processing delays** may result from manual data entry, human error, high submission volume, or a combination of these factors
- This has led to **delays**, **inaccurate data**, and **reduced accessibility**

Data

- **ArcGIS Online Layers**
  - Used to autopopulate attributes and provide spatial context
- **Custom Validation CSV**
  - Contains water quality standards from TCEQ for data validation
- **Sample Test Records**
  - Submitted in phases to test form and layer functionalities

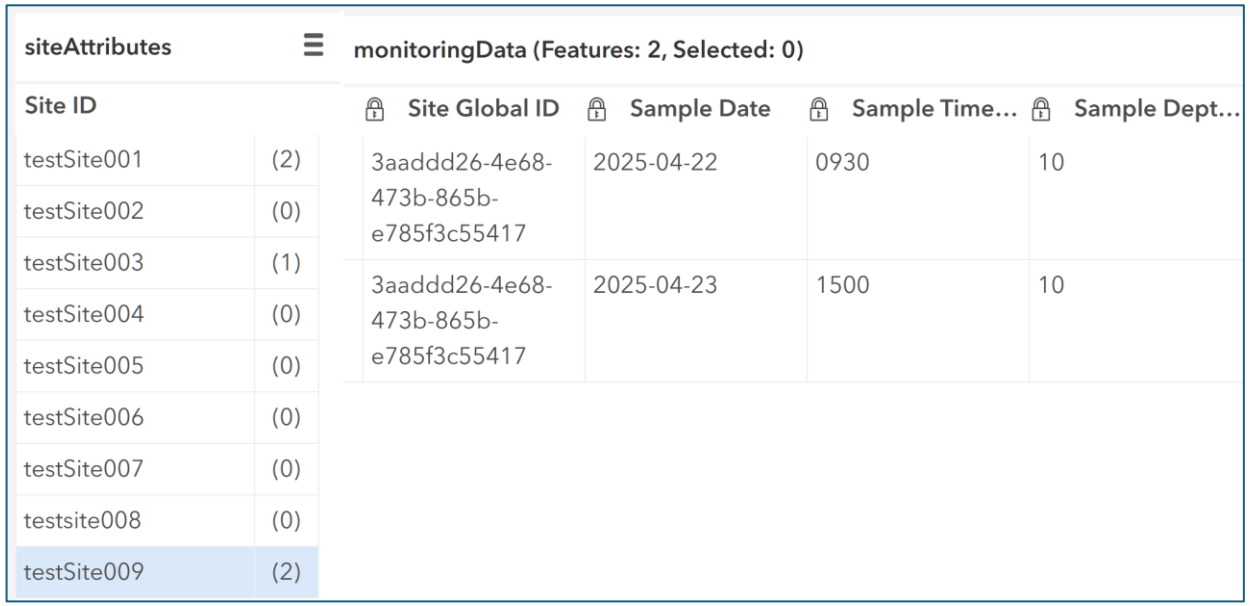
Feature Layer	Function
Texas County Boundaries	Autopopulation/Web Map
TWDB_River_Basins	Autopopulation/Web Map
Watershed Boundary Dataset HUCs	Autopopulation/Web Map
Stream Segments_Current	Autopopulation/Web Map
TCEQ_SWQM_Stations	Web Map Only
Sampling Sites	Web Map Only
Buffer of Sampling Sites	Web Map Only

New Datamap Workflow



Related Tables

- Created **siteAttributes** point feature class and **monitoringData** standalone table in ArcGIS Pro
  - Created fields and configured domains
  - Established one-to-many relationship
  - Verified relationship by manually adding test records then uploaded to ArcGIS Online



siteAttributes

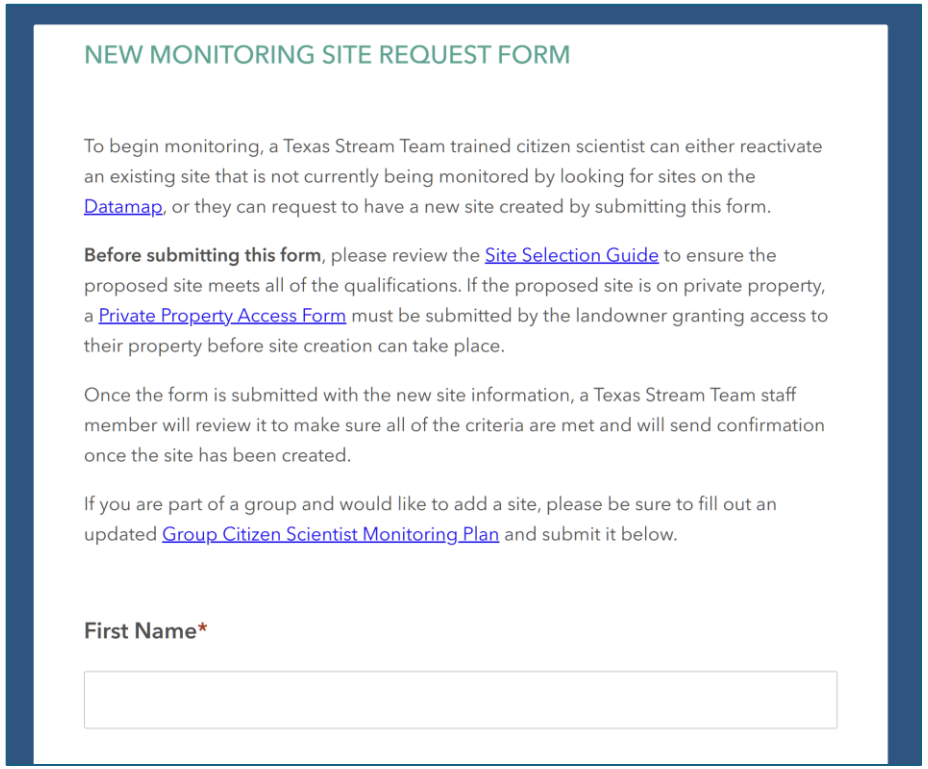
Site ID	
testSite001	(2)
testSite002	(0)
testSite003	(1)
testSite004	(0)
testSite005	(0)
testSite006	(0)
testSite007	(0)
testsite008	(0)
testSite009	(2)

monitoringData (Features: 2, Selected: 0)

Site Global ID	Sample Date	Sample Time…	Sample Dept…
3aaddd26-4e68-473b-865b-e785f3c55417	2025-04-22	0930	10
3aaddd26-4e68-473b-865b-e785f3c55417	2025-04-23	1500	10

New Monitoring Site Request Form

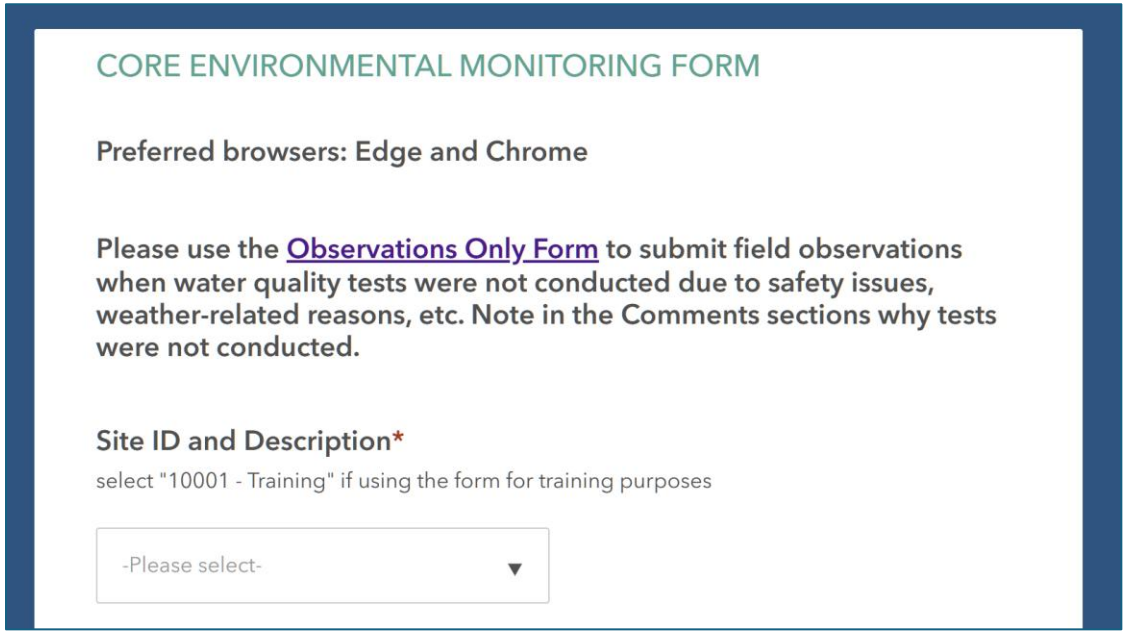
- **Designed in Survey123 Connect**
  - Customized title, font styling, color scheme, and question reordering
- **Autopopulation of geographic attributes**
  - County, River Basin, HUCs, Lat/Long
- **Conditional field visibility**
  - Uses form mode logic to hide/show admin fields

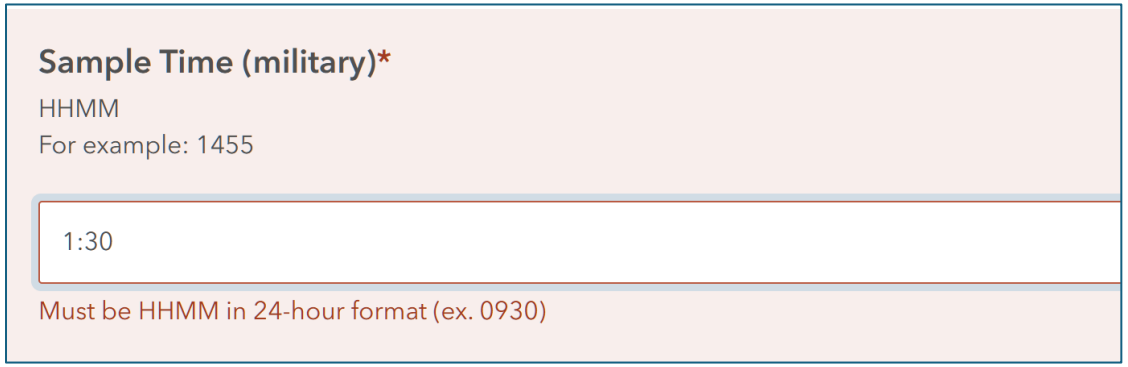


type	name	label	calculation	body::esri:visible
Hidden	survey_mode	Survey Mode	pulldata("@property", 'mode')	
Text	county	County	if(${survey_point}, pulldata("@layer", "getValueAt", "attributes.CNTY_NM", "https://services.arcgis.com/KTcxiTD9dsQw4r7Z/arcgis/rest/services/Texas_County_Boundaries/FeatureServer/0", ${survey_point}), "")	${survey_mode}='edit'

Core Environmental Monitoring Form

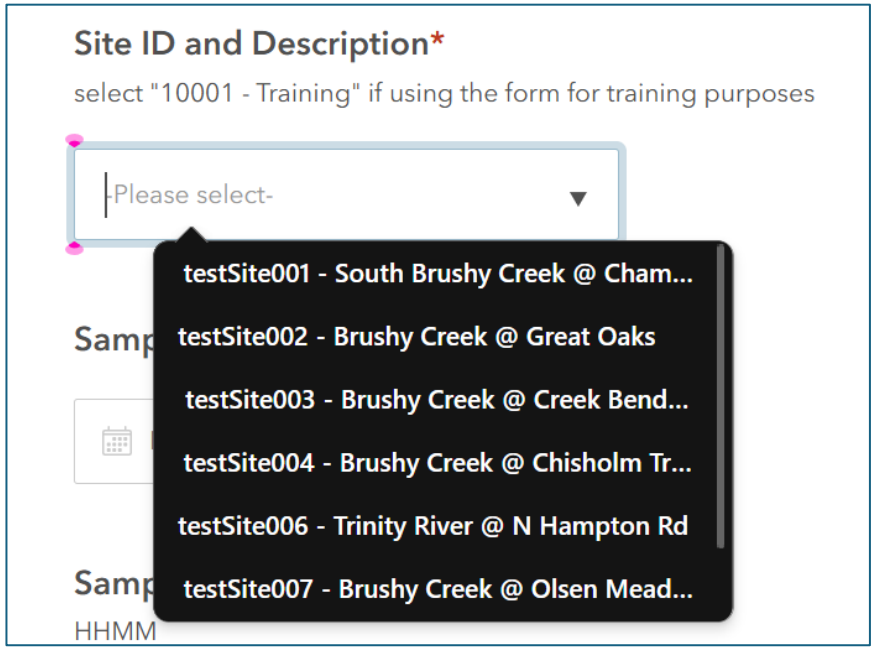
- **Designed in Survey123 Connect**
  - Customized title, font styling, color scheme, and question reordering
- **Time constraint for sample time**
  - Applied a **regular expression (regex)** and substring logic
- Configured **automatic calculations** for TDS and DO average using XLSForm expressions

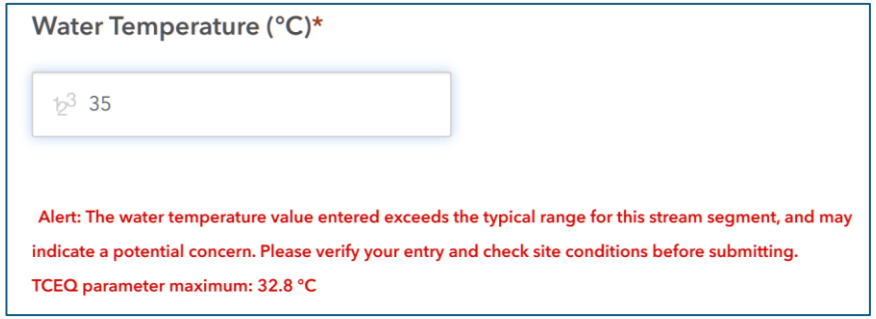




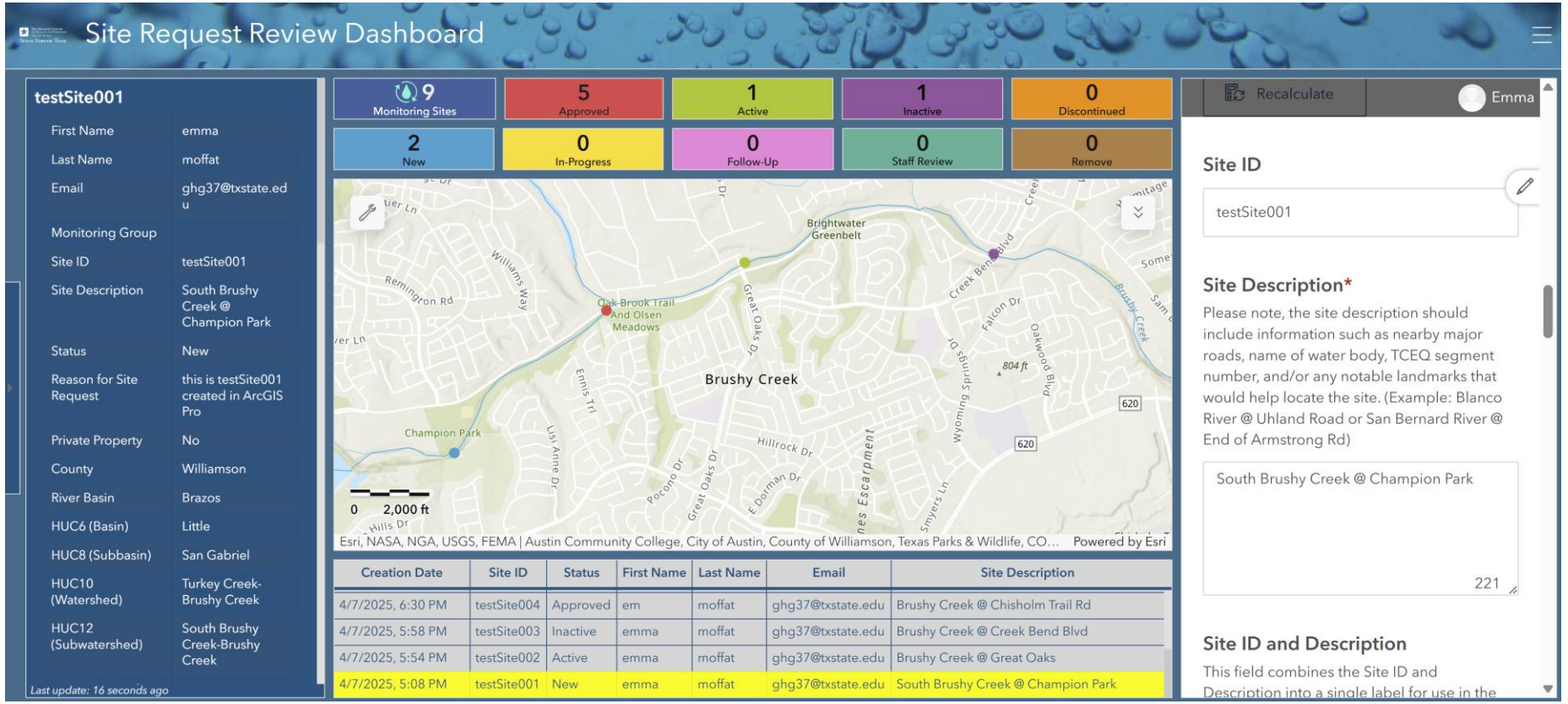
Core Environmental Monitoring Form Cont.

- **Created a dynamic list of sites**
  - Contains approved, active, inactive sites
  - Site selection stores GlobalID to maintain one-to-many relationship
  - Users can search by site ID and description, improving usability.
- **Implemented data validation**
  - Used pulldata() function to compare submitted measurements against TCEQ standards CSV
  - Warning notes displayed when values exceeds expected ranges





Site Request Review Dashboard



- **Top:** status indicators
- **Left panel:** displays detailed data from siteAttributes view layer
- **Right panel:** embedded editable version of the New Monitoring Site Request Form
- **Center:** Map element containing siteAttributes view layer
- **Bottom:** data table of siteAttributes View Layer - Form Responses

Results and Discussion

- **Successful Workflow:** Improved data accuracy and streamlined data management
- **Data Quality Issues:** No issues found during testing. Potential errors could be found by user input error and duplication
- **Limitations:** Steep learning curve, related table creation, ArcGIS dashboard constraints, Core Environmental Monitoring Form (overload)
- **Future Fixes:** Strengthen validation rules and parameters. Perform additional spatial analysis for site proximity

Conclusion

- **Enhance** the **speed** and **accuracy** of the data mapping process.
- **Improve accessibility** and **reliability** of public data maps while **minimizing** administrative workload.
- **Optimize efficiency** for community scientists and the Texas Stream Team site monitoring process.

Thank You!

Presented By Emma Moffat, Hiram Zagala, Ella Rader, Noah Lindsey

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