

Katie Harwood –Project Manager

Josiah Watson -GIS Analyst Edie Jacques -GIS Analyst Ceri Prior -GIS Analyst Jared Olson -GIS Analyst

Introduction and Background

The Texas Stream Team is a environmental organization that monitors and reports on water quality data across the state of Texas. They currently have a public ESRI dashboard that visualizes all this collected data in 400 watersheds. The Meadows Center for the water and the Environment is currently utilizing this public dashboard for analysis purposes in house.

The current issue that this dashboard faces is that it lacks a tool that will enable selection and visualization of eligible watersheds for reporting purposes. This project aims to create this tool by implementing Arcade expressions into a new ESRI dashboard, as well as using ArcGIS Pro/Online and Survey123 data. Through automation, data verification and visualization, the project's goal is to overall improve the current Texas Stream Team dashboard for the Meadows Centers staff use.

Data

The Texas Stream Team data provided by the Meadows Center consisted of a site status layer, a water quality monitoring sampling event table, and a watershed report tracking table to be used for attribute and temporal aspects of eligibility criteria filtration. For publicly available data, HUC 8 and HUC 10 polygons, River Basin boundaries, and Texas Counties shapefiles were downloaded and used in visualization and eligibility filtration as well.

Methodology

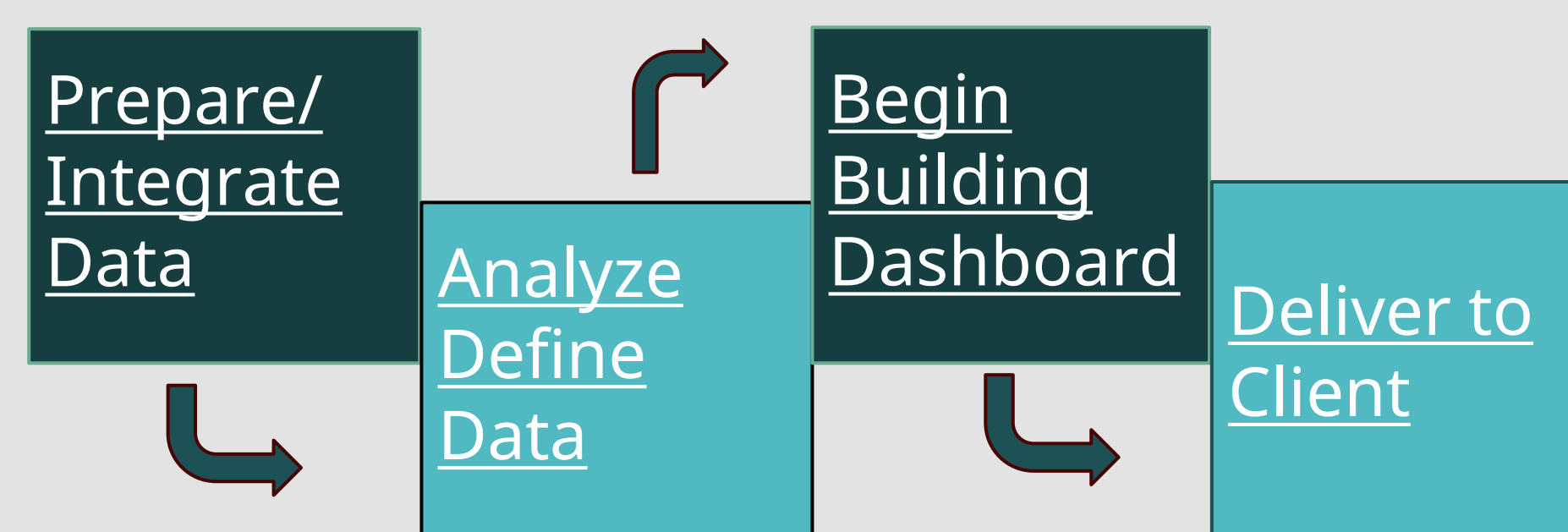


Figure 1. Simplified Methodology Chart

1. Input WQ and Site Status layers, Prepare data to form base web-map
2. Create location relation table for visualization, Define eligibility criteria needed for Dashboard
3. Publish final web-map with point and spatial layers, Implement Arcade functions of eligibility and scoring into Dashboard
4. Final check of dashboard functionality, Present to client

Results

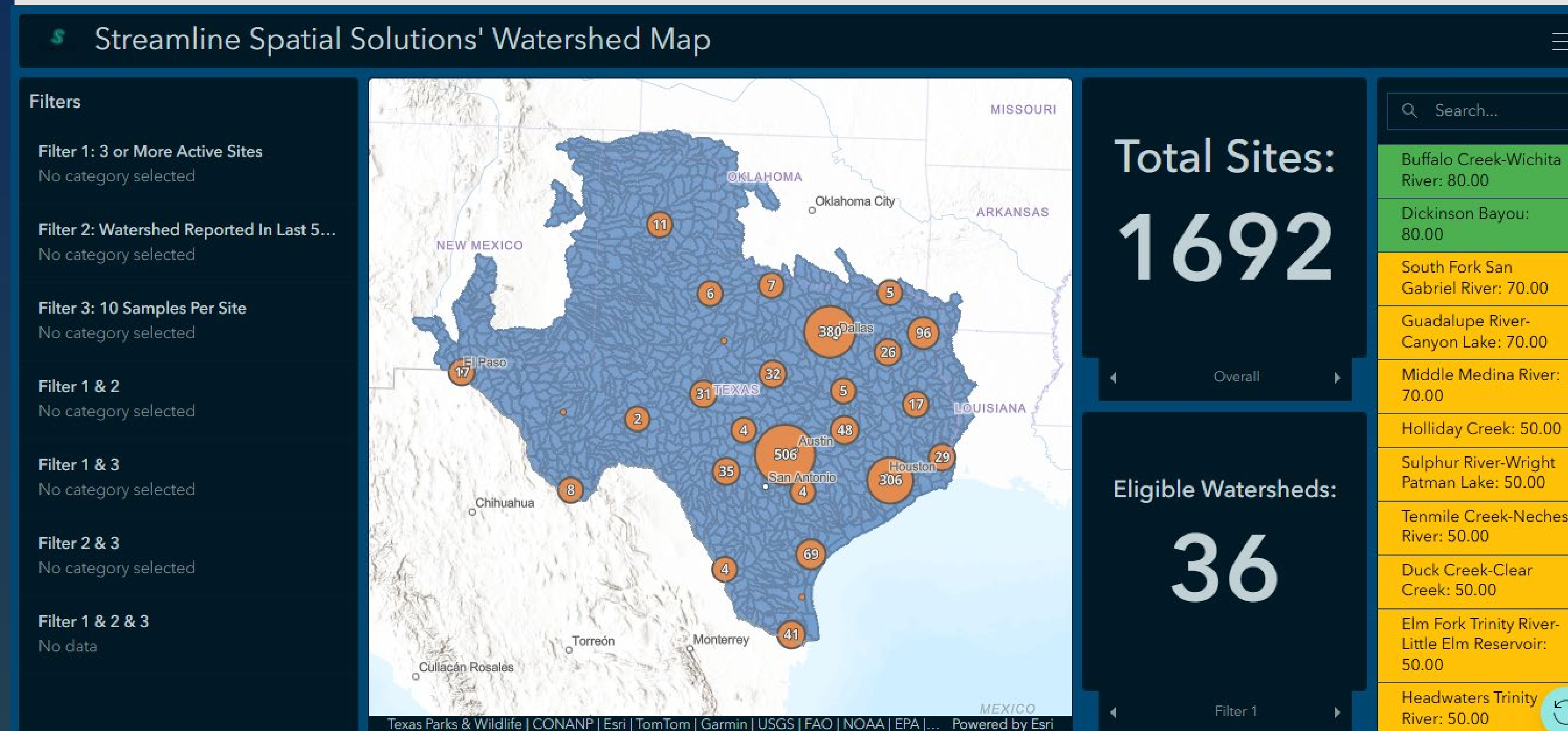


Figure 2. The completed dashboard featuring the primary web map (center), watershed eligibility filters (left), along with summary statistics and the scoring system (right).

Watershed Eligibility Results

Criteria	Assigned Weight
≥ 3 active monitoring sites	50%
≥ 10 records per site	30%
No reporting activity in 5 years	20%

Table 1. Criteria and assigned weight table

These criteria make up the filters shown above on the left, summary statistics on the right of the map and scoring system on the far right. The monitoring weight was assigned 50% due to site activity status being the most important, with quantity of samples per site as well as reporting history for each site ranking second and third in respective importance per Texas Stream Team.

Scoring System

- Highest score meets/exceeds thresholds, moderate for just below, and low for those not met
- Outputs to Score field
- Allows flexible scoring, highlights watersheds nearing eligibility

```

// site count scoring
if (siteCount >= 3) {
  | score += 50;
} else if (siteCount >= 2){
  | score += 20;
} else {
  | score += 0;
}

//record count scoring
if (recordCount >= 10) {
  | score+= 30
} else if (recordCount >= 7) {
  | score+= 20
} else {
  | score+= 0
}

//report year scoring
if(Year(Now) - reportYear >= 5) {
  | score+= 20
} else if (Year(Now) - reportYear >= 4) {
  | score+= 10
} else {
  | score+= 0
}
  
```

Figure 3. Arcade Code for Scoring System

Findings

The dashboard implemented different spatial joins amongst various water quality reporting and site records data to visualize site and edibility reporting of Texas watersheds. This was achieved through the creation of different data tables and joining them together, along with code within arcade.

- Dashboard automation reduced manual watershed screening.
- Weighted scoring identified priority watersheds for additional monitoring.
- QA/QC checks improved reliability of water quality reporting records.

There existed some limitations regarding dashboard filter customization along with attribute and field calculations with arcade which affected its overall format and user-interface.

Conclusion

This project developed an ArcGIS Dashboard workflow that automated watershed eligibility identification for the Meadows Centers use. By integrating weighted scoring, filtering, and QA/QC tools, the dashboard improves reporting prioritization, supports decision-making, and demonstrates how GIS can better streamline environmental monitoring.



Figure 4. Stream Team volunteers participating in Macroinvertebrate Bioassessment Training at Spring Lake

Acknowledgements

We thank Laura Parchman, the Meadows Center for Water and the Environment, and the Texas Stream Team for their guidance, datasets and overall support through this project.