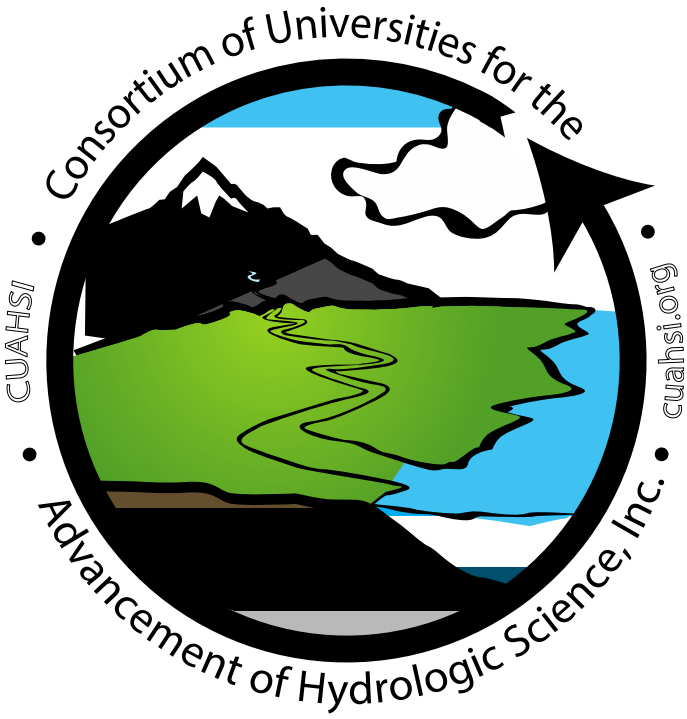
Request for Proposals

Utility Service Boundary Creation Tool



Issue Date: January 13, 2022
Submission Deadline: January 28, 2022, 5:00 p.m. EST
Contact: Dr. Jerad Bales, Executive Director, CUAHSI (jdbales@cuahsi.org)

1. Background

The Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) is a 501(c)(3) corporation that provides services and infrastructure to support the water-resources research and management community. Utilities are a key part of the nation's overall water infrastructure, and utility information can be difficult to discover.

Utility service area boundaries are essential for modern utility operations and for regional and state-wide planning and regulation of utilities. Currently, fewer than 10 state governments have a state-wide program to collect, manage, update, and publish digital versions of utility service area boundaries in the water and wastewater sectors suitable for analysis, planning and regulation. Currently, in the states without such programs, only relatively large utilities with sophisticated geospatial expertise even create digital service area boundaries for internal use, and the accessibility and interoperability of these boundary data are limited. One of the limiting factors to creating and using digital service area boundaries is that many utilities do not have access to, and/or expertise with, the necessary software or hardware to create and use digital service area boundaries. We wish to create a web application to reduce this barrier.

2. Scope

The following describes the envisioned solution.

2.1 Boundary polygon creation interface

Requirements: An in-web browser user interface that allows utility staff (see personas) to log in and create and submit service area boundary polygons and associated metadata for their (and only their) utility. If a utility already has a digital service area boundary, they should be able to upload a geospatial file, most commonly a shapefile or geojson. If a utility does not have a digital service boundary polygon file, or needs to update theirs using this system, they should be able to create one using a map-based point-and-click interface.

Risks: Utilities creating boundaries with the metadata may not be spatially precise and will require validation and could require modification.

Benefits: A mechanism to submit boundaries will provide a foundation to manage a state or region-wide boundary layer suitable for analysis, planning, decision-making, and regulation

2.2 Role-based solicitation and validation workflow

Requirements: A system allowing a system administrator (see personas) to:

1. Curate the group of utility users
2. Solicit utility users for submission of boundary polygons and metadata on an annual update basis
3. Receive notifications of submission of a boundary polygon
4. Visually inspect the polygon and associated metadata
5. Validate the polygon and metadata for inclusion in an "approved" collection of polygons
6. Request revisions from the utility users

2.3 Data Storage

Requirements: Each approved polygon for a given year should be stored and be queryable as an independent feature. Functionally, a table of the following type should be constructable from the data store.

Utility ID	Year	Metadata Fields	Geometry (WGS84)
A	2020	Values	Multi-polygon coordinates
A	2021	Values	Multi-polygon coordinates
B	2020	Values	Multi-polygon coordinates
B	2021	Values	Multi-polygon coordinates

2.4 Data Publication

Requirements: Boundary layers should be made available to human and machine users. For machine users, this should be through a web API that enables easy querying of geospatial vector features such as OGC API-Features. For human users, there can be a map-based interface to search, visualize, and download spatial and temporal subsets of all approved boundary polygons. This map-based interface could use the API as the back end.

2.5 Tech Stack

In general, the solution should be open source (commercial use allowed, e.g., MIT, Apache2, or public domain type license). The stack should be deployable cross-platform and preferably cloud-agnostic, or else use common cloud technologies such as virtual machines, container orchestration, and managed databases.

- Front-end framework(s) - no preference.
- Back-end language - python preferred.
- Data store - open-source geospatial database, e.g., PostGIS.
- Web API standard – RESTful with spatial and attribute query, e.g. OGC API Features.

2.6 Desired Delivery Schedule

Ideally, a front end minimum viable product should be delivered by May 1, 2022, and a final product by August 18, 2022.

3. User Personas

3.1 Utility Staff

Description: A person in a utility charged with submitting a new or updated boundary polygon.

Needs: (a) Find relevant submission UI; (b) If creating/modifying boundary, need intuitive drawing controls and assistive/ contextual background maps and layers such as parcel boundaries and neighboring utility boundaries.

Pain Points: (a) Doing the task at all; (b) Registering for system; (c) Drawing a polygon using an unfamiliar interface; (d) Needing to redo work if submission is not deemed to be accurate by Administrator.

Motivation: Be done with task quickly.

3.2 Administrator

Description: A manager of boundary data across many submitting utilities.

Needs: (a) Solicit updated boundaries annually; (b) Check submitted boundaries for completeness and accuracy/ plausibility; (c) Approve final publication of boundaries; (d) Load any assistive layers (e.g., statewide parcel boundaries); € Query entire dataset for any given utility boundary for any given year.

Pain Points: (a) Curating "utility staff" users;(b) Receiving boundaries from all utilities of interest on a regular basis; (c) Receiving clearly incorrect/incomplete/corrupt boundaries

Motivation: (a) Get complete boundary dataset for jurisdiction; (b) Boundaries are reasonably accurate.

4. Comparison with ready-made solutions

Software	Open Source	Intuitive purpose-built UI, including assistive layers	RBAC	Validation and publication workflow	Versioning History	OGC – APIs for publication	Public map viewer
ArcGIS Online	**No**	**Possible**	**Yes**	**No**	**No**	**Incomplete**	**Yes**
GeoNode	**Yes**	No	**Yes**	**Clunky**	**No**	**Yes**	**Yes**
Envisioned Solution	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

5. Request for Proposals

5.1 Enquiries

All enquiries related to this RFQ are to be directed, in writing via email to Dr. Jerad Executive Director, CUAHSI (jdbales@cuahsi.org). Subsequent discussions may be in person or via teleconference at CUAHSI's discretion.

5.2 Closing Date

One electronic copy of the response to the RFP must be received via email to Dr. Bales by 5:00 p.m. EST on January 28, 2022. Submissions must be electronically signed.

5.3 Late Responses

Late responses will only be accepted if an extension is provided in writing by CUAHSI 24 hours in advance of the deadline.

5.4 Review and Selection

Reviews will be performed by CUAHSI staff and CUAHSI collaborators.

Selection will be based on

- Responsiveness to this RFP,
- Proven capacity and demonstrated experience to deliver the project requirements on time and on budget,
- Proposed schedule of product delivery, with an expectation that interim, deployable products will be delivered, and
- Total and incremental costs.

5.5 Acceptance of Responses

This RFP is not a binding agreement to purchase goods or services.

6. Conflict of Interest

Respondents should disclose real, potential, or perceived conflicts of interest in writing. For the purposes of this RFP, a conflict of interest exists wherever an individual could benefit directly or indirectly from access to information or from a decision over which they may have influence. This also includes a perceived conflict where someone might reasonably perceive there to be such benefit and influence.