

## **Wisconsin Voting Districts: Executive Summary**

### **Project Background:**

The Wisconsin Elections Commission's job is to help manage election systems in the state of Wisconsin to benefit both members of the public looking to register and vote, but also to help the 1,850 election clerks around the state run elections and manage elections data.

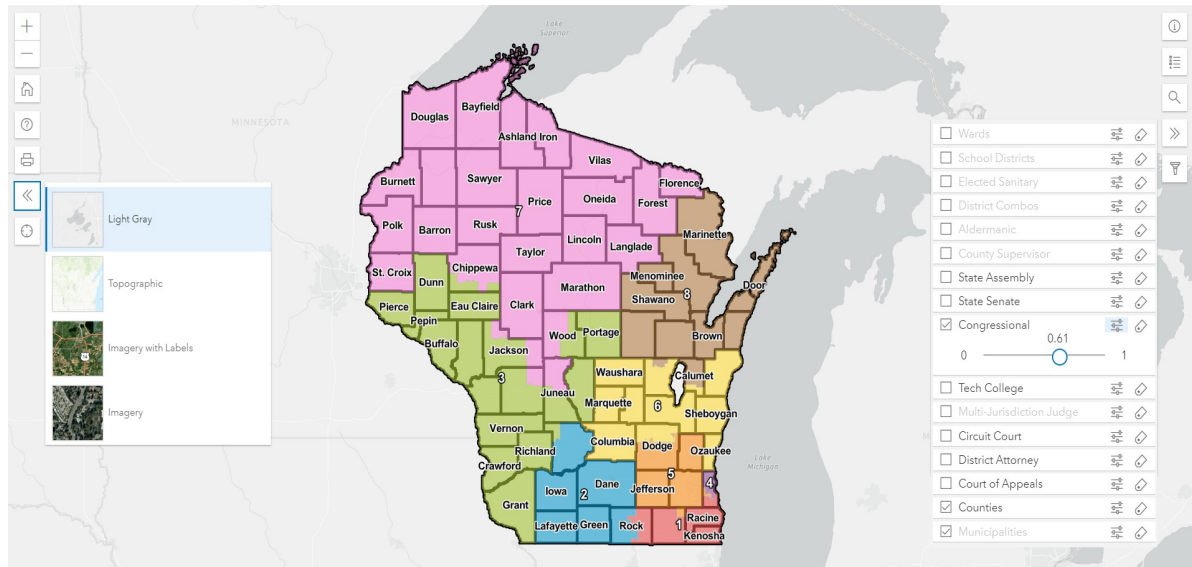
The voter registration system utilizes mapping tools to visualize two essential parts of the election process that ensures voters are provided with the correct ballots: address points, which voter records are tied to when a voter registers, and voting districts, which help to determine the unique ballot style a voter would receive for a given election if their address falls within that voting district. Address data is updated as new homes or apartment buildings are constructed or if street names or addresses change over time.

District data can also change with annexations or school district changes, but these districts are largely static, other than every 10 years after the United States Census occurs. When population numbers are adjusted through the census, states then subsequently go through a process called redistricting that adjusts the boundaries of many districts at the federal, state and local levels. These include congressional, state legislative lines and even local town or city council districts. As a result, these changes may affect many voters who will see changes to the election races that appear on their ballot when they vote. Once the voting districts are determined by the local and state officials, the Wisconsin Elections Commission updates the voting systems to reflect these changes.

### **Project Purpose and Intended Audience:**

The 2020 Redistricting cycle was particularly chaotic due to a combination of factors, beginning with census data arriving late, and then continuing with compressed timelines and lawsuits that occurred in state and federal courts. As a result, local municipal and county officials had to work quickly to implement their local boundaries and then wait until the state legislature finished the boundaries for congressional and legislative lines. Normally, these processes would be completed over the course of six months, but everyone was working on compressed timelines which made the process confusing for local election officials. This confusion was made worse by multiple lawsuits that caused state legislative lines to change and be uncertain for months.

Now that redistricting processes are largely complete, the elections commission office still receives many questions about district assignments, especially as we get closer to the fall election cycle. The purpose of this project is to help answer these district questions by designing a map that could be used by municipal and county clerks to visualize districts in a much more effective way than the current voter registration system allows. This includes new districts created during redistricting, but also includes other districts like schools that do not change during the redistricting process. My hope was to make an intuitive web map that could be used by clerks and election staff to determine where boundaries are for their level of government. Though clerks are the target audience, I also hope that the maps could be beneficial to candidates and voters as well.



*Figure 1: Map with layer list / basemap window open and congressional dataset selected*

## Application Overview:

The election districts application is designed to contain all of the statewide election district datasets. There are 16 total, ranging from Congressional districts down to local districts such as schools or aldermanic districts. These have been individually styled so that they can display the information effectively, though many of the datasets are complicated, so certain layers are only outlines while others have color fill components to them. The map is data rich, but is also designed to be easy to use and flexible and to fit different use cases. So, each layer has the ability to have labels turned on and off and the ability to change transparency as needed. There is also the ability to use different basemaps and to search for specific counties, municipalities or school districts. These were specifically customized to work with the data layers better.

For the core navigation tools, the application contains a search function that allows the user to select the county, municipality or school district they are interested in. When a user begins typing the name, it returns a pick list to choose from. Once selected, if the layer that they are searching within is turned off, zooming to that location automatically turns the layer back on. The user could also zoom directly to their current location if they desire using the Location Finder tool.

Once zoomed to a location, election districts can be clicked on to display a pop-up for more information. The pop-up function can also be docked in the corner of the map. The webmap contains a legend feature widget to view the symbology of the layers currently active. Finally, there is a print function that can be used to print out a paper reference map by exporting to a PDF document or a format of their choosing.

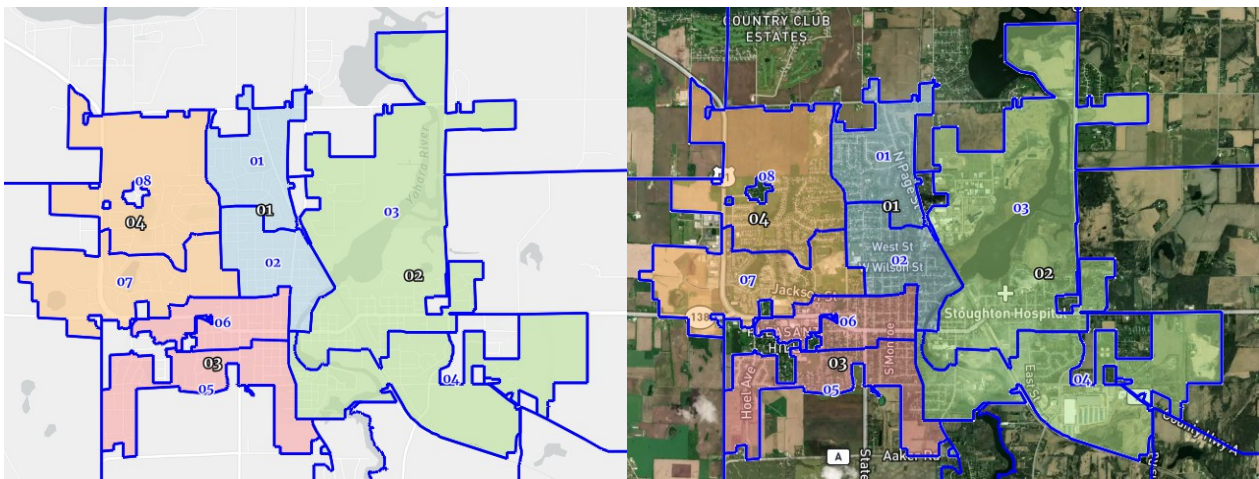
The user can also filter some of the more visually complicated local datasets (wards, district combos aldermanic or county supervisor) by municipality or county to allow a cleaner look at those. They just need to click on the municipality or county and then select a spatial relationship to view that data more easily. This filter can be done by spatial relationship of 'intersection' or 'contains.' The filter stays on the map until cleared, which allows a user to interact with the datasets while the extra information is still filtered out.

### Example Uses:

The webmap is designed first and foremost for election staff, but also can be useful for candidates or members of the public as well. One example of a use would be a county clerk using the map to determine which municipalities are within certain districts for statewide elections. County Clerks are in charge of working with voting machine vendors on behalf for their municipal clerks, so having a map to look at is extremely valuable to avoid problems with ballot printing and voting equipment mismatches with the state's election systems.

Municipal clerks could also use this map in order to discover which districts are found within their municipality. The print function could be useful for sending the maps to the polling place workers for that they know which areas of the city, town or village are in certain voting districts. They could also use it to verify voter questions on where the ward boundaries are or any changes that have occurred due to redistricting.

Finally, the map could be useful for candidates who are running for office. If a candidate has a map of the boundaries of the district that they are planning to run in, they could use that to devise a strategy to collect signatures or to reach out to their constituents with information. They could use the print tool to print out maps for volunteers that are helping with their campaigns as well to make sure that they are contacting the correct voters in the correct districts.



*Figure 2: City of Stoughton showing wards and aldermanic districts with default basemap and with aerial photo*

### Conclusions:

Overall, I think the map serves its intended purposes. All of the major election datasets are included and were customized to fit their data types and their visual needs. I also was mostly happy with each of the widgets and their functionality, with the only issues left unresolved being items that were bugs within the Javascript API. For example, the print function would not display labels if you tried to export a map that was filtered at the time. I couldn't find documentation of that issue, unfortunately. I would have also liked to have opacity sliders on the basemaps as well as the data layers, but that would have been very complicated custom code, so I decided to leave that off for this version.

Other future features to add would be address point data so that users could search for their individual address and adding the elected official names to the datasets. Because the focus was mostly on clerk users for this version of the application, these datasets were not as essential, but

would be useful for members of the public. Ultimately, I tried to limit the scope of the project to not include those elements so that I could focus on my goal of usability and clarity.

For design, the biggest challenge was to get all of the different data layers to display well on their own, as well as anticipate which layers would be used together and what colors to choose. So, the municipality and counties are on by default, so I tried to design the other layers to display well with those and trying to get them to work with both aerial and non-basemaps. This was a significant trial and error process and determining which layers would be filled and which would be only outlined was difficult. I spent significant time getting qualitative color ramps that worked and with some layers like county supervisor that had upwards of 40 district numbers, which was a major challenge.

I think this project is a good summation of what I learned in my time in the graduate program. It combines cartographic and user experience considerations with development and database design. I was especially proud of the level of customization I was able to add to the webmap and the confidence in my programming skills improved exponentially from when I started.