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## 2019 Professional Practices Program

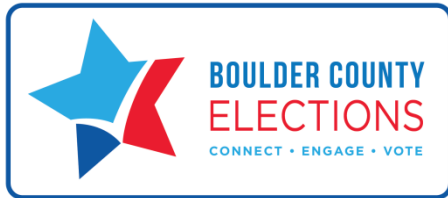
### Election Maps for Everyone

*Inspiration from colleagues,  
taken to the next level*

### Boulder County, CO

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### **Challenge: Developing Easy-to-Use Election Maps**

Just as the voting process must be accessible and easy to understand for every citizen, we here at Boulder County Elections believe that accessing election data, specifically, citizen turnout and contest results down to the precinct and/or district level should be equally as accessible and understandable. In the spring of 2016, the Boulder County Elections Division decided that we wanted to make our election results and turnout maps interactive and easy for the average person to explore and see how their community voted and turned out. Easy enough, right? Turn outs (no pun intended), this was a much more challenging project than anticipated.

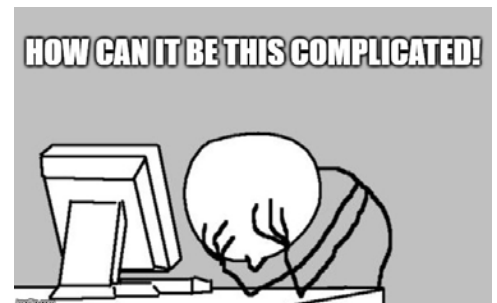
### **What we wanted: Eagle Eye & In-the-Weeds Views**

In past elections, we simply created a PDF map for each election result and a turnout map with some color shading to show percentage of the vote/turnout. However, a static PDF isn't very helpful if you want to know how a certain area turned out in detail in comparison to another. Nor is it helpful as an election results map, because you only get the big picture view of who won or what passed by the overall margin, not much detailed nuance.

For 2016 and beyond, Boulder County Elections Division wanted to display either in one single map platform or in two separate ones, both voter turnout by precinct and election results for each contest by precinct. We wanted both maps to be incredibly intuitive and not require the user to have to select or de-select map layers to get to data. Our office also felt it incredibly important that with a quick glance at the map you could get a big picture of how things went – how great voter turnout was or wasn't, who won the contest and in what general areas, etc. In addition, we wanted it to be just as easy to drill down to your neighborhood and see what happened at the very local level. We like to say we wanted both the “eagle eye view” and the “in the weeds” detail for each precinct, and we wanted this to be easy to navigate for an elections and computer novice.

### **Limited Resources & the Search for the Map(s) of our Dreams**

Our office set this ambitious goal in the spring of 2016 that we could execute these maps for the Presidential Election. While we set this goal, the Elections office does not have a dedicated GIS Specialist. The Boulder County GIS team agreed to help implement this project as long as the framework for the maps was already fairly developed. It was up to our election staff to do the research and find sample maps. As a first step, we started with researching ESRI available templates as well as scouring the websites of the largest election counties in the country.



What we found surprised us. Our initial search yielded very few interactive turnout or result maps. The ones we did find were mostly cumbersome and not very user friendly, including the basic ESRI plug-and-play results/turnout maps. However, after an exhaustive search, we found inspiration from two counties – King County, Washington and Alameda County, California.

King County's turnout map accomplished what we wanted; it provided overall turnout visually understandable at quick review. You could also click on an individual area and have the precinct turnout statistics pop up. While their map was built on an ESRI template, it was very customized. We set out to replicate their turnout map for our purposes.

For displaying election results, Alameda County, was the only map that we considered user friendly and accessible. For individual contests, countywide results were easy to see – and equally important, it was extremely intuitive and allowed you to click on a precinct to view local level results. However, this map was not based on a regular ESRI template, but instead a combination of custom coding using the ESRI JavaScript API and JSON formatted data. We reached out to Alameda in hopes they could provide guidance. They ended up going above and beyond. Alameda County created a GitHub page and uploaded their JSON files to it. From there, we took it and ran with it.

### **Maps Enhancements: How we took these maps to the next level in 2018**

*Turnout map improvements:* One of the items we refined in 2018 was updating and creating shading and map legends that were comparable between like election years. So on-year and off-year elections have different map legends. This improvement allows the user to easily see nuances at an eagle-eye view when reviewing election turnout (hence a map does not display in all one map color in a high turnout election) and allows the user to easily toggle between two like elections and compare different parts of the map.

Additionally, we created primary election turnout maps, which were more challenging since the data cannot be parsed until the election is finalized. However, creating these maps was a particularly critical public service in 2018 as it was the first Colorado primary election where unaffiliated voters did not have to change party affiliation to cast a ballot in either the Democratic or Republican party primary. Thus, we had to create three separate maps – a Democratic turnout map, a Republican turnout map, and an Unaffiliated voter turnout map. The Unaffiliated voter map displays overall unaffiliated voter turnout, but when you click on an individual precinct, you can see how many unaffiliated voters then chose to cast their ballot in each party's primary.

*Election Results Map Enhancements:* While the original JSON format provided the elections results basics we wanted to display, it did not have some of the additional precinct level data that we wanted to provide. Additional items that we redesigned our map to include are total active voters for that precinct, eligible voters for that particular contest, over votes, and under votes. We wanted to add eligible voters because we have many split precincts and being able to show that a precinct may have 2000 voters, but only 500 are eligible to vote on an item was important to us.

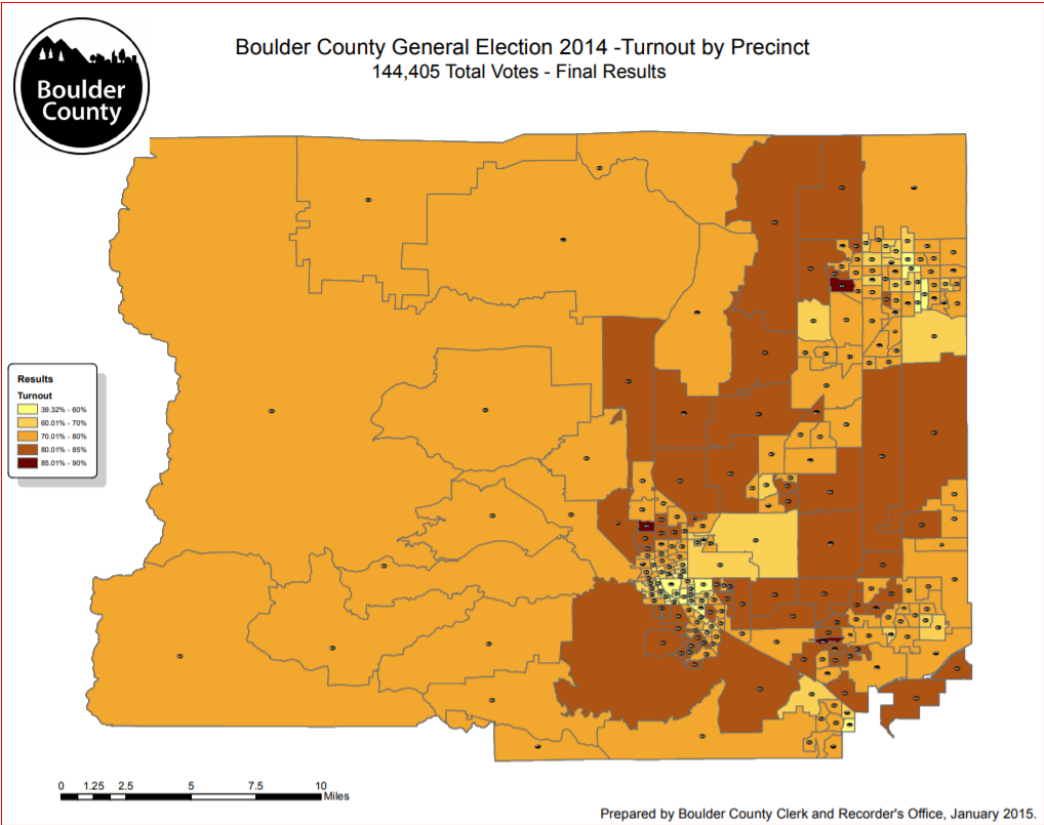
Additionally, the construction of the original results map from Alameda only assigns a one color per candidate or yes/no vote. From an eagle-eye view, this does not show how close or dynamic the results are as every precinct is either one color or another. So, we added shading and a color legend. For instance, now you can quickly see when viewing Boulder County how a candidate may have won a precinct or certain area of the county, but you can also see from the legend that their margin of victory was slim or great.

Both these enhancements required countless rounds of testing and re-coding. While it was extremely challenging, the result has been a dynamic, user-friendly election results map and a great public service.

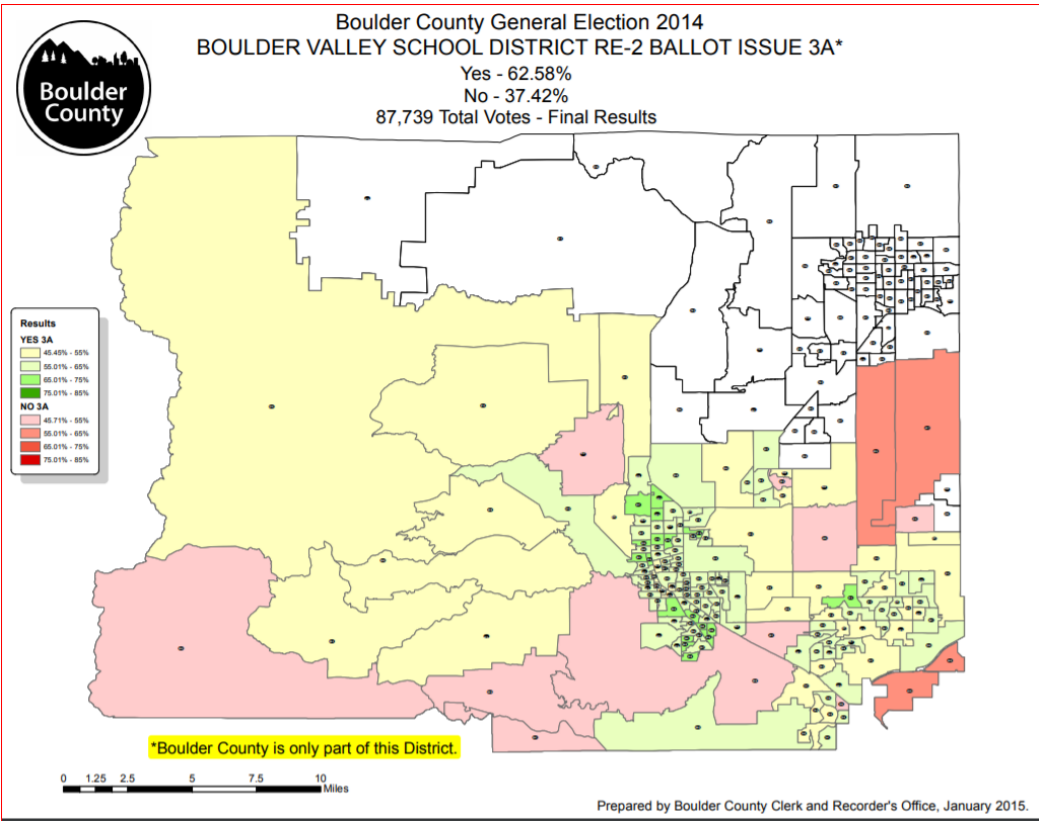
### **Paying it Forward and Future Enhancements**

In 2016, we were able to develop and publish the first set of turnout and election results maps thanks to the work already pioneered by King County, Washington and Alameda County, California. In 2018, we then built upon both maps and made much needed enhancements making both these maps extremely dynamic and user-friendly. As a public service, and in honor of the great foundation Alameda County provided, we added back our election results map html, JavaScript, and JSON files with our enhancements to the [GitHub site](#). In future years, two enhancements that we are considering adding are district line overlays and eligible population statistics to both maps.

Supporting Document 1:  
Old Static PDF maps



Sample Old Voter  
Turnout Map:  
Shows big picture,  
but no precinct level  
data



Old Election Result  
Map: Shows big  
picture, but no  
precinct level data –  
for instance, in two  
of the “red”  
precincts, only a  
handful of voters  
were eligible to vote  
on measure, as  
they are split  
precincts.

## Supporting Document 2: Election Turnout Maps

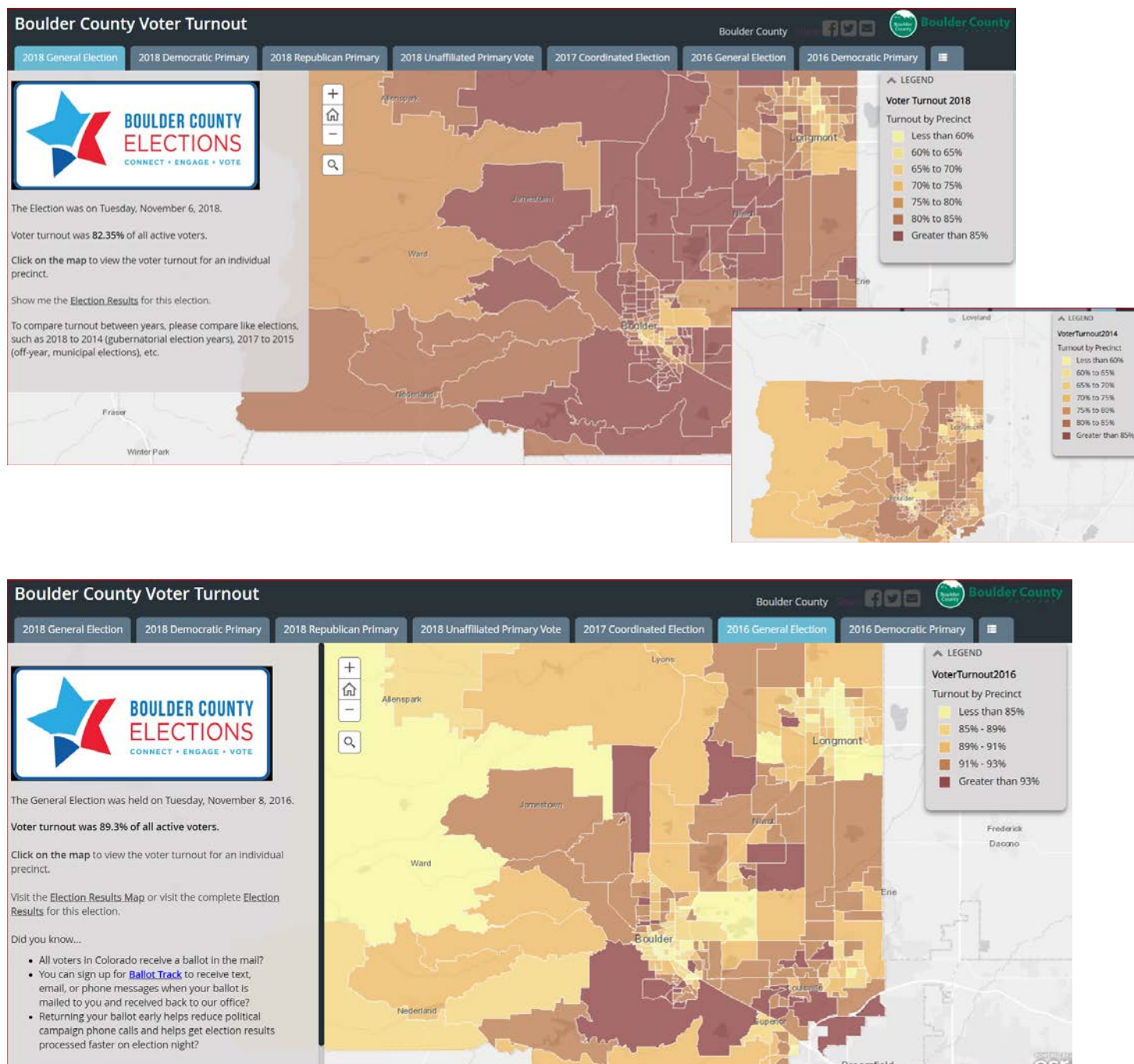


Link to Voter Turnout Maps:

<http://maps.bouldercounty.org/Elections/VoterTurnout/index.html>

*Note: We started this project in 2016 but created maps back to the 2014 General.*

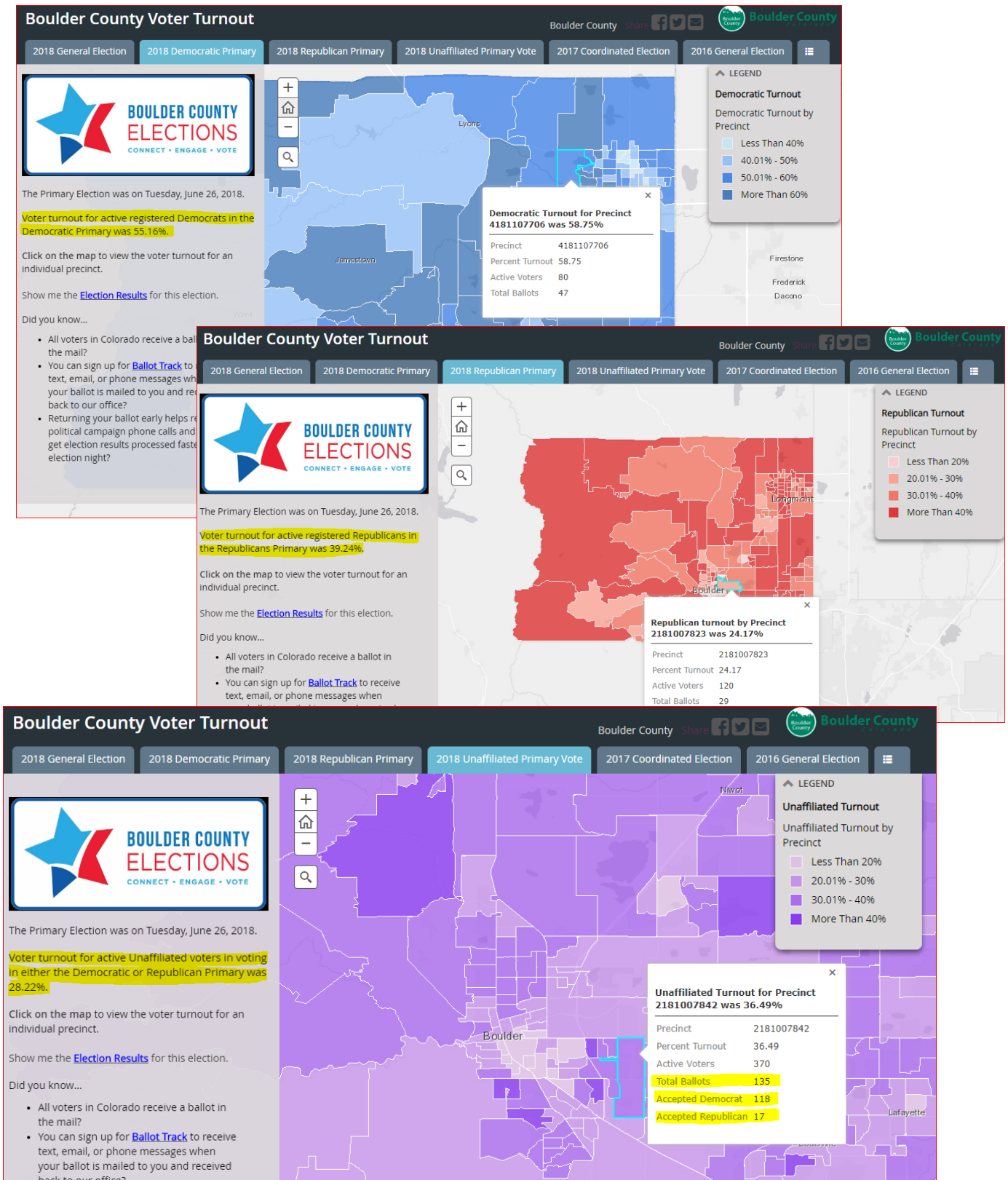
Below shows 2018 Turnout Map with an insert of 2014 map. Note that we use the same legend for both years so that one can easily compare like year turnout (2014 had 74.6% turnout). Below 2018/2014 is our 2016 turnout map. We use a different turnout legend here as turnout was much higher. We thought this was important at the “eagle eye” view so that nuances between areas could still be easily distinguished.





## Supporting Document 3: Election Turnout Maps – continued

Below shows our innovative primary turnout maps. 2018 was the first Primary in Colorado where unaffiliated voters could vote in either party primary without changing party affiliation. The pop-up box for Unaffiliated Voting shows total ballots cast and the party breakdown of which ballots unaffiliated voters chose to vote.



## Supporting Document 4: Election Results Map



Link to 2018 Map:

<https://maps.bouldercounty.org/boco/ElectionResults2018/>

*Note: Result maps appear on their own landing page (not tabbed like turnout maps) under election results for each election year.*

In the sample below, the Attorney General results map the pop-up box shows precinct details. Highlighted are the under/over votes. The second map shows results for a special district contest. The highlighted portion shows how only part of the voters in this precinct were eligible to vote. Note the variable shading based off the percentage of vote in both contests.

