

Is Distance to Drop Box an Appropriate Proxy for Drop Box Treatment? A Case Study of Washington State

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Abstract

In the United States, drop box mail-in voting has increased, particularly in the all vote by mail (VBM) states of Washington, Colorado, Utah, and Oregon. To assess if drop boxes improve voter turnout, research proxies box treatment by voters' residence distance to nearest drop box. However, no research has tested the assumption that voters use drop boxes nearest their residence more so than they do other drop boxes. Using individual-level voter data from a 2020 Washington State election, we show that voters are more likely to use the nearest drop box to their residence relative to other drop boxes. In Washington's 2020 August primary, 52% of drop box voters in our data used their nearest drop box. Moreover, those who either (1) vote by mail, or (2) used a different drop box from the one closest to their residence live further away from their closest drop box. Implications are discussed.

Keywords

voter turnout, drop boxes, vote by mail, convenience voting

Introduction

In recent years convenience voting has increased across the United States, with several states adopting high or mandatory vote by mail (VBM) regimes, including Washington, Oregon, Colorado, Hawaii, and Utah. All states with a VBM regime have used the option of drop box voting as a means of increasing political participation and voter confidence in ballot security. A voting drop box is a metal container/box where voters slot their ballots (similar to a United States Postal Service box) and serves as an alternative to sending ballots through the mail. While only five states have completely adopted VBM and the widespread use of drop boxes, a number of other states have implemented mixed regimes. In 2018, California rolled out drop box voting in five counties, with an eye toward establishing drop box voting as a way to further increase the state's relatively dismal voter turnout. In addition, due to the coronavirus, vote by mail in 2020 increased dramatically across the U.S., with many states implementing drop boxes for the first time.

In Washington State, voters have been casting ballots exclusively by mail since 2011 (<http://blog.thenewstribune.com/politics/2011/04/05/washington-to-shift-to-all-vote-by-mail-elections>). Increasingly, instead of returning ballots through the mail, voters place ballots into conveniently located, and secure drop boxes. This voting technology has become so popular that on May 16, 2017, Governor Jay Inslee signed a law mandating a 300 drop box expansion across the state (<http://app.leg.wa.gov/billssummary?BillNumber=5472&Year=2017>). Today, depending on the election,

between 40% and 60% of Washington State voters choose to vote by drop box rather than send ballots via USPS (<https://www.sos.wa.gov/elections/research/ballot-drop-box-usage-by-year.aspx>).

Collingwood et al. (2018) studied whether drop boxes increased turnout in two election years (2015 and 2016) in King County, WA, by exploiting a change in the number of boxes between the two years. By moving from 10 to 40 boxes within 1 year, the distance between voters' and their nearest drop box changed, which presented a unique opportunity to examine whether this change in distance for each individual voter increased one's likelihood of casting a ballot. The researchers found that drop boxes did improve turnout but primarily in off-years and primaries. Instead of relying upon a change in distance between one election and the next to proxy treatment, McGuire et al. (2020) worked with a local election auditor to randomly assign five new treatment boxes and one placebo control box (a site that could have been treated with a new box but did not ultimately get one due to randomization) to geographic locations across Pierce County, WA. This tighter design revealed that a decrease of one mile to the closest drop box increases a voter's probability of voting by 0.64%.

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Other than these two papers, the academic literature on convenience voting has not analyzed the use or effects of drop boxes in American politics. In this paper, we investigate three questions (and relevant hypotheses) related to drop box voting behavior: (1) Do voters, in fact, disproportionately use the box closest to their residence? (2) Do voters disproportionately opt for voting in central locations (i.e., auditor's offices, election headquarters)? (3) Do voters who choose to vote by drop box rather than mail physically live closer to a drop box? These questions are important to help guide state investment in drop boxes, particularly considering the increase in the number of VBM states, with UT and HI transitioning to mail elections in 2019 and 2020, respectively.

To investigate these questions we gathered publicly available individual-level voter data from Washington State's 2020 August primary election.¹ Washington has a top-two primary system, where all candidates are listed on a single ballot and the two candidates with the highest vote share proceed to the general election regardless of party. It is worth noting that primaries in Washington State tend to see significantly lower turnout than the general election, often by double-digits, which may make the primary electorate less representative of the voting public as a whole. High propensity voters are more likely to cast a ballot in primaries and these voters tend to be wealthier, older, more educated, and largely White. And indeed, as indicated by Figure A1 in Appendix A, primary voters are less likely to use a drop box than are general election voters. That said, it is hard to imagine how this gap in drop box usage across election type would alter whether drop box voters are more or less likely to use boxes closer to their residence—although we leave that specific question to future research.

The data include measurements for voting method (e.g., drop box, mail, etc.) and ballot return location. To our knowledge this is the only publicly available data with such drop box detail. We then geo-coded all voters' residences and paired these data with a geo-coded list of all drop box sites across the state. We next calculated the distance in miles between each voter's residence and all drop boxes across the state.²

We find that: (1) Voters disproportionately use drop boxes closer to their residence relative to other drop boxes within their county; (2) Drop box voters who fail to use their nearest drop box live farther away from their nearest box relative to voters who do use their nearest box; (3) Drop box voters who fail to use their nearest drop box do disproportionately cast a ballot in a central location like an election headquarters, city hall, or courthouse; and (4) Voters who return their ballots by mail rather than by drop box live farther away from their nearest box. Coupled with evidence from a recent survey on voting behavior, we find consistent support for the argument that a convenience versus security framework guides drop box decision-making.

Background and Expectations

There is a robust literature on the effect of convenience voting on turnout. In general, convenience voting increases

participation, though by how much varies by election and voter demographics. Recently, COVID-19 may have generated long-term changes in convenience voting, with states investing in vote by mail (Baringer et al., 2020). While this is generally welcomed by election administration scholars, it is important that researchers investigate both the pros and cons of VBM (e.g., ballot rejections (Shino et al., 2021), postal service disruptions (Herron & Smith, 2021)). In particular, there are a number of studies that have shown that geography plays a significant role in determining the likelihood that someone will cast a ballot. Dyck and Gimpel (2005) found that the greater the distance between a precinct location and a voter's home, the less likely that individual was to cast a ballot. Similarly, Brady and McNulty (2011) found that if you increased the distance between a voter and their nearest precinct voting location, their likelihood of voting decreased: Twenty-five percent for every tenth of a mile increase up to 0.40 of a mile. Building on Brady and McNulty (2011), Amos et al. (2017) found that redistricting in Manatee County, FL, led to a decrease in turnout for those who were assigned a new precinct, which they posit is due to the information and possible transportation costs on voters as a result of the change in location of the precinct. Distance to voting location was found to have the largest effect for those in metropolitan areas, with a much smaller impact on rural voters (Gimpel & Schuknecht, 2005). These studies were, however, on distance to precinct locations rather than to the nearest drop box.

To date, just two papers investigate drop box voting in American politics (Collingwood et al., 2018; McGuire et al., 2020). Both papers test whether decreasing the distance to the nearest drop box increases voter turnout. Using different methods but still instrumenting drop box treatment by distance to nearest drop box, both papers find a positive and statistically significant effect for distance to drop box (how close one lives to a drop box) and probability of voting. Still the authors proxy drop box treatment based on distance to nearest drop box, crucially assuming that voters are most likely to use the box closest to their address available on the voter file. While both studies are illuminating, the assumption that voters use the drop box closest to their house,³ however, may not always be true.

As more states consider moving to a VBM system, it is important to have a better understanding not only of the effect that drop boxes have on voting behavior, but also how voters interact with these boxes. With each box costing an estimated \$6,000, a better understanding of how voters use these boxes can inform states how to install them in a more strategic manner, potentially cutting costs in the process (https://www.eac.gov/sites/default/files/electionofficials/vbm/Ballot_Drop_Box.pdf). If voters are just using the box closest to their home, then states would be encouraged to place boxes in a variety of locations. If voters are using boxes in a central location, such as at a courthouse or city hall, then states may be able to install few boxes while still reaping the positive benefits that drop boxes have on turnout. Finally, if increased distance to a box leads to a greater likelihood of

using the USPS to return a ballot, states may have to think strategically in terms of the location and number of boxes installed or whether to include pre-paid postage.

We theorize that choosing to vote by drop box, then which one, versus returning a ballot by mail is largely a matter of a convenience versus security trade-off. In general, the closer one lives to a drop box voting location, the more likely one is to use a drop box relative to returning a ballot by mail. First, the process of even walking or driving down the street may at times be more convenient than placing a ballot in the mail (especially if the state or county does not provide a stamp). Second, voters may reason that a drop box is more secure than USPS, where, theoretically, postal workers and election workers can tamper with ballots. On the other hand, if a voter must drive far to drop off a ballot, the convenience of returning a ballot by mail is likely to override ballot security concerns—especially when a voter casts their ballot more than one or two weeks prior to election day and can verify their county auditor has received it.

In a study of Colorado's VBM system, Menger and Stein (2020) examined why a voter would choose to return their ballot in person at a ballot drop-off location, instead of by mail. They found that distrust in the Postal Service had the largest overall effect, but that there were also only a small proportion of voters in their study who expressed unease with sending their ballot via the USPS. They did find that among both frequent and infrequent voters, a desire to avoid a change in routine made them less likely to cast a ballot in person or at a drop box location. This desire to avoid costs associated with travel to vote in person, necessitating a change in routine, is likely to also be influenced by the kind of interruption voting in person will entail. In other words, in the context of the current study, we would expect voters who choose to return their ballot by drop box to choose the box closest to their residence, as this will require a smaller change in their daily routine.

A survey by Charles Stewart on the "Performance of American Elections, 2016," provides further context for why some voters might prefer voting by drop box versus returning a ballot by mail (Stewart, 2017). Surveying $n=10,200$ respondents who cast a ballot in the 2014 general election, Stewart finds that 21.6% of voters cast an absentee ballot. Of these, about 22% voted via some type of drop box—whether an official box, an election headquarters, or some type of voting center. A follow up open-ended question asks why voters decided to use a drop box reveals answers consistent with our theoretical framework⁴: Responses generally referenced either convenience or security as a reason for using a drop box. Common responses are: "I didn't have to pay postage and it was conveniently located"; "It was more convenient and the place was near my home"; "That way I was sure it wasn't lost in the mail"; and "I wanted to make sure it was received and I personally put it in the container."

The survey also asked voters who mailed their ballots back why they chose to do this rather than return their ballot personally.⁵ Here, the majority of the responses reflect

convenience: "easier and more convenient"; "It is convenient. We are Senior citizens (my wife and me). This is great for us"; and "Convenience and to save time and gasoline."

Based on the available studies and the survey evidence just presented, conditional on voting via drop box, voters should be more likely to use the drop box closest to their physical residence compared to other drop boxes. We operationalize this by testing whether more than 50% of drop box voters use the box closest to their house. In this way, we can, at the mean, test the assumption in earlier studies that proxy drop box treatment by closest box. Here we can test whether at least a majority—the lowest burden of proof—of drop box voters do indeed line up with this assumption thereby demonstrating the assumption statistically legitimate. We therefore deduce hypothesis 1:

- **H1:** Among voters who vote via drop box, a majority will cast a ballot in the box physically closest to their residence.
- **H1a:** Voters who vote via drop box are more likely to use the box closest to their address compared to other boxes in that voter's county.

However, there are ample reasons to expect why voters might not use the drop box closest to their house, but instead use one closer to a job, their children's school, their own school, some other place that is more convenient to one's daily movements, or a central voting location. All of this seems more plausible the further one lives from their nearest drop box. From this we deduce our second hypothesis:

- **H2:** Conditional on voting by drop box, voters who use a box other than the one closest to their residence disproportionately live farther from their nearest drop box.

Many voters may feel more confident their ballots will be counted if they drop ballots off at a central voting location than in a drop box say on a shopping center corner. The reasoning here is that by delivering a ballot at an auditor's office, courthouse, or city hall, the ballot likely has shorter distance to travel to its final counting location than it would if dropped off at a more distant neighborhood drop site. Thus, the ballot likely faces fewer security threats. Given this, a voter might reason a central facility is simply more secure and opt to take their ballot there. From this, we deduce the following hypothesis:

- **H3:** Conditional on voting by drop box, voters who do not use their nearest drop box are disproportionately likely to use a central voting location relative to drop box voters using their nearest box.

Finally, we move beyond only drop box voters to better understand why voters might opt to place their ballots in the mail as opposed to into a drop box. Based on the extant literature that voters are more likely to vote the closer they live

to a drop box, we theorize that voters who live farther from a drop box are more likely to cast a ballot by mail. We therefore deduce our final hypothesis:

- **H4:** Voters who return their ballot by mail live farther from their nearest drop box than do voters who vote by drop box.

Data

To test our above hypotheses, we rely on individual-level voter data from Washington State's August 2020 primary (<https://www.sos.wa.gov/elections/research/2020-primary-election.aspx>). These data include each individual who voted in the August primary election, their residential address, county, voting method, and if voting by drop box, the box's name. We pair these data with a list of all 419 drop boxes in the state as generated from the 2019 general election.⁶ We cross-referenced this list against the secretary of state's 2020 general election ballot drop box list then against ballot return data in the individual-level voting data. Of the 419 drop boxes only 330 are present in the individual level data. We therefore subset our initial list of available drop boxes to 330.⁷ Unfortunately, King and Clallam Counties did not adequately record drop box voting data (either method or location) and we thus had to omit them from our analysis. While Clallam is a relatively small county, ranking 18th in terms of population, and unlikely to significantly affect our findings, King County is another matter. King County is Washington's most populous and thus could have affected our findings had it been included. However, past research has found that the expansion of drop boxes in King County in 2016 increased the likelihood of voting, and that voters who lived closer to a drop box were more likely to vote (Collingwood et al., 2018). Therefore, it seems most likely that our results would not substantively change had King County data been available for this study.

To generate our measure of drop box centrality, we ran each of the 330 drop box names through the following algorithm such that if any of the below phrases appeared in the drop box name, we coded the box as central: city hall OR town OR hall OR auditor OR auditor's OR clerk OR vote OR center OR election OR elections OR civic OR courthouse OR administration OR admin. We then validated each of the centrally located drop boxes via Google maps to ensure the box indeed is centrally located. We classified 93 of the 330 (28.2%) boxes as central locations.

To calculate our key distance measure—between voters' residences and each drop box—we geo-coded both datasets. Of the 1,785,535 voters in our initial dataset, 3,279 returned missing latitude/longitude coordinates, so these records are dropped from our analysis. Another 3,054 records—primarily PO Boxes return inaccurate geo-codes. In addition, a handful of records (0.003%) are out of state based on voter file records. We drop these voters too. Finally, our geo-coder placed 3,745 respondents out of state, when clearly they are

not. We therefore drop these records as clear geo-coding errors. All told, our geo-coding accuracy is greater than 99%.

For most of our analyses we are only concerned with voters who cast ballots via drop box; whereas our last hypotheses pits drop boxes versus returning a ballot by mail. We therefore subset our data to only voters who the secretary of state records as voting by drop box or voting by mail. Finally, upon inspection of Table A2, we observe that just one box (Elections Office—Ballot Drop Box) is used for the entire county of Spokane. It seems highly plausible that the county auditor simply tallied all drop box votes as coming in just this one box. This data collection procedure disqualifies Spokane from our analysis. This generates a final dataset of 1,554,857 rows. Of this, 851,149 (54.7%) people voted by drop box, whereas 703,708 (45.3%) voted by mail.⁸

We pair these data with a geo-coded list of all drop box sites. Following Collingwood et al. (2018), we calculate the nearest drop box for each voter based on a straight-line (i.e., as the crow flies) calculation. Figure A2 presents the variable's distribution (overall, mail voters, and drop box voters). On average, people in our data live 2.88 miles (*SD*, 3.13 miles) from the closest drop box. The median distance is 1.78 miles, and the inter-quartile range 0.96 to 3.74 miles. We then compare the drop box return location name in the voter database against the drop box name in the drop box database (after correcting for minor typos across the two datasets, and adjusting for scenarios where drop boxes are labeled the same but are in different counties). Voters are given a 1 when the drop box names match between the two databases, and a 0 otherwise. This unique dataset lets us to test our hypotheses presented in the previous section.

Results

To test hypotheses 1 to 3 we rely on the subset of voters who cast a ballot by drop box. Recall our first hypothesis states that voters who vote via drop box are more likely to use the box closest to their residence relative to other boxes in that voter's county.

First, we find that of the 851,149 drop box voters, 445,581 (52.4%) voted via the box closest to their residence.⁹ To test hypothesis 1, we conducted a difference of means *t*-test against a μ value of 50. Our results produce a *t*-statistic of 43.53, *p*-value < .001, indicating that a majority of voters did indeed use the box closest to their house. This provides clear support for hypothesis 1.

We think that if a voter uses a box other than the one closest to their home it is most likely that they still use a box in their own county. The question now becomes whether an individual is more likely to use the box closer to their house than they are any other nearby drop box—where we define nearby as within the voter's county. We therefore calculate the number of boxes per county and calculate the probability that any one voter will vote in any one box within that county. This value ranges from 0.02 to 1, with a mean value of 0.098. Thus, to test whether voters disproportionately use boxes

closer to their house we conduct a difference of means *t*-test between the proportion of voters who do (1) and do not (0) use the box closest to them against the μ value of 0.098. We find a *t*-statistic of 785.52, which is statistically significant at the *p*-value < .001 level. This provides overwhelming support for hypothesis 1a.

Our second hypothesis begins to intimate a causal mechanism as to why voters might use the box closest to their house versus any other box. And the answer is quite simple. We hypothesize that voters who use a box other than the one closest to their residence live farther from their nearest drop box. To evaluate this hypothesis we conduct a difference of means *t*-test between our two groups (use box closest to residence versus do not use box closest to residence) and distance to nearest drop box. The mean distance in group 1 (voted in box nearest) is 2.28 miles to the nearest drop box, whereas the mean distance in group 2 (did not vote in box nearest) is 2.82 miles to the nearest drop box. This difference is statistically significant ($t=91.93$, $p < .001$), substantively the difference is a bit more than half a mile. These results support hypothesis 2.

Hypothesis 3 begins to get at a mechanism for why some voters who vote by drop box choose not to vote at the one closest to their residence. H3 states that voters who do not use their nearest drop box are disproportionately likely to use a central voting location relative to drop box voters overall. We theorize this is most likely due to issues of security although more work needs to be done to explicate this possibility. To test this hypothesis we conducted a χ^2 analysis between proportion using central location and whether one used their nearest drop box. We find a statistically significant difference between the two populations (33% [use nearest box] vs. 40.3% [do not use nearest box], $\chi^2 = 4896.72$, $< .001$). These findings support hypothesis 3. Thus, voters who do not use a ballot at their nearest location are more inclined to place their ballot in a centrally located venue like an election headquarters or courthouse. This provides support for our overarching framework of convenience versus security.

Our final hypothesis further elaborates on the distance mechanism but inquires as to why this might explain voting by drop box versus returning a ballot by mail. H4 states that voters who return their ballot by mail live farther from their nearest drop box than do voters who vote by drop box. We find support for this hypothesis: people voting by drop box live on average 2.53 miles from their closest drop box, whereas voters opting to return by mail live 3.30 miles to their closest drop box ($t=148.55$, p -value < .001). The substantive effect is about 3/4 of a mile.

Discussion and Limitations

While many states in recent years have turned to measures associated with lower voter turnout, some states have gone in a different direction by pursuing policies designed to enhance voter turnout. The premier non-partisan method for increasing turnout is by making voting easier (Dyck & Gimpel,

2005; Highton, 1997; Mitchell & Wlezien, 1995; Neiheisel & Burden, 2012; Rhine, 1995). Colorado, Utah, Hawaii, Oregon, Washington, and now California have or are turning to implementing some form of drop box voting whereby voters place their otherwise would be VBM ballot into a secure drop box. With a number of states installing drop boxes for the 2020 general election, it is very likely that drop box usage will continue to expand as states, and voters, realize their convenience and the positive effects on participation. With increase boxes, voters are more likely to actually see the box in the course of their daily activity, thereby increasing the election's saliency and possibly inducing voting habits (Aldrich et al., 2011; Coppock & Green, 2016; Gerber et al., 2003).

Turning back to our analysis, of the 851,149 drop box voters in our data, 445,581 (52.3%) use a box nearest their residence. We also find that voters who opt for another box or mail do so likely for one of two reasons: (1) Distance (convenience, or lack thereof) or (2) Ballot security.

In particular, we find that voters who do not vote in the drop box closest to their residence live farther away from their nearest drop box. This suggests that as county auditors add in more drop boxes, and as voters' distance to their closest box continues to drop, more voters will opt to vote via drop box. In a climate with rising concerns over USPS delivering ballots on time, ballot drop boxes likely add an additional avenue in which voters can feel secure in casting their ballot.

On the other hand, a healthy share of voters choose to vote in a central voting location (i.e., city hall, auditor's office, etc.). This suggests that many voters are still nevertheless willing to forego the convenience of voting in a nearby drop box or putting one's ballot in the USPS. We think this is due to concerns over ballot security but future research should investigate this working hypothesis further by not only using similar methods as presented in this paper but even via survey research.

One major take away from this research is that voters will use the box closest to their home, and this is most likely the case when the box is located very close to their home. Perhaps this is not surprising, but the implication is that election administrators may want to consider further increasing the number of drop boxes within their jurisdictions as they drop the overall mean distance to nearest drop box thereby potentially driving up turnout.

Future research should consider how drop box usage varies by demographic and contextual characteristics. It is well known that political participation varies by race/ethnicity, income, and education (Bowler & Segura, 2011; Fraga, 2018; Gilens, 2012; Griffin & Newman, 2007; Martin, 2003; Wolfinger & Rosenstone, 1980). As the U.S. continues to diversify so do its elected officials; however racial/ethnic gaps between population size and political influence remains large. The same goes for class (Carnes, 2013, 2016). Unfortunately in our case, our data remain limited. But, as drop boxes are rolled out in states with more demographic characteristics on voters files (i.e., in the South), more detailed analysis will be possible.

Additionally, this study would be worth replicating if King County begins collecting data on the drop box used by voters to return their ballot. While we would expect our findings to hold, King does have some unique demographic characteristics as the most populous county in Washington, the home to Seattle, and a tech hub for companies like Amazon and Microsoft. Data from an earlier study by Collingwood et al. (2018) found that the expansion of drop boxes in King County in 2016 did increase the likelihood of voting for those who saw a decrease in distance to their nearest box but the researchers did not know which box individuals used. However, the tracking of the specific box used is relatively new in Washington State, so we are hopeful that King will follow in collecting this data some time in the not-too-distant future.

Appendix A

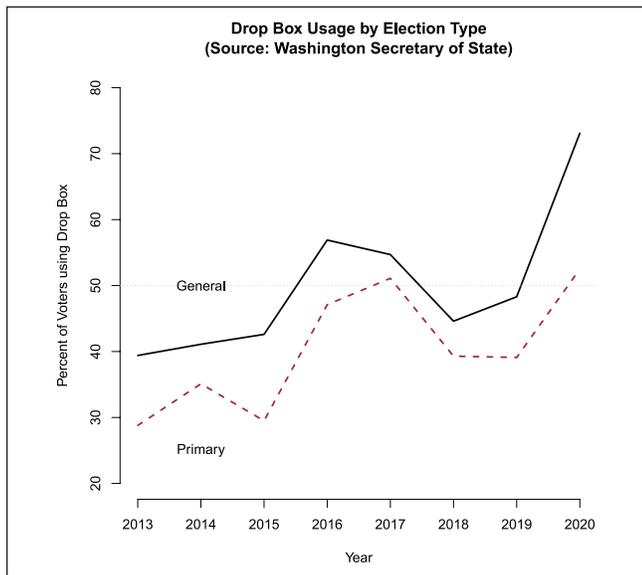


Figure A1. Drop box usage by Washington State general and primary elections across time.

Table A1. Number of Drop Boxes Per County.

| County | Frequency |
|--------------|-----------|
| Adams | 4 |
| Asotin | 3 |
| Benton | 14 |
| Chelan | 7 |
| Clark | 29 |
| Columbia | 2 |
| Cowlitz | 7 |
| Douglas | 7 |
| Ferry | 5 |
| Franklin | 6 |
| Garfield | 1 |
| Grant | 10 |
| Grays Harbor | 9 |
| Island | 6 |
| Jefferson | 6 |
| Kitsap | 25 |
| Kittitas | 10 |
| Klickitat | 12 |
| Lewis | 14 |
| Lincoln | 3 |
| Mason | 8 |
| Okanogan | 10 |
| Pacific | 6 |
| Pend Oreille | 3 |
| Pierce | 47 |
| San Juan | 4 |
| Skagit | 9 |
| Skamania | 6 |
| Snohomish | 35 |
| Spokane | 24 |
| Stevens | 4 |
| Thurston | 29 |
| Wahkiakum | 4 |
| Walla Walla | 9 |
| Whatcom | 18 |
| Whitman | 3 |
| Yakima | 20 |

Table A2. Drop Box Names, Counties, and Number of Ballots Returned. Washington State August 2020 primary.

| Name | County | Ballots returned |
|--|--------|------------------|
| Adams County Public Services Building Drop Box | Adams | 1,026 |
| Ritzville City Hall | Adams | 517 |
| Town of Lind—Town Clerk | Adams | 171 |
| Town of Washtucna City Hall | Adams | 93 |
| Asotin County Auditor’s Office Drop Box | Asotin | 887 |
| Clarkston City Hall | Asotin | 1,632 |
| Lincoln Middle School | Asotin | 1,289 |
| Badger Mt Community Park | Benton | 5,941 |
| Benton City Hall | Benton | 1,447 |
| Benton County Vote Center | Benton | 407 |

(continued)

Table A2. (continued)

| Name | County | Ballots returned |
|--|----------|------------------|
| Benton County Vote Center—Inside | Benton | 250 |
| Jefferson Park | Benton | 6,241 |
| Kennewick Auditor's Annex | Benton | 9,880 |
| Kennewick City Hall | Benton | 6,527 |
| Prosser Auditor's Office | Benton | 2,808 |
| West Richland City Shops | Benton | 2,329 |
| West Richland Library | Benton | 2,993 |
| WSU Tri-Cities | Benton | 247 |
| Cashmere City Hall | Chelan | 2,194 |
| Chelan City Hall | Chelan | 2,496 |
| Chelan County Auditor—Elections | Chelan | 890 |
| Entiat City Hall | Chelan | 619 |
| Leavenworth City Hall | Chelan | 2,815 |
| Wenatchee Public Library | Chelan | 8,537 |
| Clark County Elections | Clark | 70,179 |
| Courthouse Alley | Columbia | 725 |
| Starbuck City Hall | Columbia | 15 |
| Broadway Street (Ballot Drop Box) | Cowlitz | 3,455 |
| Castle Rock (Ballot Drop Box) | Cowlitz | 3,475 |
| Kalama (Ballot Drop Box) | Cowlitz | 2,476 |
| Kelso (Ballot Drop Box) | Cowlitz | 2,899 |
| Longview Civic Center Circle (Ballot Drop Box) | Cowlitz | 9,102 |
| Ryderwood (Ballot Drop Box) | Cowlitz | 216 |
| Woodland City Parking Lot (Ballot Drop Box) | Cowlitz | 2,369 |
| Bridgeport City Hall Drop Box | Douglas | 174 |
| Douglas County Courthouse Drop Box | Douglas | 719 |
| Douglas County Law & Justice Center Drop Box | Douglas | 2,940 |
| Douglas County Public Service Bldg Drop Box | Douglas | 1,684 |
| East Wenatchee City Hall | Douglas | 1,641 |
| Mansfield City Hall Drop Box | Douglas | 155 |
| Rock Island City Hall Drop Box | Douglas | 211 |
| Curlew Drop Box—Curlew Fire Station | Ferry | 93 |
| Danville Drop Box—Danville Outpost | Ferry | 21 |
| Inchelium Drop Box | Ferry | 74 |
| Keller Drop Box—Sanpoil Community Health | Ferry | 28 |
| Republic City Hall | Ferry | 336 |
| Connell PUD Shop | Franklin | 533 |
| Fire District No. 3 | Franklin | 1,755 |
| Franklin County Annex—Elections Center | Franklin | 624 |
| Franklin County Auditor's Office | Franklin | 158 |
| Franklin County Courthouse Drop Box | Franklin | 1,812 |
| The HAPO Center (TRAC) | Franklin | 6,498 |
| Garfield County Auditor's Office Drop Box | Garfield | 698 |
| Coulee City City Hall | Grant | 146 |
| George City Hall | Grant | 81 |
| Grand Coulee | Grant | 226 |
| Grant County Courthouse | Grant | 2,588 |
| Mattawa Hospital | Grant | 208 |
| Moses Lake City Hall | Grant | 4,727 |
| Quincy Public Library | Grant | 1,202 |
| Royal City | Grant | 357 |
| Soap Lake City Hall | Grant | 251 |
| Warden Community Center | Grant | 184 |

(continued)

Table A2. (continued)

| Name | County | Ballots returned |
|---|--------------|------------------|
| Aberdeen, Hoquiam, Cosmopolis Area | Grays Harbor | 2,730 |
| Elma City Hall | Grays Harbor | 1,442 |
| Grays Harbor County Auditor's Office Drop Box | Grays Harbor | 3,579 |
| McCleary Area | Grays Harbor | 2 |
| Oakville Area | Grays Harbor | 244 |
| Oakville City Hall | Grays Harbor | 46 |
| Ocean Shores Convention Center | Grays Harbor | 2,738 |
| Westport City Administration | Grays Harbor | 499 |
| Camano Island Annex | Island | 3,702 |
| Island County Auditor's Office | Island | 2,415 |
| Ken's Korner Red Apple Grocery | Island | 2,734 |
| Langley Post Office | Island | 2,276 |
| Oak Harbor City Hall | Island | 4,649 |
| Trinity Lutheran Church | Island | 2,400 |
| Brinnon Community Center | Jefferson | 142 |
| Jefferson County Auditor | Jefferson | 73 |
| Jefferson County Courthouse—Back Parking Lot | Jefferson | 3,850 |
| Jefferson County Library | Jefferson | 2,364 |
| Nordland, East Jefferson Fire & Rescue Station 12 | Jefferson | 180 |
| Quilcene Community Center | Jefferson | 95 |
| Hansville—Norwegian Point Park | Kitsap | 266 |
| Marvin Williams Recreation Center | Kitsap | 118 |
| North Kitsap Vote Center | Kitsap | 185 |
| Port Orchard—Admin Bldg | Kitsap | 55,046 |
| Seabeck—Green Mountain Elementary | Kitsap | 421 |
| South Kitsap Vote Center | Kitsap | 461 |
| Central Washington University—SURC—DROP BOX ONLY | Kittitas | 427 |
| City of Kittitas—DROP BOX ONLY | Kittitas | 267 |
| City of Roslyn Roslyn Library—DROP BOX ONLY | Kittitas | 277 |
| Courthouse—Drive Up Drop Box | Kittitas | 6,723 |
| Easton Fire Station—DROP BOX ONLY | Kittitas | 98 |
| Kittitas County Auditor's Office Drop Box | Kittitas | 658 |
| Ronald Fire Station—DROP BOX ONLY | Kittitas | 86 |
| South Cle Elum Town Hall—DROP BOX ONLY | Kittitas | 377 |
| Thorp Fire District No 1—DROP BOX ONLY | Kittitas | 143 |
| Upper County District Court—DROP BOX ONLY | Kittitas | 2,098 |
| Auditor's Office Ballot Box | Klickitat | 158 |
| Bickleton Remote Ballot Box | Klickitat | 84 |
| Bingen Remote Drop Box | Klickitat | 83 |
| Dallesport Remote Ballot Box | Klickitat | 376 |
| Glenwood Remote Ballot Box | Klickitat | 138 |
| Goldendale Remote Ballot Box | Klickitat | 1,775 |
| Klickitat Remote Ballot Box | Klickitat | 110 |
| Lyle Remote Ballot Box | Klickitat | 535 |
| Roosevelt Remote Ballot Box | Klickitat | 37 |
| Trout Lake Remote Ballot Box | Klickitat | 371 |
| White Salmon Remote Ballot Box | Klickitat | 1,891 |
| Wishram Remote Ballot Box | Klickitat | 47 |
| Centralia College Drop Box | Lewis | 2,077 |
| Chehalis Avenue Drop Box | Lewis | 5,130 |
| Lewis County Historic Courthouse Drop Box | Lewis | 1,776 |
| Mineral Drop Box | Lewis | 92 |
| Morton Drop Box | Lewis | 775 |

(continued)

Table A2. (continued)

| Name | County | Ballots returned |
|--|--------------|------------------|
| Mossyrock Drop Box | Lewis | 420 |
| Napavine Drop Box | Lewis | 942 |
| Onalaska Drop Box | Lewis | 717 |
| Packwood Drop Box | Lewis | 197 |
| Pe Ell Drop Box | Lewis | 190 |
| Toledo Drop Box | Lewis | 903 |
| Twin Cities Senior Center Drop Box | Lewis | 1,262 |
| Vader Drop Box | Lewis | 214 |
| Winlock Drop Box | Lewis | 825 |
| Election Office Ballot Box | Lincoln | 213 |
| Harrington City Hall | Lincoln | 174 |
| Lincoln County Court House | Lincoln | 761 |
| Belfair, John L. Scott Building | Mason | 3,203 |
| Grapeview, Horton Community Center | Mason | 295 |
| Hood Canal Visitor Center | Mason | 812 |
| Kamilche Area, Fire District No. 4 Station | Mason | 451 |
| Mason County Auditor's Office Drop Box | Mason | 5,239 |
| Port of Allyn | Mason | 1,159 |
| Shelton Timberland Regional Library | Mason | 2,481 |
| Union, Chevron Station | Mason | 572 |
| Coulee Dam Town Hall | Okanogan | 151 |
| Nespelem Agency | Okanogan | 73 |
| Okanogan County Auditor's Office Drop Box | Okanogan | 379 |
| Omak | Okanogan | 1,299 |
| Omak Casino | Okanogan | 54 |
| Oroville | Okanogan | 419 |
| Pateros | Okanogan | 383 |
| Tonasket | Okanogan | 1,087 |
| Twisp | Okanogan | 1,341 |
| Bay Center | Pacific | 44 |
| Chinook Community Center | Pacific | 132 |
| Long Beach Annex Drop Box | Pacific | 1,412 |
| Naselle | Pacific | 249 |
| Pacific County Courthouse Drop Box | Pacific | 1,112 |
| Raymond | Pacific | 421 |
| Ione Public Library | Pend Oreille | 370 |
| Pend Oreille County Court House Drop Box | Pend Oreille | 1,679 |
| nd St Transit Center | Pierce | 3,407 |
| Anderson Island Ferry Landing Park & Ride | Pierce | 479 |
| Ashford County Park | Pierce | 163 |
| Barney's Corner | Pierce | 1,599 |
| Bonney Lake South Park & Ride | Pierce | 9,689 |
| Browns Pt NE Tacoma Police Substation | Pierce | 4,142 |
| Buckley Library | Pierce | 2,575 |
| Central District | Pierce | 2,519 |
| Community Health Care at Salishan | Pierce | 688 |
| DuPont Ross Plaza | Pierce | 1,797 |
| Eatonville Town Hall | Pierce | 1,082 |
| Edgewood City Hall | Pierce | 3,363 |
| Fife City Hall | Pierce | 1,757 |
| Fircrest City Hall | Pierce | 1,242 |
| Fox Island Fire Station 53 | Pierce | 1,020 |
| Gig Harbor Fire Station 51 | Pierce | 4,846 |

(continued)

Table A2. (continued)

| Name | County | Ballots returned |
|---|-----------|------------------|
| Gig Harbor Library | Pierce | 5,692 |
| Graham Fire & Rescue | Pierce | 4,139 |
| Home Park | Pierce | 728 |
| Kandle Park Police Substation | Pierce | 8,614 |
| Key Center Food Market | Pierce | 2,061 |
| Lake Kathryn Food Market | Pierce | 1,975 |
| Lakewood (SR512) Park & Ride | Pierce | 629 |
| Lakewood City Hall | Pierce | 7,587 |
| Milton City Hall | Pierce | 912 |
| Orting Public Safety | Pierce | 3,003 |
| Parkland Spanaway Library | Pierce | 7,310 |
| Pierce County Election Center | Pierce | 628 |
| Pierce County Annex | Pierce | 10,749 |
| Purdy Fire Station | Pierce | 2,379 |
| Puyallup Library | Pierce | 9,039 |
| Puyallup Tribal Administration | Pierce | 240 |
| Roy City Hall | Pierce | 1,655 |
| Roy Y Park & Ride | Pierce | 4,773 |
| Skookum Archers | Pierce | 1,783 |
| South Hill Library | Pierce | 13,099 |
| South Prairie Fire Department | Pierce | 955 |
| Steilacoom Library | Pierce | 3,581 |
| Summit Library | Pierce | 3,497 |
| Sumner Library | Pierce | 5,536 |
| TACID | Pierce | 2,427 |
| Tillicum Community Center | Pierce | 228 |
| UW Tacoma | Pierce | 586 |
| Wapato Park | Pierce | 2,904 |
| West Pierce Fire & Rescue | Pierce | 8,875 |
| Wheelock Library | Pierce | 4,029 |
| Wilkeson Town Hall | Pierce | 337 |
| Lopez Island Fire District Office | San Juan | 889 |
| Orcas Senior Center | San Juan | 1,146 |
| San Juan County Courthouse Drop Box | San Juan | 3,257 |
| Anacortes—Library | Skagit | 7,187 |
| Anacortes—Skyline | Skagit | 662 |
| Burlington | Skagit | 4,029 |
| Concrete | Skagit | 1,023 |
| La Conner | Skagit | 1,736 |
| Mt Vernon—Continental | Skagit | 5,308 |
| Mt Vernon—Courthouse | Skagit | 4,700 |
| Sedro-Woolley | Skagit | 6,051 |
| Swinomish | Skagit | 90 |
| Canyon Creek Middle School (parking lot) | Skamania | 619 |
| Carson Transit Station (near Wind River Market) | Skamania | 280 |
| North Bonneville Central Business District (near city hall) | Skamania | 361 |
| Skamania County Court House (north side, near door) | Skamania | 974 |
| The Little Church in the Valley (parking lot) | Skamania | 87 |
| Underwood Community Center (parking lot) | Skamania | 442 |
| Alderwood Water & Wastewater District | Snohomish | 194 |
| Arlington | Snohomish | 5,734 |
| Bothell | Snohomish | 10,761 |
| Brier | Snohomish | 1,695 |

(continued)

Table A2. (continued)

| Name | County | Ballots returned |
|------------------------------------|-----------|------------------|
| County Elections Office | Snohomish | 366 |
| Darrington | Snohomish | 687 |
| Edmonds | Snohomish | 9,715 |
| Everett—County Courthouse | Snohomish | 8,785 |
| Everett—McCollum Park | Snohomish | 7,376 |
| Everett Community College | Snohomish | 941 |
| Everett Mall | Snohomish | 6,593 |
| Gold Bar | Snohomish | 832 |
| Granite Falls | Snohomish | 2,491 |
| Index | Snohomish | 109 |
| Lake Stevens | Snohomish | 7,876 |
| Lakewood | Snohomish | 657 |
| Lynnwood | Snohomish | 15,780 |
| Lynnwood—Ash Way | Snohomish | 397 |
| Marysville | Snohomish | 12,612 |
| Mill Creek | Snohomish | 15,804 |
| Monroe | Snohomish | 6,483 |
| Mountlake Terrace | Snohomish | 3,088 |
| Mukilteo | Snohomish | 7,532 |
| Sauk-Suiattle | Snohomish | 35 |
| Silvana | Snohomish | 688 |
| Smokey Point | Snohomish | 3,096 |
| Snohomish | Snohomish | 8,484 |
| Snohomish—Glacier Peak | Snohomish | 1,737 |
| Snohomish County Campus | Snohomish | 1,468 |
| Stanwood | Snohomish | 4,353 |
| Startup | Snohomish | 94 |
| Sultan | Snohomish | 1,282 |
| Tulalip | Snohomish | 513 |
| Woodway | Snohomish | 348 |
| Elections Office—Ballot Drop Box | Spokane | 67,711 |
| Fire District 1—District Office | Stevens | 357 |
| Lake Spokane Elementary School | Stevens | 654 |
| Stevens County Courthouse | Stevens | 3,555 |
| United Church of Christ | Stevens | 258 |
| Bucoda | Thurston | 244 |
| Church of the Good Shepherd | Thurston | 3,519 |
| Crain's Office Supply | Thurston | 4,463 |
| Fire District 3, Station 34 | Thurston | 2,381 |
| Fire District 3, Station 35 | Thurston | 2,727 |
| Gloria Dei Lutheran Church | Thurston | 2,767 |
| Grand Mound Center | Thurston | 1,683 |
| Griffin Fire 13, Station 1 | Thurston | 2,050 |
| Haggen NW Fresh | Thurston | 5,621 |
| Lacey City Hall | Thurston | 4,562 |
| Lacey Post Office | Thurston | 9,825 |
| Lackamas Elementary | Thurston | 722 |
| Little Rock Fire 11 | Thurston | 1,199 |
| Martin Village | Thurston | 981 |
| McLane Black Lake Fire, Station 95 | Thurston | 915 |
| Nisqually Tribal Admin Bldg | Thurston | 123 |
| Olympia City Hall | Thurston | 1,201 |
| Rainier City Hall | Thurston | 1,904 |
| Rochester Fire 1, Station 3 | Thurston | 1,198 |

(continued)

Table A2. (continued)

| Name | County | Ballots returned |
|---|-------------|------------------|
| South Bay Fire 8, Station 81 | Thurston | 1,588 |
| South Bay Fire 8, Station 83 | Thurston | 899 |
| South Puget Sound Community College | Thurston | 562 |
| Tenino School District Administration | Thurston | 1,707 |
| The Evergreen State College | Thurston | 656 |
| Thurston County Courthouse | Thurston | 3,536 |
| Tumwater School Administration | Thurston | 1,743 |
| Tumwater Timberland Library | Thurston | 5,868 |
| Woodland Retirement and Assisted Living Community | Thurston | 2,661 |
| Yelm Schools Administration | Thurston | 3,539 |
| Johnson Park | Wahkiakum | 64 |
| Skamokawa Resort | Wahkiakum | 108 |
| Wahkiakum County Auditor's Office | Wahkiakum | 571 |
| Burbank—Columbia Elementary School | Walla Walla | 827 |
| College Place City Hall | Walla Walla | 1,968 |
| Corner of 5th & Poplar | Walla Walla | 2,127 |
| Courthouse Alley Walla Walla | Walla Walla | 4,357 |
| Touchet School District | Walla Walla | 127 |
| Waitsburg City Hall—Outside | Walla Walla | 447 |
| Walla Walla County Auditor's Office | Walla Walla | 91 |
| Walla Walla County Elections Center | Walla Walla | 179 |
| Walla Walla Fire Station #2—Parking Lot | Walla Walla | 1,835 |
| Acme Elementary School | Whatcom | 216 |
| Blaine Library | Whatcom | 3,417 |
| Custer Elementary School | Whatcom | 761 |
| Deming Library | Whatcom | 1,608 |
| Everson WECU | Whatcom | 2,338 |
| Ferndale City Hall | Whatcom | 9,070 |
| International Marketplace | Whatcom | 274 |
| Kendall (North Fork Community Library) | Whatcom | 1,418 |
| Lummi Nation Admin Building | Whatcom | 509 |
| Lynden Library | Whatcom | 8,445 |
| Meridian (Laurel Grange) | Whatcom | 1,141 |
| North Whatcom Fire & Rescue Station | Whatcom | 1,782 |
| Sehome Village | Whatcom | 7,275 |
| Sudden Valley | Whatcom | 1,258 |
| Sumas | Whatcom | 791 |
| Western Washington University | Whatcom | 1,014 |
| Whatcom Community College | Whatcom | 1,909 |
| Whatcom County Courthouse South Parking Lot | Whatcom | 17,720 |
| Alley behind Whitman County Elections Center | Whitman | 776 |
| Pullman | Whitman | 2,356 |
| WSU Campus | Whitman | 191 |
| hour ballot return—East Martin Luther King Jr Blvd | Yakima | 8,836 |
| hour ballot return—S 8th St & Edison Ave (by Sunnyside Fire Department) | Yakima | 2,096 |
| hour ballot return—Yakama Nation Main Agency Offices | Yakima | 379 |
| Granger City Hall | Yakima | 39 |
| Neighborhood Health Sunnyside | Yakima | 93 |
| Parker | Yakima | 28 |
| Selah City Hall | Yakima | 478 |
| Union Gap City Hall | Yakima | 225 |
| White Swan | Yakima | 51 |
| Yakima County Election Office | Yakima | 71 |
| Zillah City Hall | Yakima | 180 |

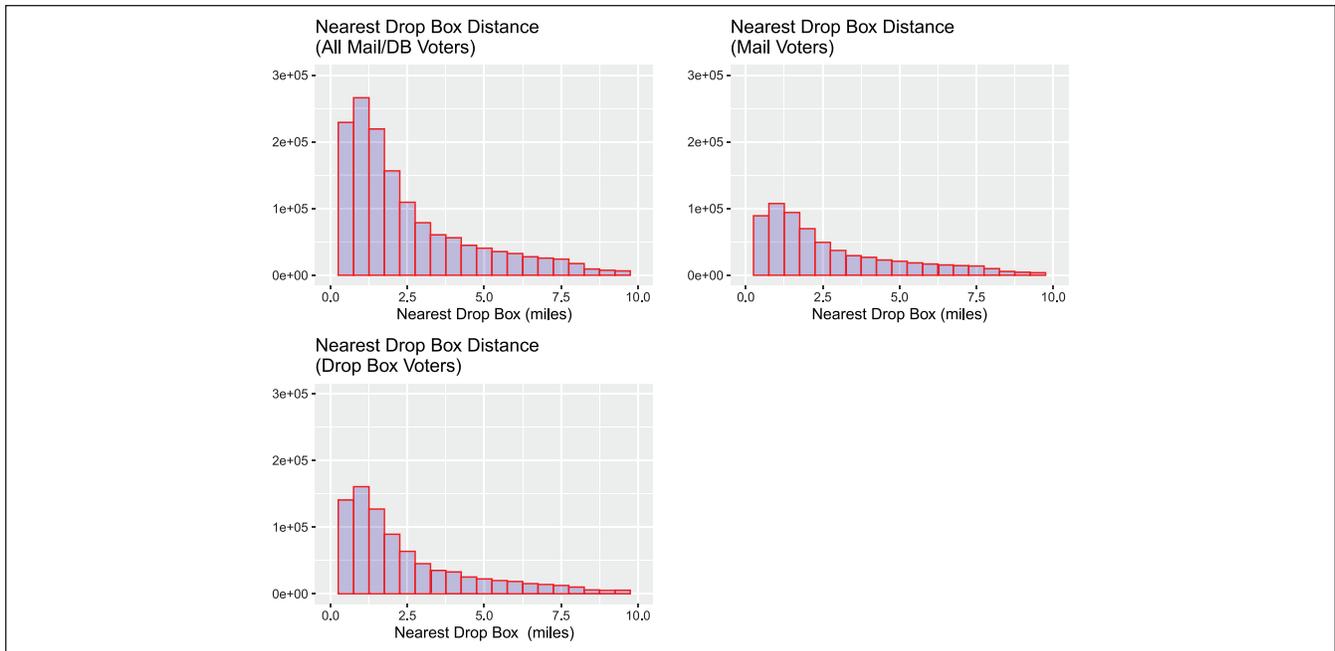


Figure A2. Washington August Primary, 2020, distribution of voters' nearest drop box in miles. Top-left plot is all mail/drop box voters, top right is only mail-in voters, and bottom left is drop box voters.

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Notes

- We do not include King County and Clallam County in our analysis. King County did not differentiate between mail and drop box voting; whereas Clallam did not record which drop boxes voters used. The data section contains a longer discussion of the possible issues posed by the omission of King County in particular.
- In Washington, voters can return ballots to a drop box in a county they do not reside in. While there is no requirement that counties forward ballots to their correct county for processing, this has been the practice since the beginning of Washington's Vote By Mail system according to the Secretary of State's Office (personal communication, March 23, 2021). Empirically, though, almost all voters do appear to use drop boxes within their own county, as 99.99% of drop box ballots are placed into same county drop boxes. For example, of the 851,149 drop box voters we examine, 850,986 record a ballot in a box from the county in which the voter lives. Another concern is that some voters' nearest box is not in their home county but is in another county, and that our distance analysis does not take this into account. Just 6.4% of drop box voters in our data fit into this category. While voters can theoretically use this nearest box almost all do not, as 99.98% of them use a box within their own county instead. Thus, to the extent that our distance measurement method does create some sort of bias because voters on county borders may be less inclined to use their nearest drop box (which is the point of this paper), the bias is against our alternative hypothesis because these voters elect to use a drop box farthest from their nearest box (which is in another county). We tested this by conditioning distance by voters' county registration and find that 56.8% (as opposed to 52.3%) of voters use the box closest to their house.
- In statewide elections, WA voters can drop their ballot off in any drop box across the state.
- Specific item language: "Earlier you answered that you personally dropped off your ballot at an official location. Why did you decide to do that, rather than mail the ballot back in?"
- "Earlier you answered that you mailed your ballot back. Why did you decide to do that, rather than return your ballot personally to an official location?"
- Table A1 in Appendix A shows the county drop box distribution. Just one county, Garfield County, has one drop box. So, in that particular county all voters have the same closest drop box. However, just 0.001% of all drop box voters come from Garfield County so any uniqueness surrounding voters in this county does not influence our overall findings.
- Table A2 in Appendix A lists each drop box name, the county, and the number of returned ballots.

8. This is consistent with drop box usage time trends reported by the secretary of state: <https://www.sos.wa.gov/elections/research/ballot-drop-box-usage-by-year.aspx>
9. In our distance calculation, 98 voters returned missing calculations so these are dropped from the analysis.

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