

# Technical Appendix: Data and Methods

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Data and estimation behind *Postal Network Redesign and Mail Ballot Rejections in the 2026 Primaries*.

## 1. Data

The analysis draws on three sources: county-level counts of rejected mail ballots for the three states that publish them, the Postal Service’s own designation of which facilities RTO covers, and a national survey of election administration that supplies the general-election comparison.

### 1.1 Ballot rejections

California, North Carolina, and Washington publish county-level counts of mail ballots returned and rejected, with a reason recorded for each rejection and late arrival as its own category, for the 2022, 2024, and 2026 federal primaries. California’s counts are read from the Secretary of State’s vote-by-mail ballot status workbook for each primary: the VBM Ballot Counts and VBM Challenge sheets for 2022, and the VBM Reject Press Version sheet for 2024 and 2026. North Carolina’s are counted from the State Board of Elections’ absentee ballot files, which carry one record per ballot with its return status; a late rejection is the status Returned After Deadline. Washington’s are read from the Secretary of State’s county reconciliation report for each primary, which records ballots received and ballots rejected for a late postmark by county. The outcome throughout is late rejections as a percentage of mail ballots returned by any method. These three states were selected on the availability of that reporting, not on any expectation that they represent the country.<sup>1</sup>

### 1.2 RTO exposure

Regional Transportation Optimization applies to post offices more than 50 miles from their regional processing and distribution center. Two Postal Service sources identify them. The proposed determination filed with the Postal Regulatory Commission in docket N2024-1 lists every facility from which collected mail is dispatched into the network and flags those that meet the distance test. The licensed PostalPro GIS product supplies the Postal Service’s own coordinates for its post offices.<sup>2</sup>

Exposure is built at the census block and aggregated to the county. Each of the 8.1 million 2020 census blocks is assigned to its nearest office in the GIS file by great-circle distance, that office’s

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<sup>1</sup>California’s 2022 VBM Ballot Counts tab carries three categories the 2024 and 2026 files do not: undeliverable (365,895), cancelled (2,079) and voter deceased (457). All years use the common nine-category set, so “other reasons” means the same thing throughout.

<sup>2</sup>Office locations are from the PostalPro Post Office Locations product, September 2026 vintage; designation is the RTO flag in the N2024-1 filing, matched on facility ID. The 116 locations in the product that do not appear in the filing have no known designation and are excluded rather than counted as uncovered.

status is taken from the filing, and block voting-age population is taken from the 2020 Census PL 94-171 redistricting file. A county’s exposure is the share of its voting-age residents living in blocks whose nearest post office is covered. Alaska and Hawaii are not in the block universe, so exposure covers the 48 contiguous states and the District of Columbia.

### 1.3 National comparison

The Election Administration and Voting Survey, collected by the U.S. Election Assistance Commission after each federal election, supplies mail ballots returned and rejections by reason, by jurisdiction, for the 2016 through 2024 general elections; the 2024 file is the corrected version the Commission released in February 2026. The exposure comparison uses a balanced panel of 2,218 counties reporting the late category in all five cycles. The panel is not a random subset: a state failing to report the category in any one cycle loses all of its counties, so Illinois, Virginia, Hawaii, Vermont, Idaho, Rhode Island, and New Mexico drop out entirely or almost so. This procedure retains roughly 90% of mail ballots recorded across the five cycles. The balanced panel is used only for the exposure comparison in Figure 4 of the brief and Table A4.

## 2. Specification

The effect of RTO on the late ballot rejection rate is estimated using a difference-in-differences model:

$$\text{rate}_{ct} = \alpha_c + \gamma_t + \beta_{2022} (D_c \times \mathbf{1}[t = 2022]) + \beta_{2026} (D_c \times \mathbf{1}[t = 2026]) + \varepsilon_{ct}$$

where  $D_c$  is county exposure and 2024 is omitted. RTO began rolling out in 2025, so 2022 and 2024 are both pre-treatment and 2026 is the only post-treatment period.  $\beta_{2026}$  captures the difference-in-differences estimate;  $\beta_{2022}$  reflects a test of parallel trends, or specifically whether trends in late ballot rejection rates were dissimilar before RTO began rolling out.

Exposure is measured in three ways. The first is a binary variable equal to 1 when at least 50% of county voting-age population is exposed to RTO, and 0 otherwise. The second is a binary variable equal to 1 when at least 75% of county voting-age population is exposed to RTO, 0 when no more than 25% is exposed, and missing otherwise. The third treats exposure as a continuous variable between 0 and 1. Table A2 reports all three.

### 2.1 Pooling the three states

The effect is estimated separately in each state and also when all three states are pooled together. The pooled specification replaces the year effects with state-by-year effects:

$$\text{rate}_{ct} = \alpha_c + \gamma_{s(c),t} + \beta_{2022} (D_c \times \mathbf{1}[t = 2022]) + \beta_{2026} (D_c \times \mathbf{1}[t = 2026]) + \varepsilon_{ct}$$

where  $s(c)$  is the state containing county  $c$  and 2024 is the omitted year within each state.

### 2.2 Designation, not implementation

Exposure is defined by designation in the October 2024 filing, not by whether an office had begun operating on the new schedule. The estimates are therefore intent-to-treat effects: they measure

the effect of being designated for RTO, whether or not the new schedule had reached the office by the time of the election. Designation is the basis for assigning treatment because it depends only on distance from a processing plant and was fixed before the elections studied, so it cannot respond to anything about how a county votes. The order of implementation is a scheduling decision by the Postal Service, and it could depend on such factors. For example, the Postal Service agreed, in response to a September 2026 audit by its Office of Inspector General of election mail in the 2026 primaries, to pause scheduled operational changes, including RTO, from October 17, 2026 through Election Day.<sup>3</sup>

RTO implementation was incomplete at each of the three primaries, to different degrees. The Postal Service records activation by ZIP code in periodic filings in docket RM2024-9.<sup>4</sup> By the date of each state’s primary, 98% of designated offices in Washington had activated, 75% in California, and 31% in North Carolina. The treated group therefore includes counties where RTO had not yet taken effect, which narrows the gap between groups, so the estimates in Table A2 are likely to understate the effect of RTO once it is fully in place.

Figures A1 through A3 show the geography behind the estimates. Figure A1 maps county exposure with each regional processing and distribution center and a 50-mile ring around it; the control counties are the plant catchments. Figure A2 maps each county’s change in the late-rejection rate net of the change in the state’s low-exposure counties. Figure A3 repeats Figure A2 for California and North Carolina with designated but unconverted counties greyed out, and Table A5 reports the underlying means.

Table A5 splits the exposed counties in California and North Carolina by whether their designated offices had activated before the state’s primary. The increase in late rejections is concentrated where the new schedule was in place and largely absent where it was not. In California, the 36 exposed counties that had activated rose 1.3 points relative to the low-exposure counties, while the five designated counties that had not yet converted, which returned 711,000 mail ballots in 2024, moved with the low-exposure group. In North Carolina, the 30 activated counties rose 6.0 points relative to the low-exposure group and the 52 unconverted counties rose 0.2. The estimate in Table A2 is the average of the two, which is why North Carolina’s coefficient is both large and imprecise: most of its treated group had not yet been treated.

Observations are weighted by mail ballots returned in 2024. Standard errors are robust (HC1).

### 3. Results

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<sup>3</sup>U.S. Postal Service Office of Inspector General, *Processing of Election and Political Mail for the 2026 Primary Elections*, Report No. 26-054-R26, September 4, 2026, Recommendation 8 and the Postal Service’s response, [https://www.uspsaig.gov/sites/default/files/reports/2026-09/26-054-r26\\_0.pdf](https://www.uspsaig.gov/sites/default/files/reports/2026-09/26-054-r26_0.pdf).

<sup>4</sup>Activation is matched to offices on ZIP5 and is a lower bound: an office whose own ZIP is not listed reads as not activated, and the reports cover Leg 1 activation only. Plant locations in Figure A1 are from the Postal Service’s response to Question 30 of Chairman’s Information Request No. 1 in docket ACR2025, geocoded from the street address.

Table A1: Late-Rejection Rates by Exposure Group

|                           | 2022<br>(1) | 2024<br>(2) | 2026<br>(3) | $\Delta$ 2024–2026<br>(4) | Counties<br>(5) |
|---------------------------|-------------|-------------|-------------|---------------------------|-----------------|
| <i>California</i>         |             |             |             |                           |                 |
| Under 50% exposed         | 1.04        | 1.13        | 0.83        | -0.30                     | 17              |
| 50% or more exposed       | 1.00        | 1.01        | 1.62        | +0.61                     | 41              |
| Difference-in-differences |             |             |             | +0.91                     |                 |
| <i>North Carolina</i>     |             |             |             |                           |                 |
| Under 50% exposed         | 2.42        | 3.94        | 4.15        | +0.21                     | 17              |
| 50% or more exposed       | 2.35        | 3.65        | 5.72        | +2.07                     | 82              |
| Difference-in-differences |             |             |             | +1.86                     |                 |
| <i>Washington</i>         |             |             |             |                           |                 |
| Under 50% exposed         | 0.76        | 0.80        | 0.66        | -0.14                     | 9               |
| 50% or more exposed       | 0.70        | 0.80        | 1.76        | +0.95                     | 30              |
| Difference-in-differences |             |             |             | +1.09                     |                 |

*Notes:* Ballot-weighted mean late-rejection rates, in percent of mail ballots returned, for the three states that report county-level rejections by reason. Counties are grouped by whether at least half of voting-age residents live nearest a post office covered by Regional Transportation Optimization. Weights are mail ballots returned, fixed at 2024. RTO began rolling out in 2025, so 2022 and 2024 both precede it.

Table A2: Effect of RTO Exposure on Late Ballot Rejections

|                                                                               | California<br>(1)   | North Carolina<br>(2) | Washington<br>(3)   | Pooled<br>(4)       |
|-------------------------------------------------------------------------------|---------------------|-----------------------|---------------------|---------------------|
| <i>Panel A. Exposure <math>\geq 50\%</math> of voting-age population</i>      |                     |                       |                     |                     |
| Exposure $\times$ 2026                                                        | 0.915***<br>(0.259) | 1.864<br>(1.543)      | 1.092***<br>(0.184) | 0.958***<br>(0.202) |
| Exposure $\times$ 2022                                                        | 0.085<br>(0.205)    | 0.227<br>(1.109)      | -0.065<br>(0.124)   | 0.051<br>(0.160)    |
| Pre-RTO baseline rate (%)                                                     | 1.058               | 3.066                 | 0.770               | 1.000               |
| Effect relative to baseline                                                   | +86%                | +61%                  | +142%               | +96%                |
| Counties                                                                      | 58                  | 99                    | 39                  | 196                 |
| Observations                                                                  | 174                 | 297                   | 117                 | 588                 |
| <i>Panel B. Exposure <math>&gt; 75\%</math> versus <math>&lt; 25\%</math></i> |                     |                       |                     |                     |
| Exposure $\times$ 2026                                                        | 1.118***<br>(0.273) | 1.985<br>(1.646)      | 1.159***<br>(0.235) | 1.130***<br>(0.221) |
| Exposure $\times$ 2022                                                        | 0.091<br>(0.221)    | 0.358<br>(1.175)      | -0.096<br>(0.156)   | 0.054<br>(0.177)    |
| Pre-RTO baseline rate (%)                                                     | 1.058               | 3.066                 | 0.770               | 1.000               |
| Effect relative to baseline                                                   | +106%               | +65%                  | +150%               | +113%               |
| Counties                                                                      | 54                  | 92                    | 34                  | 180                 |
| Observations                                                                  | 162                 | 276                   | 102                 | 540                 |
| <i>Panel C. Exposure as a continuous share</i>                                |                     |                       |                     |                     |
| Exposure $\times$ 2026                                                        | 1.205***<br>(0.256) | 2.449<br>(1.632)      | 1.237***<br>(0.224) | 1.218***<br>(0.200) |
| Exposure $\times$ 2022                                                        | 0.099<br>(0.227)    | 0.471<br>(1.171)      | -0.089<br>(0.150)   | 0.056<br>(0.175)    |
| Pre-RTO baseline rate (%)                                                     | 1.058               | 3.066                 | 0.770               | 1.000               |
| Effect relative to baseline                                                   | +114%               | +80%                  | +161%               | +122%               |
| Counties                                                                      | 58                  | 99                    | 39                  | 196                 |
| Observations                                                                  | 174                 | 297                   | 117                 | 588                 |

*Notes:* Each panel reports a separate measure of county exposure. The dependent variable is late rejections as a percent of mail ballots returned. All specifications include county and year fixed effects; the pooled model uses state-by-year effects, so identification is within state. 2024 is omitted, so the 2026 interaction is the difference-in-differences and the 2022 interaction tests parallel trends. Weighted by mail ballots returned, fixed at 2024. Robust standard errors in parentheses.

\*, \*\*, \*\*\* indicate significance at 0.05, 0.01, and 0.001, respectively.

Table A3: Within-Election Placebo: Only Late Arrival Moves

|                             | California<br>(1)   | North Carolina<br>(2) | Washington<br>(3)   | Pooled<br>(4)       |
|-----------------------------|---------------------|-----------------------|---------------------|---------------------|
| Late arrival                | 0.915***<br>(0.259) | 1.864<br>(1.543)      | 1.092***<br>(0.184) | 0.958***<br>(0.202) |
| All other rejection reasons | -0.137<br>(0.125)   | 0.285<br>(0.418)      | 0.045<br>(0.067)    | -0.094<br>(0.097)   |
| Observations                | 174                 | 297                   | 117                 | 588                 |

*Notes:* Identical specification and sample to Panel A of Table A2; only the rejection reason changes. Other reasons comprise the nine categories reported consistently across all three elections, including missing and non-matching signatures and missing dates. Robust standard errors in parentheses.

\*, \*\*, \*\*\* indicate significance at 0.05, 0.01, and 0.001, respectively.

Table A4: Pre-RTO General Elections, 2016 Through 2024

|                            | 2016<br>(1)       | 2018<br>(2)       | 2020<br>(3)       | 2022<br>(4)      | 2024<br>(5)    |
|----------------------------|-------------------|-------------------|-------------------|------------------|----------------|
| Low-exposure counties (%)  | 0.236             | 0.397             | 0.074             | 0.390            | 0.225          |
| High-exposure counties (%) | 0.238             | 0.407             | 0.106             | 0.299            | 0.213          |
| Gap (percentage points)    | +0.003            | +0.010            | +0.032            | -0.091           | -0.012         |
| Exposure $\times$ year     | -0.051<br>(0.060) | -0.105<br>(0.172) | 0.049*<br>(0.023) | 0.280<br>(0.386) | <i>omitted</i> |

*Notes:* Late rejections as a percent of mail ballots returned, from the Election Administration and Voting Survey, for a balanced panel of 2,218 counties reporting the category in all five cycles. Every cycle precedes RTO. The final rows report the same specification as Table A2 with 2024 omitted. The 2020 cycle is anomalous in level: the national late-rejection rate fell to about a third of normal. The 2020 interaction is distinguishable from zero at 5%; it is five hundredths of a point in the pandemic cycle, and no other pre-period coefficient approaches significance.

\*, \*\*, \*\*\* indicate significance at 0.05, 0.01, and 0.001, respectively.

Table A5: Late-Rejection Rates by Implementation Group, California and North Carolina

|                                              | Counties<br>(1) | 2024 ballots<br>(2) | 2024<br>(3) | 2026<br>(4) | $\Delta$ vs. low exposure<br>(5) |
|----------------------------------------------|-----------------|---------------------|-------------|-------------|----------------------------------|
| <i>California</i> (primary 2 June 2026)      |                 |                     |             |             |                                  |
| Low exposure                                 | 17              | 4,523,969           | 1.13        | 0.83        |                                  |
| Exposed, activated                           | 36              | 1,729,405           | 0.85        | 1.84        | +1.30                            |
| Exposed, not yet activated                   | 5               | 710,880             | 1.39        | 1.08        | -0.01                            |
| <i>North Carolina</i> (primary 3 March 2026) |                 |                     |             |             |                                  |
| Low exposure                                 | 17              | 11,308              | 3.94        | 4.15        |                                  |
| Exposed, activated                           | 30              | 5,719               | 2.87        | 9.09        | +6.01                            |
| Exposed, not yet activated                   | 52              | 14,024              | 3.97        | 4.35        | +0.17                            |

*Notes:* Ballot-weighted mean late-rejection rates, in percent of mail ballots returned, weights fixed at 2024. Exposed counties are those where at least half of voting-age residents live nearest a designated office; activated counties are those where at least half live nearest a designated office with an activation date before the state's primary. The means are descriptive rather than estimates, because activation order is the Postal Service's own decision, and no standard errors are reported. Tyrrell County, NC, returned no mail ballots in 2022 or 2026 and is excluded.

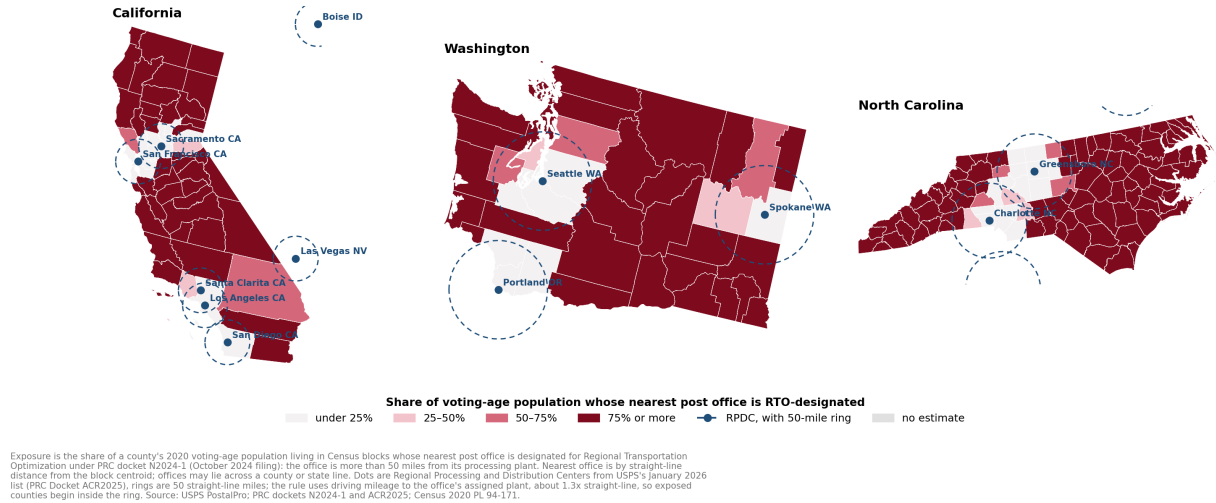


Figure A1: County Exposure and the Plants That Define It

*Notes:* Share of county voting-age population living nearest an RTO-designated post office, with regional processing and distribution centers and a 50-mile ring. The rule uses driving mileage to the office's assigned plant, about 1.3 times the straight-line distance, so exposure begins inside the ring.

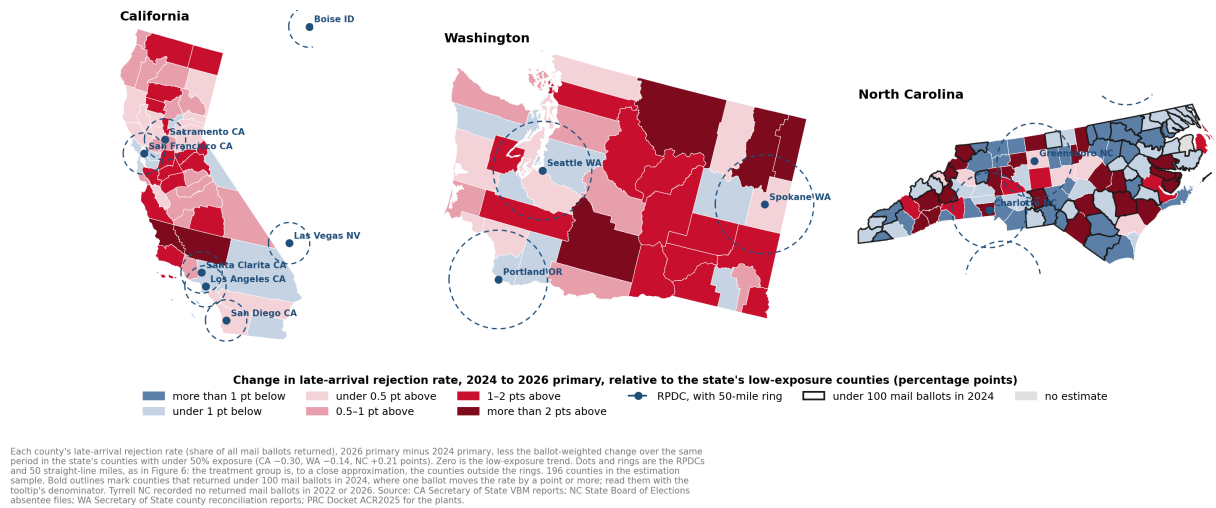


Figure A2: Change in the Late-Rejection Rate, 2024 to 2026 Primary, Net of the State's Low-Exposure Counties

*Notes:* Percentage points, for the 196 counties in the estimation sample. Bold outlines mark counties that returned fewer than 100 mail ballots in 2024. Plants and rings as in Figure A1.

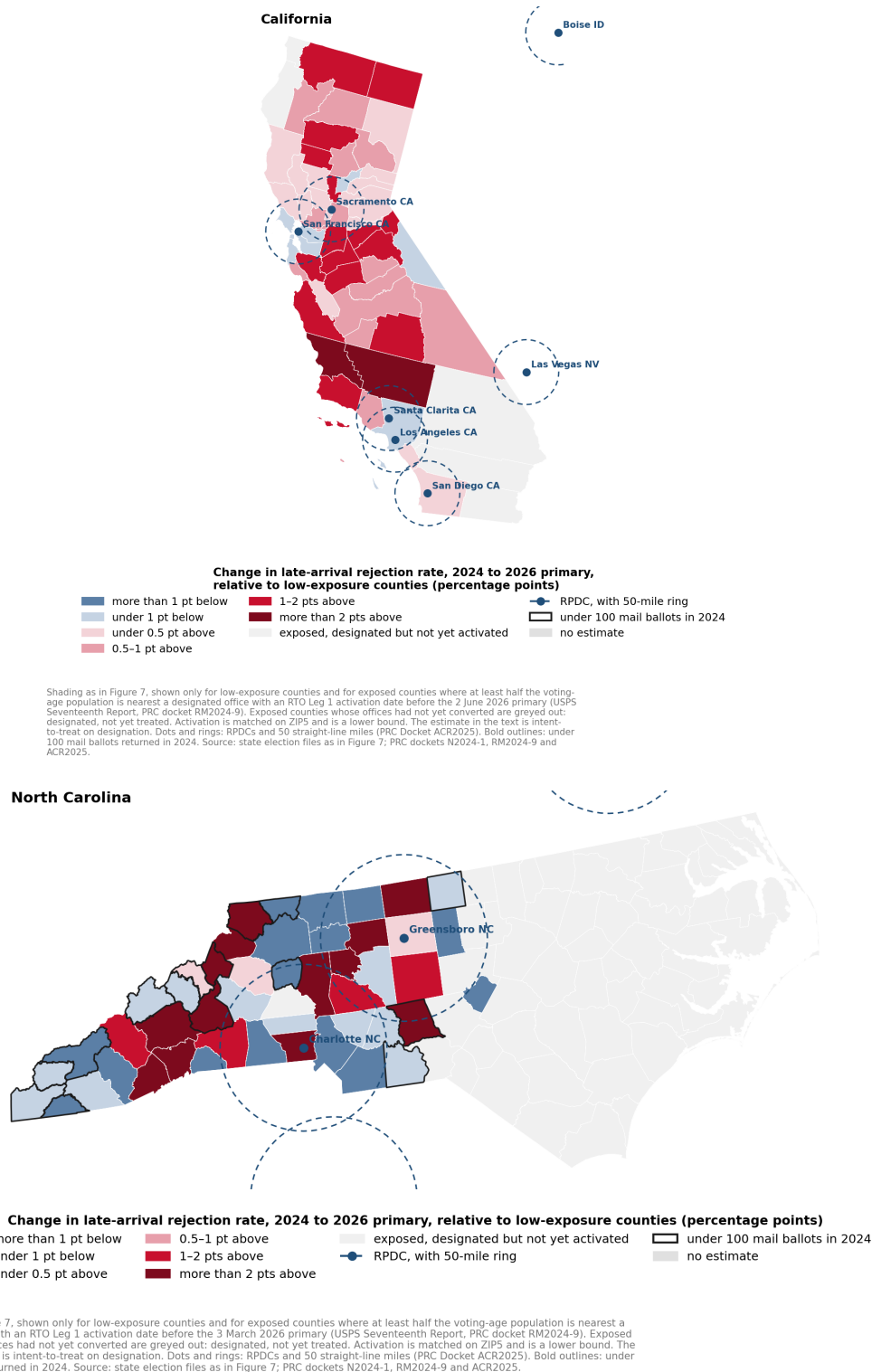


Figure A3: Figure A2 with Designated but Unconverted Counties Greyed Out, California and North Carolina

*Notes:* A county is greyed out when fewer than half of its voting-age residents live nearest a designated office with an activation date before the state’s primary. Washington is omitted; 98% of its designated offices had activated.