



# Does Firewise USA® reduce fuel loads and structure damage from wildfires?

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## Why this matters & what we ask

Wildfire risk is rising in the wildland–urban interface as climate change extends fire seasons. **Firewise USA®** is the nation’s largest community-level wildfire-mitigation program, with nearly **3,000 enrolled communities** since 2002. Yet after two decades, there is virtually no rigorous causal evidence on whether participation changes vegetation management or reduces damage during fires.

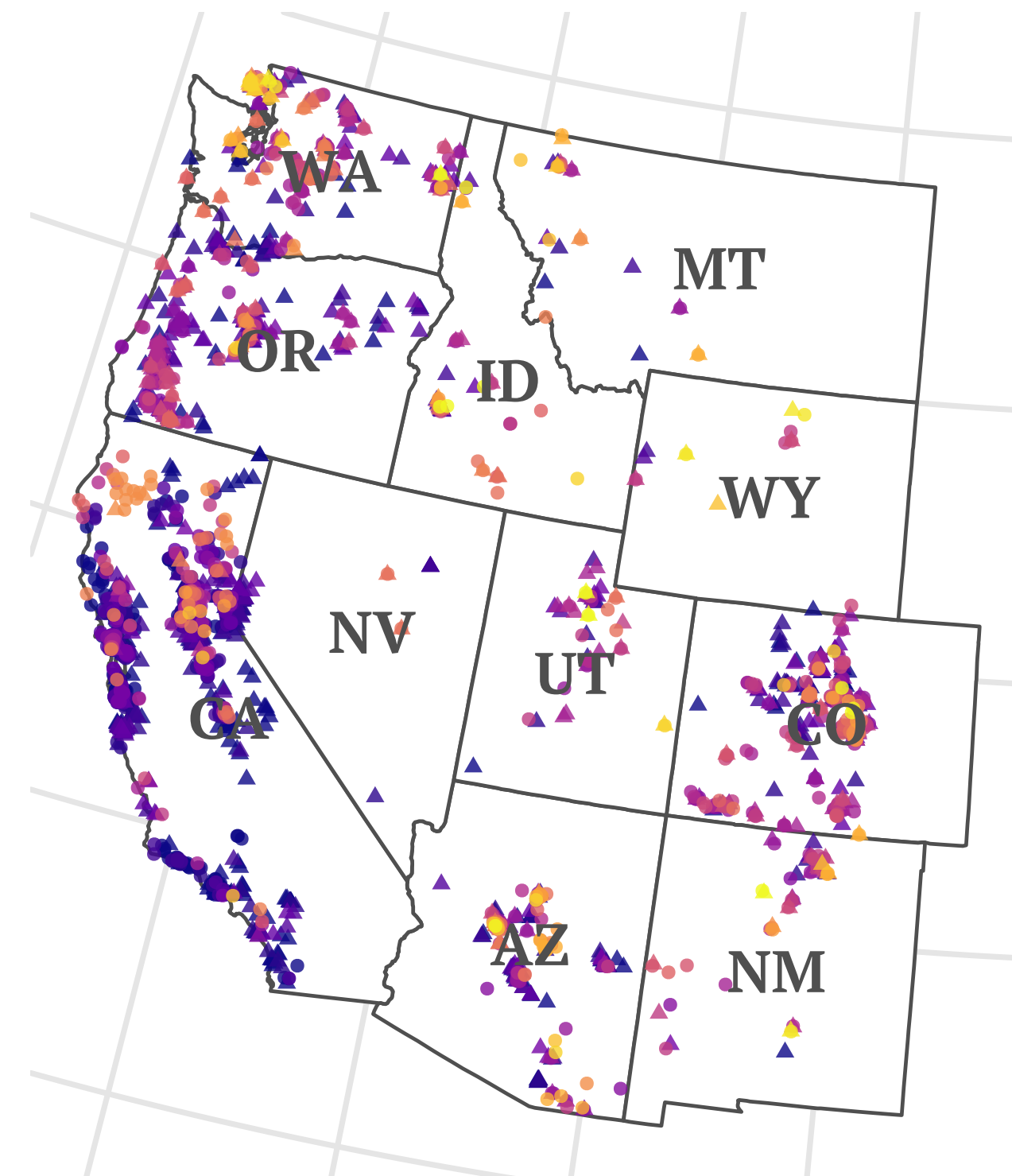
We ask:

- Does joining Firewise lead to more active vegetation management?
- Does it reduce structure damage when fires occur?
- Does effectiveness depend on the type of community?

## Where are Firewise communities?

### Firewise USA sites in the Western U.S.

2,737 sites in the analysis universe



#### Year first recognized



- Polygon boundary (n = 1,609)
- ▲ Imputed 800 m buffer (n = 1,128)

Concentration is greatest along the Sierra Nevada, Rocky Mountain Front Range, and central Oregon. Communities joined in different years, which lets us compare each site’s outcomes after joining to similar sites that hadn’t yet joined.

## Data & design

We study the **3,000+ communities** that have joined Firewise USA between 2002 and 2025: 1,349 with official pre-2017 boundaries, **846 with boundaries compiled from Fire Safe Councils and California county sources**, and the rest matched to 800 m buffers around building clusters.

**Vegetation:** annual satellite measures of greenness and canopy moisture in the 30 m around homes, 2000–2025.

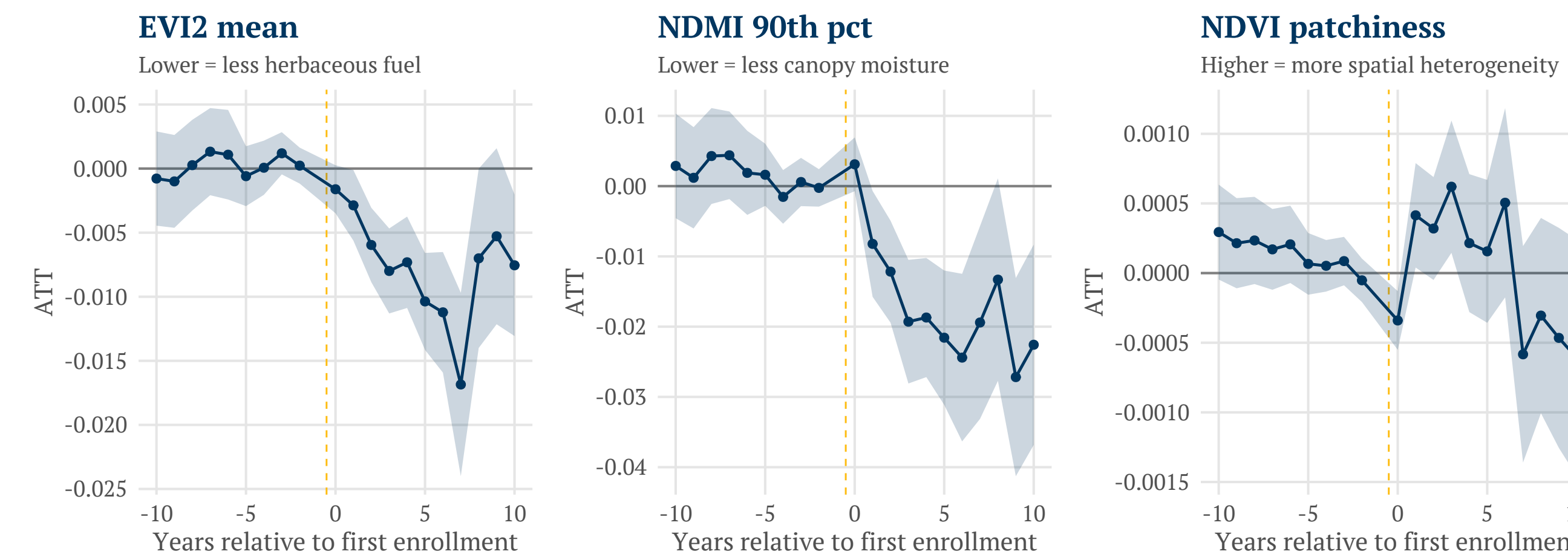
**Damage:** California fire-damage inspections (DINS, 2014–2025) and satellite-derived burn severity (MTBS, 1984–2023).

**Design:** because communities joined in different years, we compare each site’s outcomes after joining to its pre-joining trajectory and to similar not-yet-joined sites with the same fire exposure.

## Vegetation in California: strongest signal

### California: per-state SunAb event study, fire-matched cohort-fixed comparison

Sun & Abraham (2021) estimator on 457 fire-exposed treated CA sites (20 cohorts, 2005–2025); 95% CIs

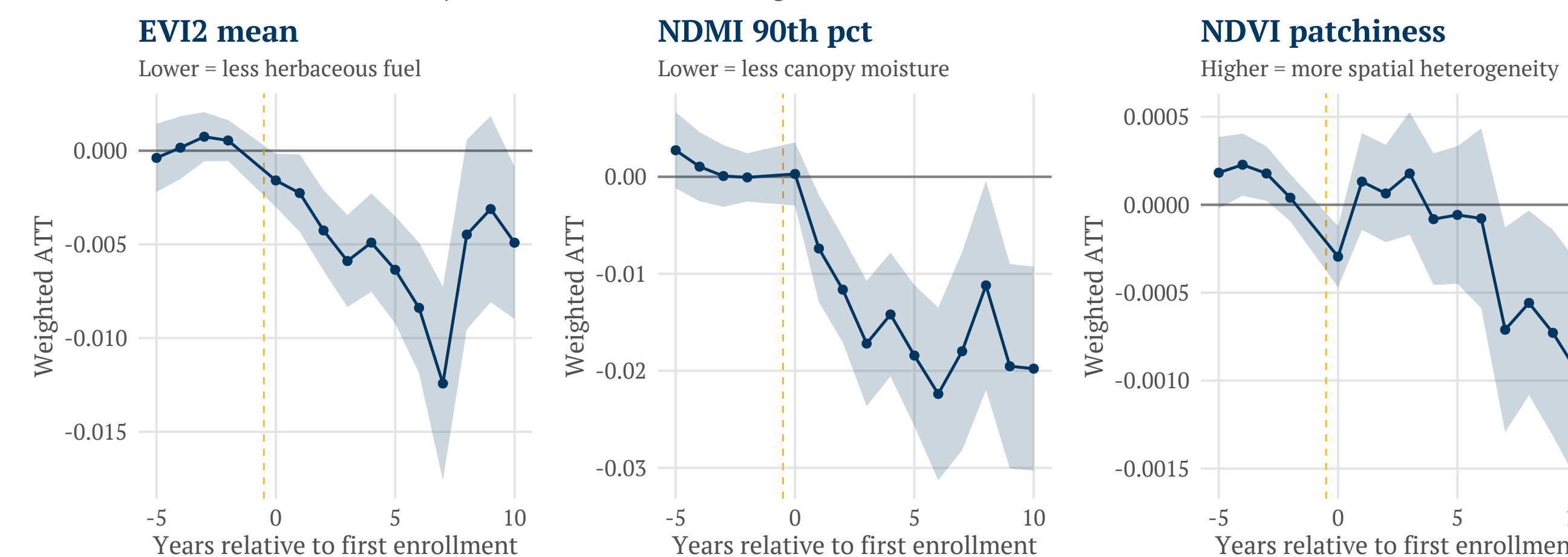


After joining, California sites show **declining greenness and declining canopy moisture** — the directional signature of active vegetation management. Pre-joining trends are flat. The effect emerges 1–2 years after joining and grows through year 5.

## Vegetation pooled across the Western U.S.

### Western U.S.: state-decomposed event study (n-treated-weighted aggregate)

Per-state Sun-Abraham estimates pooled across 10 contributing western states (AK/HI/WY excluded); 95% CIs



The same picture across the West: **declining greenness and canopy moisture** after joining, when state-level estimates are combined. The aggregate is more precise than any single state because the effects look similar in direction across very different landscapes.

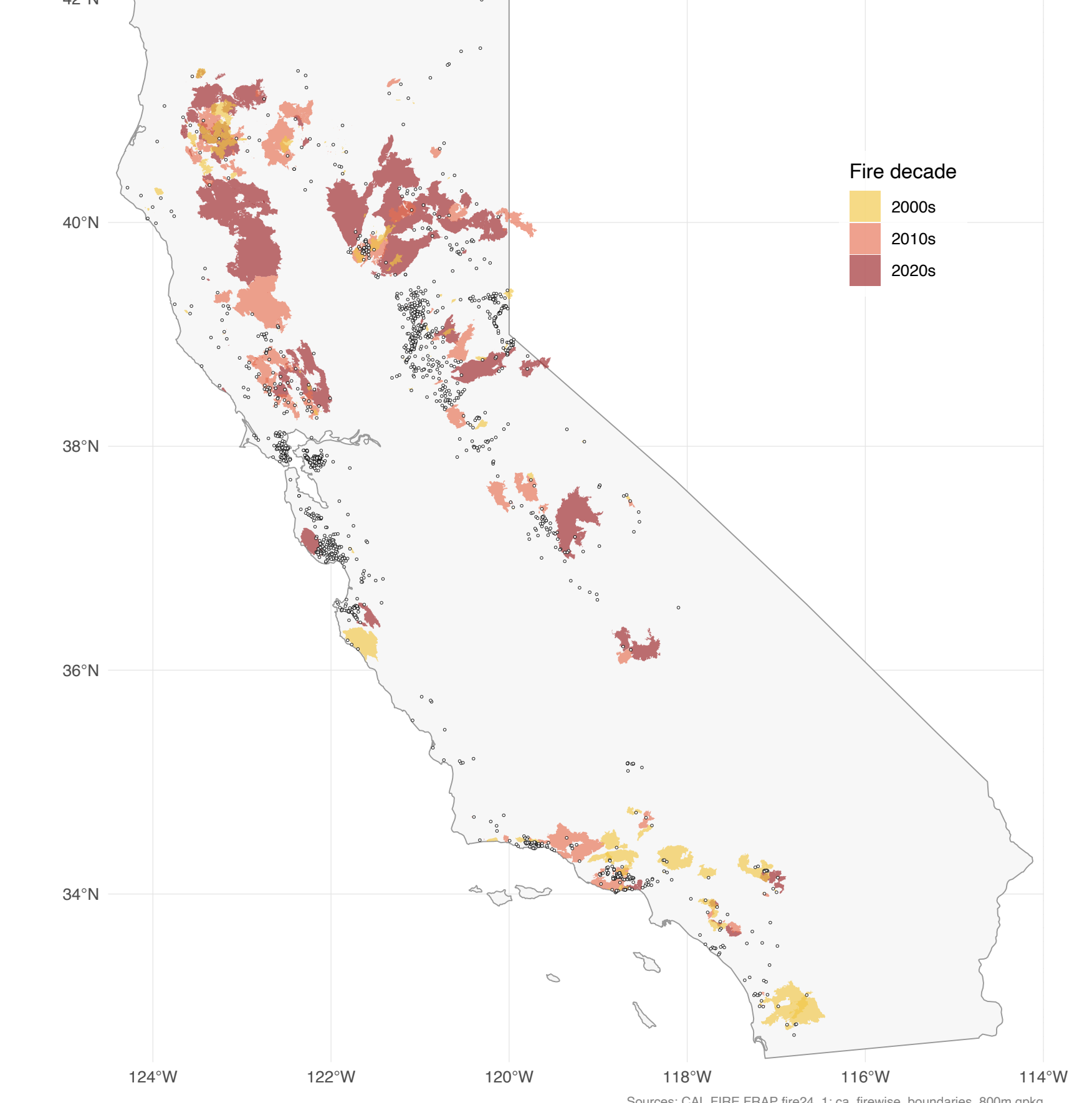
## Take-away on vegetation

After joining Firewise, sites show **less live vegetation and fuel near homes** — what active fuel management should produce. The signal is strongest in California and directionally consistent across the West. **We do not find consistent evidence that effects differ across community types** (income, density, owner-occupancy, social capital, civic-organization density).

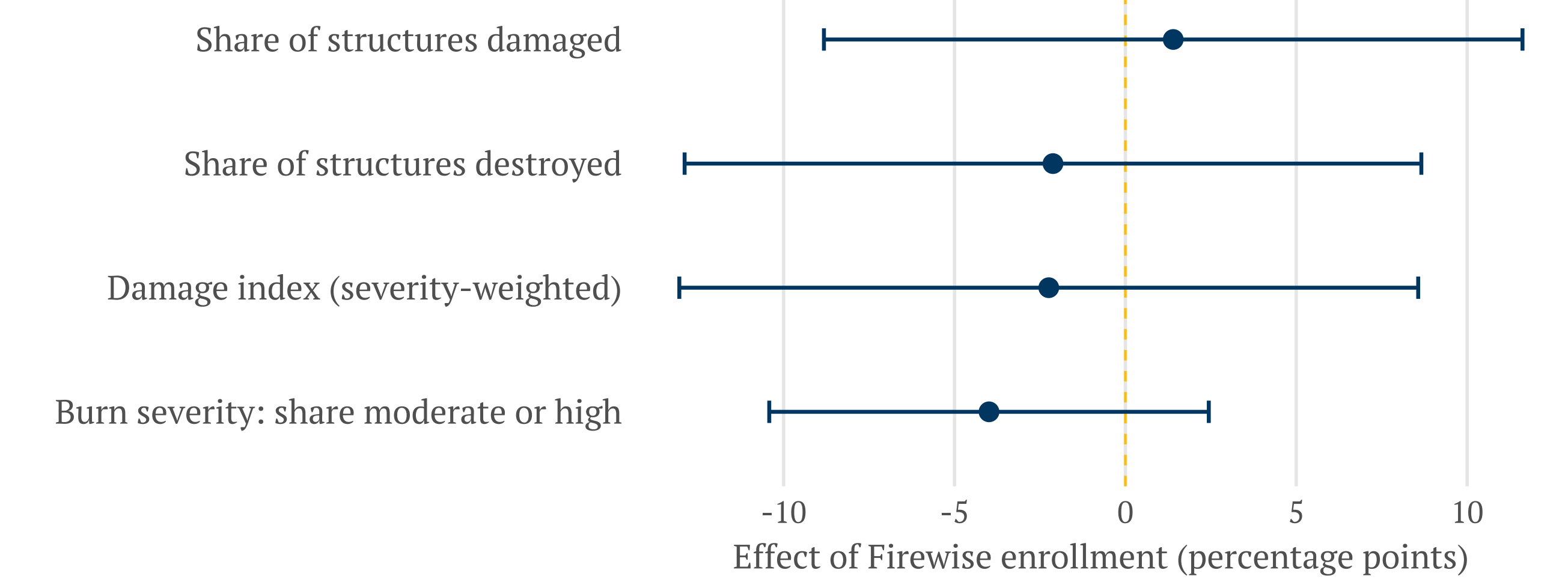
## Damage: California fire–Firewise intersections

### California fire perimeters intersecting Firewise sites

539 FRAP fires (2000–2024) overlap 400 unique FW polygons; sites shown as white dots



Pre-registered cross-fire analysis with post-double-selection LASSO; 95% confidence intervals. 158 site-by-fire observations (damage), 345 (burn severity).



**539 California fires** have hit **400 Firewise communities** since 2000 (above). Every estimate of Firewise’s damage-reduction effect points in the protective direction, but **none is statistically distinguishable from zero**. We cannot yet rule out a small protective effect — nor confirm one.

## Caveats & next steps

- **Access to the full set of site boundaries could change results.** We will open-source the pipeline so the analysis can be re-run as more boundaries become available.
- **Damage data only exist for California.** Nationwide tests require new state-by-state data agreements.

## Applications & implications

- Firewise USA appears to support fuel reduction efforts, with the signal clearest in California.
- Efforts persist and strengthen over several years, indicating the program is helpful for maintaining attention and collective action.
- We are not able to detect a protective signal for fires, but more data would clarify this relationship.