

Table 4: Support-filtered expected-affinity family near 2.75.

Rail	Active hits	Random hits	Enrichment
Primary valley crest near 2.7477	736	218	3.376×
Basin companion near 2.74475	721	251	2.873×
Tip companion near 2.7545	685	246	2.785×

The companion rails do not replace the primary sign-control result. They are retained as descriptive evidence that the enrichment appears in a small neighborhood of related marker values and morphology classes. A continuous coordinate scan is required before making a stronger claim about the width or peak location of this neighborhood.

4.4 Morphology rotation

The morphology-envelope diagnostic is descriptive. It shows that the active marker can rotate among morphology states. In the evaluated aggregate telemetry, the strongest morphologies were distributed among tip extreme, valley, and tight basin rows. This rotation explains altitude bands where the primary fixed-valley cross-section weakens while the broader active neighborhood remains enriched. Detailed rotation data is retained in Appendix D.

4.5 Coordinate-locality validation scan (R142A)

The primary R141H ledger establishes the frozen-design sign-control result. To test whether that result is tied to a single coordinate or to a broader neighborhood, we then performed a coordinate-locality validation scan, denoted R142A. This scan used the same frozen morphology grammar as the primary ledger:

$$\epsilon = 5 \times 10^{-4}, \quad W = 4, \quad R = 4, \quad \tau = 0.10.$$

The scan evaluated a regular coordinate grid over $2.30 \leq x \leq 3.20$, the original active coordinate, sign-reversed controls, nearby perturbations, and named companion coordinates.

R142A changes the interpretation of the geometric prior in an important way. The original active marker remained enriched, but it did not emerge as a unique isolated maximum. Instead, it lies inside a broader enriched shelf spanning approximately

$$2.70 \leq x \leq 2.81.$$

The active coordinate

$$a_{\text{Euler}+\cos} = \frac{\pi}{2} + \frac{2}{\pi} + \cos(1) \approx 2.747718$$

produced

$$702/218 = 3.220\times$$

over 21 support-qualified R142A blocks. Several nearby coordinates were comparable or stronger. In particular,

$$\frac{7\pi}{8} \approx 2.748894$$

produced $692/190 = 3.642\times$, while grid coordinates 2.740 and 2.780 produced $784/218 = 3.596\times$ and $570/158 = 3.608\times$, respectively.

Thus R142A supports a shelf interpretation: the original geometric marker successfully localized an enriched coordinate neighborhood, while the empirical crest rotates among nearby rails. This is stronger and more conservative than claiming that the prior identified a unique needle-point maximum.

Table 5: Representative R142A coordinate-locality results. Enrichment is computed as total pre-hits divided by total random-pre hits over support-qualified blocks. This table is not a top-rank table; it includes the sign-control floor, upper negative-control trend, frozen active coordinate, named companions, and representative shelf rails.

Coordinate	Value	Support blocks	Hits	Enrichment
Sign-control floor	1.667114	22	60332/40657	1.483927
Negative control upper trend	2.450000	22	3461/1382	2.504342
Active exact	2.747718	21	702/218	3.220183
Empirical basin companion	2.744750	22	707/226	3.128319
$7\pi/8$ companion	2.748894	21	692/190	3.642105
α_1 companion	2.749611	21	714/234	3.051282
2.750 grid / 22/8	2.750000	22	743/224	3.316964
R124 tip companion	2.754500	22	651/239	2.723849
Shelf rail	2.740000	22	784/218	3.596330
Shelf rail	2.780000	21	570/158	3.607595
Shelf rail	2.805000	19	487/137	3.554745

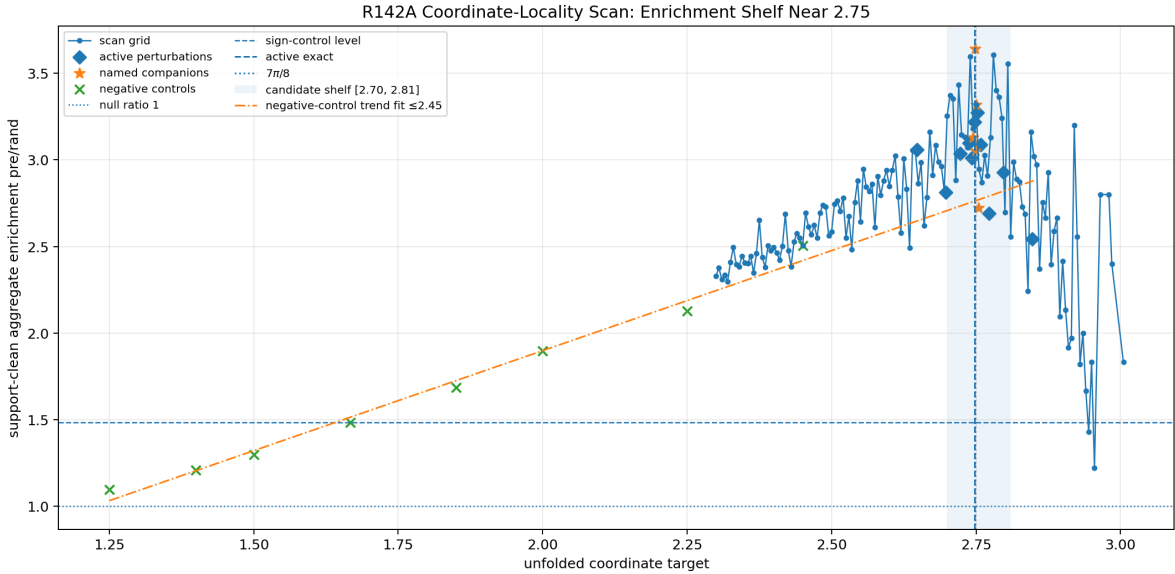


Figure 3: R142A coordinate-locality scan. The horizontal axis is the unfolded target coordinate and the vertical axis is support-clean aggregate enrichment, computed as total pre-hits divided by total random-pre hits. Negative controls below $x = 2.45$ follow a smooth rising background trend. The original active coordinate $a_{\text{Euler}+\cos} \approx 2.747718$ lies inside an elevated shelf spanning approximately 2.70–2.81. Nearby rails, including $7\pi/8$, 2.740, and 2.780, show comparable or stronger enrichment. The scan supports a shelf interpretation rather than a unique coordinate-local peak.

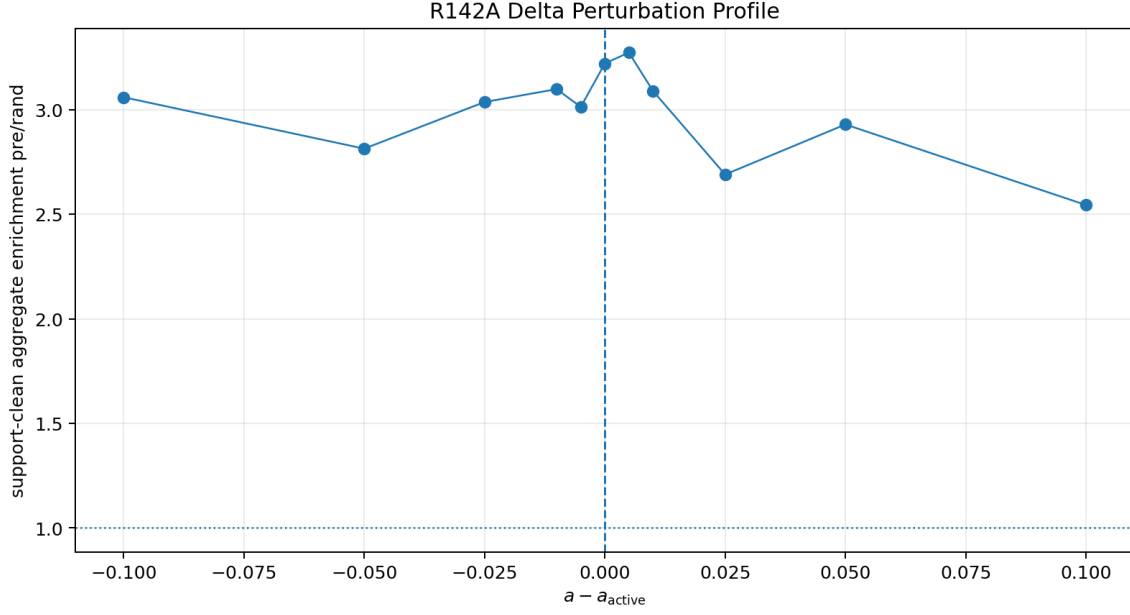


Figure 4: R142A perturbation profile around the active coordinate. The profile remains elevated across small perturbations of the active marker, with the local maximum occurring near $a_{\text{Euler}+\cos} + 0.005$. This confirms that the active coordinate is embedded in a finite-width enrichment shelf rather than forming a sharp isolated spike.

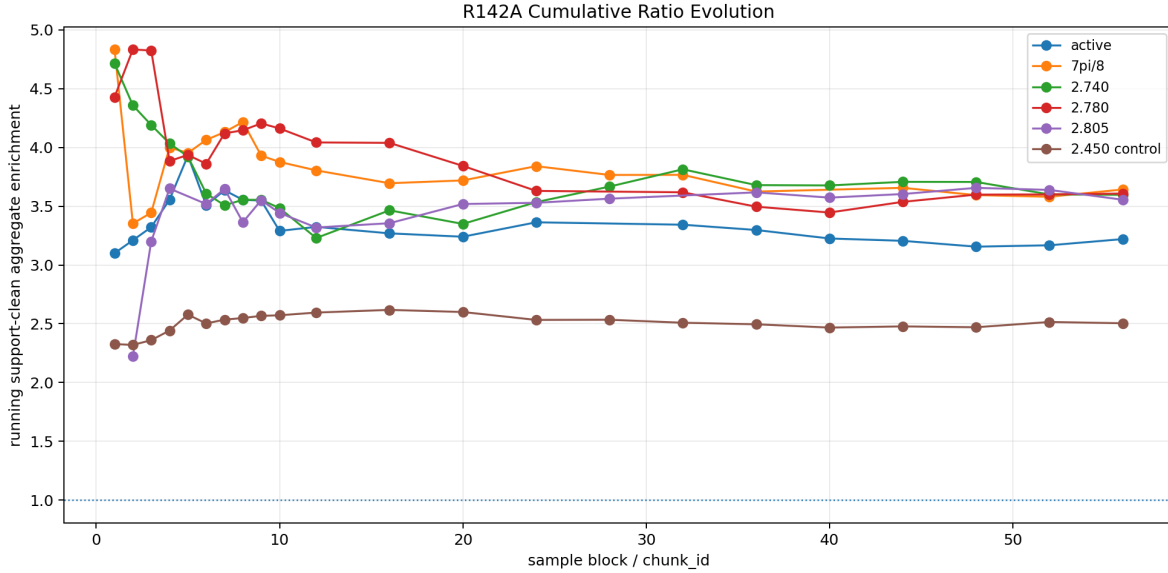


Figure 5: Cumulative aggregate enrichment for selected shelf coordinates and the 2.450 negative-control coordinate. The shelf coordinates stabilize above the negative-control trend as additional blocks are accumulated, while the 2.450 control remains distinctly lower. This supports the interpretation that the observed 2.75-neighborhood response is not driven solely by early-block transients.