

GLP (GMX v1) sub-report

NAV dynamics of a perp-LP index token: fee yield versus basket mark-to-market, drawdowns, and the v1→v2 wind-down, 2022–2026

Derivalink R&D

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Abstract

GLP is the GMX v1 liquidity-provider *index* token on Arbitrum: a single shared basket of BTC, ETH, LINK, UNI and stablecoins that stands as the direct counterparty to perpetual-futures traders. It is *not* a \$1-pegged stablecoin. Its on-chain price equals its net asset value ($\text{NAV} = \text{AUM}/\text{supply}$) by construction, so the canonical tracking-error/depeg programme is reframed here as a *NAV-dynamics* study: what moves NAV, how deep the drawdowns run, and how the product rose and then wound down as GMX v2 isolated GM pools drew liquidity away. The authoritative backbone is the GMX stats subgraph (1,122 daily NAV rows, 2022-11-25 to 2026-01-01), cross-checked exactly against an independent AUM/supply flows panel (NAV reconciliation max abs. diff 3.8×10^{-10}). Over its observed life GLP returned -89.0% (NAV $0.852 \rightarrow 0.094$), peaking at 1.750 on 2024-12-09 and troughing at 0.078 on 2025-07-11 (max drawdown -95.5% , never recovered), with AUM peaking at \$598.5 M on 2023-05-06 and ending at \$1.21 M. The core finding is a *NAV-return decomposition*: cumulative supply-side revenue paid to GLP holders is \$64.7 M (55% of \$117.6 M total protocol revenue) for a 7.9% supply-side APR, but the per-token NAV change of -0.758 splits into a fee accrual of $+0.257$ against a basket mark-to-market of -1.015 : real yield offset only $\approx 25\%$ of the basket loss. A regime split is decisive — the -89% headline is wind-down noise (tiny AUM, 374% annualized vol below \$50 M); lived holder risk in the live product was $\approx 50\%$ annualized (growth 49.2%, mature 53.3%). Two on-chain chapters complete the picture from a weekly Arbitrum archival backfill: the min/max-AUM *redemption spread* was negligible when the pool was liquid (median 0 bps, mean 0.92 bps) and widened only mechanically to 27 bps at the near-empty wind-down tail; the *basket composition* was a life-mean 50.1% stablecoins / 49.9% volatile crypto (WETH+WBTC $\approx 48\%$), so a holder carried roughly half BTC+ETH beta throughout. We close with monitoring implications for LP-index and delta-neutral products in Derivalink V2.

Contents

Executive summary	4
1 Dataset characterisation	5
1.1 What GLP is, and why this is a NAV study	5
1.2 The authoritative NAV backbone	6
1.3 The flows panel and the exact NAV cross-check	6
1.4 Integrity audit verdict	7
1.5 The on-chain enrichment series	7
2 NAV-tracking descriptive statistics	7
2.1 NAV level and total return	7
2.2 NAV by calendar year	8
2.3 Drawdown	8
2.4 AUM, supply and the wind-down scale	9
3 NAV-return decomposition: fees versus basket mark-to-market	9
3.1 The per-token additive decomposition	9
3.2 The dollar revenue split and the supply-side APR	10
3.3 Interpretation	10
3.4 Caveat: a first-order attribution, not an exact identity	10
4 The min/max-AUM redemption spread	11
4.1 What this measures	11
4.2 Data	11
4.3 Result: frictionless when liquid, mechanical at the tail	11
4.4 Read for a monitor	12
5 Basket composition and the holder’s risk split	12
5.1 What this measures	12
5.2 Data	13
5.3 Result: a $\approx 50/50$ stable-crypto basket	13
5.4 Drift over the wind-down	14
5.5 On a basket-implied NAV residual	14
6 Drawdowns and risk regimes	14
6.1 Three AUM regimes	14
6.2 The discrete drawdown ledger	15
7 Case studies	15
7.1 Case A — the September 2022 AVAX oracle-manipulation exploit (context) . . .	15
7.2 Case B — the GLP-v1 wind-down as GMX v2 took over	16
8 Findings and Derivalink V2 implications	16
8.1 Consolidated findings	16
8.2 Implications for Derivalink V2 monitoring	17

List of Figures

1	GLP NAV (per token, left axis) and AUM (log scale, right axis), 2022-11 to 2026-01. NAV rose to 1.750 in late 2024 then collapsed toward 0.078 through the wind-down; AUM peaked at \$598.5 M in mid-2023 and decayed to \$1.2 M.	8
2	GLP NAV underwater (drawdown-from-peak) plot. The terminal -95.5% draw-down is the unrecovered wind-down; earlier excursions are bounded basket draw-downs that recovered.	9
3	Cumulative per-token NAV decomposition: the steadily rising fee accrual ($+0.257$) against the basket mark-to-market (-1.015) and their sum, the total NAV change (-0.758). The fee coupon is real and monotone but small relative to basket volatility.	10
4	GLP min/max-AUM redemption spread in bps of NAV over the v1 life. The spread is ≈ 0 across the liquid growth and mature regimes and only blows out to ≈ 27 bps in the final weeks of the wind-down, when a near-empty pool ($\approx \$1.2$ M AUM) makes the relative gap between the two oracle marks mechanically large.	12
5	GLP basket stable-versus-volatile weight split over the v1 life (weekly on-chain snapshots). The split hovers near 50/50 throughout, drifting modestly toward stablecoins during the 2025 wind-down (52% stable, from $\approx 48\%$ at the start).	14

List of Tables

1	The on-disk series used in this report.	6
2	GLP NAV by calendar year (daily subgraph backbone). The 2026 row is a single stub day and is omitted.	8
3	NAV decomposition by year. Fee/basket per-token terms sum to the total per-token NAV change; the fee share is the fraction of the absolute NAV change attributable to fees.	10
4	GLP min/max-AUM redemption spread, weekly on-chain <code>getPrice</code> (162 snapshots, 2022-11-24 to 2025-12-25).	12
5	GLP basket composition: per-token time-mean weight over 157 weekly snapshots, and the last (2025-12-25) snapshot weight. Weights sum to 100% per snapshot.	13
6	NAV risk by AUM regime. The wind-down's 373.9% annualized volatility is a near-empty-pool artefact; lived risk in the live product was $\approx 50\%$	15
7	The eight largest GLP NAV drawdowns. Only the terminal wind-down drawdown failed to recover.	15
8	GLP-v1 wind-down: AUM threshold crossings relative to the 2023-05-06 peak (\$598.5 M).	16

Executive summary

Asset nature and scope. GLP is the GMX v1 liquidity-provider *index* token on Arbitrum: a single, shared, multi-asset basket (BTC, ETH, LINK, UNI and stablecoins) that acts as the direct counterparty to every perpetual-futures position on GMX v1 (GMX 2023a). It is *not* a fiat-reserve or over-collateralised stablecoin and it carries no \$1 peg: by construction its on-chain price *equals* its net asset value, $NAV = AUM/supply$. There is therefore no peg to defend and no peg-arbitrage band in the stablecoin sense; the relevant question is not “does it hold \$1” but “how does NAV behave, what drives it, and how risky is holding it.” This sub-report consequently reframes the canonical tracking-error/depeg template as a **NAV-dynamics / LP-index tracking study**. Our analytical surface is the authoritative GMX stats subgraph daily NAV backbone (1,122 rows, 2022-11-25 to 2026-01-01; GMX and The Graph 2024) plus an independent daily AUM/ supply/revenue flows panel that reconciles against it to machine precision (NAV reconciliation max abs. diff 3.8×10^{-10} , Section 1).

F1 — GLP is an index, not a peg; its price *is* its NAV. Over its observed life the NAV ran 0.852→0.094, a total return of -89.0% , peaking at 1.750 (2024-12-09) and troughing at 0.078 (2025-07-11; Section 2). Framing this as a “depeg” would be a category error: there was no par to return to. The right benchmark is the basket the token represents, and the right object of study is the NAV path itself and its drivers.

F2 — Fee yield was real but could not offset basket mark-to-market (the core finding). The per-token NAV change of -0.758 decomposes additively as a fee accrual of $+0.257$ against a basket mark-to-market of -1.015 (Section 3). Cumulative supply-side revenue paid to GLP holders was \$64.7 M — 55 % of the \$117.6 M total protocol revenue, the rest going to the protocol — for a supply-side APR of 7.9 %. As a proxy for the trader-PnL transfer, cumulative entry/exit premium paid by traders into the pool was \$110.2 M. The verdict: a GLP holder earned a genuine $\approx 8\%$ fee/PnL-transfer yield, but fees offset only $\approx 25\%$ of the basket drawdown. GLP was a *levered long the basket with a fee coupon*, not a market-neutral carry instrument.

F3 — The -89% headline is wind-down noise; lived risk was $\approx 50\%$ annualized. A three-regime split is decisive (Section 6). In GROWTH (163 days, AUM \$355–599 M) annualized vol was 49.2 % with $+12.3$ bps/day; in MATURE (702 days) 53.3 % with $+5.4$ bps/day; only in WIND-DOWN (257 days, AUM below \$50 M, falling to \$1.2 M) does vol explode to 373.9 % with -108.1 bps/day. Full-life vol of 184.8 % and the -89% return are dominated by the wind-down, where a near-empty pool makes per-token NAV mechanically noisy. The risk a live holder actually bore was $\approx 50\%$ annualized — a high-beta crypto basket, as expected.

F4 — The deepest drawdown is the v2 transition, not a crash event. The worst drawdown is -95.5% (peak NAV 1.750 on 2024-12-09 to trough 0.078 on 2025-07-11, 376 days, never recovered; Section 6). It is not a single-day exploit or liquidation cascade but the slow bleed of the wind-down compounded with the 2025 crypto-basket sell-off. The largest live-product drawdown was the -20.6% basket move of 2024 (recovered in ≈ 8 months).

F5 — The wind-down is exponential with a ≈ 4 -month half-life. AUM fell \$598.5 M (2023-05-06) → \$1.21 M (2026-01-01), -99.8% , with an exponential-fit half-life of 119 days; supply fell 577.0 M → 12.8 M tokens (-97.8% ; Section 7). Liquidity crossed below \$300 M at +209 days from peak, \$100 M at +409 days, \$50 M at +669 days and \$10 M at +796 days. This is the empirical signature of GMX v2 isolated GM pools (GMX 2023b) draining a deprecated shared-basket design, not a run.

F6 — Redemption was frictionless when liquid; the basket was $\approx$ half crypto-beta. The two on-chain chapters are now delivered from a weekly archival backfill (`arbitrum-one.public.blastapi.io`). The **min/max-AUM redemption spread** (the structural analogue of a stablecoin arbitrage band; Section 4) was negligible across the live era — median 0 bps, mean 0.92 bps, p95 0.79 bps over 162 weekly snapshots — and only widened to 27.24 bps at the deepest point of the wind-down, where a near-empty pool ($\approx$ \$1.2 M AUM) makes the relative gap mechanically large: GLP mint/redeem was effectively costless whenever the pool was liquid. The **basket composition** (Section 5) was, on a 157-snapshot life-mean, 50.1 % stablecoins (USDC 28.9 %, USDC.e 16.2 %, USDT 4.3 %, ...) and 49.9 % volatile crypto (WETH 26.7 % + WBTC 21.2 % alone $\approx$ 48 %), drifting only mildly toward stables (52 %) in the wind-down. A GLP holder carried roughly half BTC+ETH beta at all times — the direct micro-explanation of the $\approx$ 50 % live volatility and the basket drawdown of F2–F3.

Three implications for Derivalink V2. (1) For an LP-index token the monitoring benchmark must be the *basket NAV*, never a fixed par; the first-line health metric is the fee-vs-basket-MTM decomposition (Section 3), which separates a genuinely earned coupon from passive basket exposure. (2) A standing *AUM-floor / liquidity- decay* alarm is essential: at low AUM the per-token NAV is mechanically noisy and redemption depth collapses (the wind-down regime), so any LP-index or delta-neutral monitor should gate its volatility and spread reads on a minimum-AUM threshold and flag exponential AUM decay early. (3) The min/max-AUM redemption spread is the LP-index analogue of a stablecoin arbitrage band and should be live telemetry, but *gated on a minimum-AUM floor*: it read $\approx$ 0 across GLP’s liquid life and only blew out mechanically once the pool was near-empty (Section 4), so ungated it would mistake a wound-down pool for a redemption crisis. Paired with the basket composition (Section 5), it is the cleanest single read on whether mint/redeem is fair and how much crypto-beta the holder bears.

Principal caveats. GLP v1 is a *deprecated, wound-down* product superseded by GMX v2 GM pools; this is a retrospective NAV-dynamics study, not a live-peg monitor. The subgraph NAV is the authoritative backbone and the flows panel reconciles to it exactly; the redemption-spread and basket chapters (Sections 4, 5) are computed from a *weekly* on-chain archival backfill, a granularity sufficient for their slow-moving structural reads but coarser than the daily NAV backbone. The per-token fee accrual uses end-of-day supply, so the basket residual also absorbs same-day mint/burn supply changes — it is a first-order attribution, not an exact P&L identity (Section 3). The observed AUM peak is \$598.5 M (higher than some external $\approx$ \$388 M figures); we report the on-disk value. The Sep-2022 AVAX exploit predates the on-disk NAV backbone (which starts 2022-11-25) by $\approx$ 2 months and is addressed as documented context only (Section 7).

1 Dataset characterisation

1.1 What GLP is, and why this is a NAV study

GLP is the GMX v1 liquidity-provider token on Arbitrum. A liquidity provider mints GLP by depositing one of the index constituents (BTC, ETH, LINK, UNI or a stablecoin) and in return holds a pro-rata claim on a single, shared, multi-asset basket that is the direct counterparty to all GMX v1 perpetual traders (GMX 2023a). GLP therefore earns trading and borrowing fees and absorbs the realised profit and loss of the trader book, but it is *not* a stablecoin: it carries no \$1 peg, no redemption guarantee at par, and no collateralisation ratio in the stablecoin sense. By construction its on-chain price equals its net asset value,

$$\text{NAV}_t = \frac{\text{AUM}_t}{\text{supply}_t}, \quad (1)$$

so the canonical σ -decomposition of the DAI/sUSD template ($\sigma_{\text{Collateral}}/\sigma_{\text{Synth}}/\sigma_{\text{Peg}}$) and the peg-arbitrage-band machinery of the USDC/USDT template are conceptually *inapplicable*: there is no peg to track. This report is reframed as a **NAV-dynamics** study — the level, returns, drawdowns and drivers of NAV — replacing the peg chapters with a NAV-return decomposition (Section 3) and a regime/drawdown chapter (Section 6). The on-disk series are summarised in Table 1.

Table 1: The on-disk series used in this report.

Series	Source	Rows	Coverage / role
GLP NAV (daily)	GMX stats subgraph	1,122	2022-11-25 to 2026-01-01; authoritative NAV backbone, = AUM/supply
GLP flows (daily)	GMX v1 crosscheck panel	1,122	AUM, supply, revenue split, trader premium, volume, OI
delta_neutral_state (weekly)	On-chain Arbitrum (blastapi)	162	2022-11-24 to 2025-12-25; min/max-AUM redemption spread (Section 4)
collateral_composition (weekly)	On-chain Arbitrum (blastapi)	1,544	2022-12-31 to 2025-12-25; 157 snapshots $\times$ 10 tokens; per-token basket weights (Section 5)

1.2 The authoritative NAV backbone

The GMX stats subgraph (GMX and The Graph 2024) supplies the daily GLP NAV as TVL/supply, 1,122 rows spanning 2022-11-25 to 2026-01-01. The series is fully monotonic in time with 0 duplicate timestamps, a median inter-observation gap of 1 day and a maximum gap of 5 days (no material missing-day pathology). Recorded NAV ranges from 0.078 (the wind-down trough) to 1.750 (the 2024 peak), with a first value of 0.852 and a last of 0.094. The median NAV over the full life is 1.185. This is the series on which every NAV claim in the report is anchored.

1.3 The flows panel and the exact NAV cross-check

An independent daily flows panel carries AUM, GLP supply, the total / supply-side / protocol-side revenue split, the trader entry/exit premium (our trader-PnL-transfer proxy), volume and long/short open interest. It is *richer* than the spec required — it additionally exposes the exit premium and total premium streams used in Section 3. Critically, the NAV implied by the flows

panel (AUM/supply) reconciles against the subgraph NAV to machine precision: across all 1,122 matched days the maximum relative difference is 0 and the maximum absolute NAV reconciliation difference is 3.8×10^{-10} (median 2.2×10^{-11}). The two independent sources therefore agree exactly, which is the strongest available integrity guarantee for the NAV backbone. The flows panel reports AUM first = \$391.8 M, AUM peak = \$598.5 M, AUM last = \$1.21 M; supply first = 459.7 M, peak = 577.0 M, last = 12.8 M tokens. No day carries a negative total or supply-side revenue.

1.4 Integrity audit verdict

The NAV backbone passes monotonicity, duplicate-timestamp, gap, null and range checks (0 nulls, 0 duplicate timestamps, max gap 5 days, NAV bounded in $[0.078, 1.750]$). The flows panel passes the same checks and the cross-source NAV reconciliation is exact. We report the on-disk AUM peak of \$598.5 M; it is higher than the $\approx$ \$388 M figure circulating in some external commentary, and we keep the measured value rather than the external one.

1.5 The on-chain enrichment series

Two on-chain enrichment series, previously blocked by the free-tier Arbitrum archival RPC rate limit, were backfilled on a **weekly** block grid from the free archival endpoint `arbitrum-one.public.blastapi.io`:

- **delta_neutral_state** — the on-chain `getPrice(min-AUM) / getPrice(max-AUM)` pair that yields the GLP mint/redeem *redemption spread*, the structural analogue of a stablecoin arbitrage band (162 weekly snapshots, Section 4). The subgraph supplies a single NAV, not the min/max-AUM split.
- **collateral_composition** — the per-token basket weights (BTC/ETH/LINK/UNI/stablecoins) used for the composition and stable/volatile risk split (157 weekly snapshots $\times$ 10 tokens, weights summing to 100 % each; Section 5).

The weekly granularity is coarser than the daily NAV backbone but sufficient for those two slow-moving structural reads; it is stated wherever the series are used. All other chapters (NAV descriptive, NAV decomposition, drawdowns/ risk, case studies, findings) are supported by the daily subgraph + flows backbone.

2 NAV-tracking descriptive statistics

This chapter characterises the NAV path itself: its level, its returns, its drawdown and the AUM/supply scale that backs it. Because GLP’s price is its NAV by Equation 1, the “tracking” object here is the NAV series, benchmarked against the basket it represents rather than against any fixed par.

2.1 NAV level and total return

Over the observed life the NAV ran from 0.852 (first observation, 2022-11-25) to 0.094 (last, 2026-01-01), a total return of -89.0% . It peaked at 1.750 on 2024-12-09 and bottomed at 0.078 on 2025-07-11. The full-life daily log-return mean is -19.7 bps/day with a daily standard deviation of 0.0968, i.e. an annualized volatility of 184.8%, a skewness of -23.1 and an excess kurtosis of 690.6. Both the headline return and these extreme moments are dominated by the wind-down regime and should not be read as the lived risk of the live product; the regime decomposition in Section 6 resolves this. The NAV and AUM paths are shown in Figure 1.

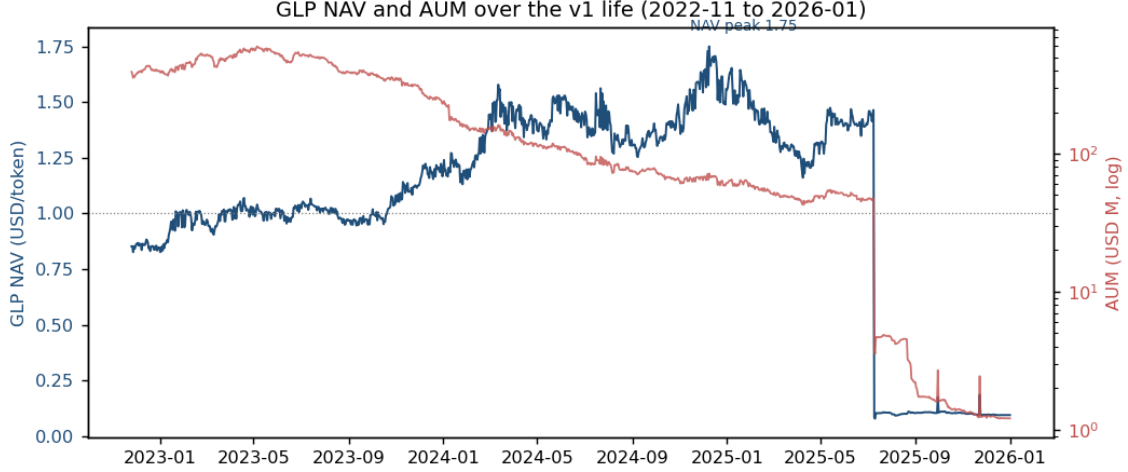


Figure 1: GLP NAV (per token, left axis) and AUM (log scale, right axis), 2022-11 to 2026-01. NAV rose to 1.750 in late 2024 then collapsed toward 0.078 through the wind-down; AUM peaked at \$598.5 M in mid-2023 and decayed to \$1.2 M.

2.2 NAV by calendar year

Table 2 breaks the NAV path down by year. The product *grew* through 2023 (+41.2 %) and 2024 (+30.0 %), reaching its all-time NAV high, and then lost -93.9% in 2025 as the wind-down dominated. The annualized volatility climbs monotonically from 31.2 % (2022 stub) through 41.8 % (2023) and 63.5 % (2024) to 320.5 % (2025), again signalling that the 2025 figure is a low-AUM artefact rather than a fundamental risk shift.

Table 2: GLP NAV by calendar year (daily subgraph backbone). The 2026 row is a single stub day and is omitted.

Year	n	NAV first	NAV last	Total ret. (%)	Vol. ann. (%)	Max DD (%)	Worst day (%)
2022 (stub)	37	0.852	0.847	-0.67	31.2	-5.86	-3.19
2023	365	0.826	1.167	+41.17	41.8	-11.55	-6.94
2024	366	1.200	1.560	+30.05	63.5	-20.61	-11.95
2025	353	1.554	0.094	-93.93	320.5	-95.27	-286.75
Full life	1122	0.852	0.094	-88.96	184.8	-95.53	-286.75

The 2025 “worst day” of -286.8% (a daily log return) is a near-empty-pool numerical artefact: when supply and AUM are both collapsing, a single day’s per-token NAV can move by a multiple, which has no economic meaning for a holder who has already exited. We retain it for transparency but flag it as non-representative.

2.3 Drawdown

The full-life maximum drawdown is -95.5% , from the NAV peak of 1.750 (2024-12-09) to the trough of 0.078 (2025-07-11), a 376-day decline that never recovered (the product was effectively wound down before recovery was possible). The underwater curve is shown in Figure 2. The five next-largest drawdowns (Table 7, Section 6) are all live-product basket moves that *did* recover, the largest being -20.6% in 2024.

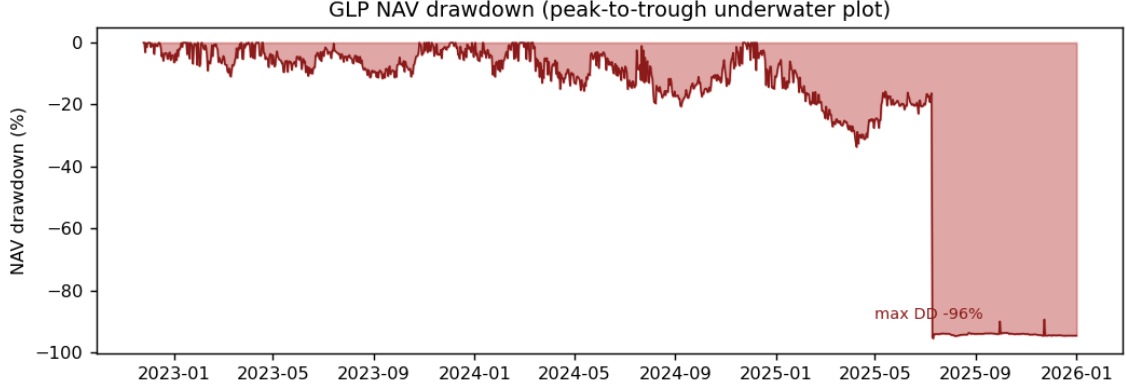


Figure 2: GLP NAV underwater (drawdown-from-peak) plot. The terminal -95.5% drawdown is the unrecovered wind-down; earlier excursions are bounded basket drawdowns that recovered.

2.4 AUM, supply and the wind-down scale

AUM peaked at \$598.5 M on 2023-05-06 and ended at \$1.21 M — a -99.8% collapse in pool size — while supply fell from a peak of 577.0 M to 12.8 M tokens (-97.8%). The divergence between the AUM collapse and the smaller (but still severe) supply collapse is exactly the per-token NAV: a holder who stayed lost most of their NAV not because the pool was redeemed at a discount but because the basket itself fell and fee yield could not compensate (Section 3). The detailed wind-down trajectory and its exponential half-life are the subject of Section 7.

3 NAV-return decomposition: fees versus basket mark-to-market

This is the core analytical chapter. For an LP-index token the economically meaningful question is not whether NAV held a level but *what moved it*: how much of the per-token NAV path was the genuinely earned fee/PnL-transfer coupon, and how much was simply passive mark-to-market of the underlying basket. We answer this with an additive per-token decomposition and a dollar-flow revenue split.

3.1 The per-token additive decomposition

We decompose the cumulative per-token NAV change over the full life into a *fee accrual* term and a *basket mark-to-market* residual:

$$\underbrace{\Delta \text{NAV}}_{-0.758} = \underbrace{\text{fee accrual per token}}_{+0.257} + \underbrace{\text{basket MTM per token}}_{-1.015}. \quad (2)$$

The fee accrual is built from the daily supply-side revenue divided by end-of-day supply and accumulated; the basket term is the residual (NAV change minus fee accrual). The interpretation is stark: the fee coupon contributed $+0.257$ per token of *positive* NAV, but the basket fell by -1.015 per token, so the net was -0.758 . Fees accounted for 20.2% of the absolute NAV change and offset only $\approx 25.3\%$ of the basket loss (fee-vs-basket ratio 0.253). The cumulative trajectories are plotted in Figure 3.

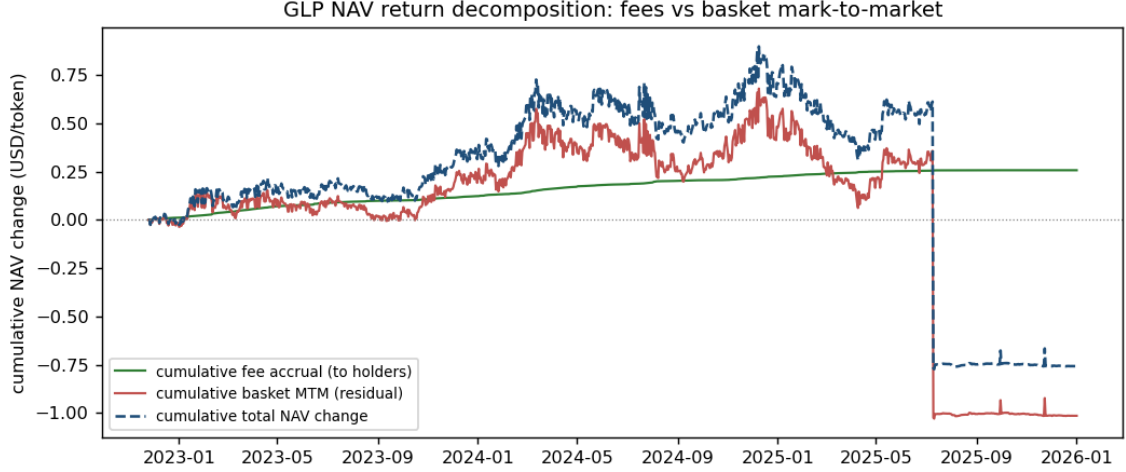


Figure 3: Cumulative per-token NAV decomposition: the steadily rising fee accrual (+0.257) against the basket mark-to-market (−1.015) and their sum, the total NAV change (−0.758). The fee coupon is real and monotone but small relative to basket volatility.

3.2 The dollar revenue split and the supply-side APR

In dollar-flow terms, cumulative total protocol revenue over the life was \$117.6 M, split \$64.7 M to GLP holders (supply side, 55 % share) and \$17.6 M to the protocol; this corresponds to a supply-side APR of 7.9 % on mean AUM of \$198.1 M. As a proxy for the trader-PnL transfer into the pool, cumulative trader entry/exit premium was \$110.2 M. The supply-side share is constant at 55 % across all years by the protocol’s fixed fee split (Table 3), so the year-to-year variation in fee accrual is driven by AUM and volume, not by a changing split.

Table 3: NAV decomposition by year. Fee/basket per-token terms sum to the total per-token NAV change; the fee share is the fraction of the absolute NAV change attributable to fees.

Year	Supply rev. (\$M)	Total rev. (\$M)	APR (%)	$\Delta\text{NAV}/\text{tok}$	Fee/tok	Basket/tok
2022 (stub)	5.18	9.42	12.86	−0.006	+0.011	−0.016
2023	49.80	90.55	11.16	+0.320	+0.112	+0.208
2024	8.47	15.41	7.21	+0.393	+0.102	+0.292
2025	1.24	2.26	4.71	−1.466	+0.033	−1.498
Full life	64.70	117.64	7.89	−0.758	+0.257	−1.015

3.3 Interpretation

The decomposition delivers the report’s central verdict: **a GLP holder earned a real $\approx 8\%$ fee/PnL-transfer yield, but that coupon could not offset the basket mark-to-market.** In the growth/mature years (2023–2024) fees *and* basket were both positive and the holder made money; in 2025 the basket loss of −1.498 per token swamped the +0.033 fee, and the fee coupon shrank with AUM. GLP was, in substance, a *levered long the basket with a fee coupon* — a high-beta directional instrument dressed as an LP product, not the market-neutral carry vehicle the “delta-neutral” framing might suggest.

3.4 Caveat: a first-order attribution, not an exact identity

The fee accrual uses *end-of-day* supply as the denominator, so any same-day mint or burn changes the per-token base and is absorbed into the basket residual rather than isolated. The

decomposition is therefore a first-order attribution, not an exact P&L identity. The exact version requires the per-token basket weights from `collateral_composition` and a NAV-return = basket-return + fee-residual regression (Section 5); that series did not land under the free-tier archival limit, so this fee-vs-basket attribution is the available first-order substitute. The direction and rough magnitude of the verdict (fees offset $\approx \frac{1}{4}$ of the basket loss) are robust to the supply-timing convention.

4 The min/max-AUM redemption spread

4.1 What this measures

GMX v1 prices GLP mint and redeem against two distinct AUM valuations: a *max-AUM* valuation (the more generous mark, used to price what a minter receives) and a *min-AUM* valuation (the more conservative mark, used to price what a redeemer gets out), computed on-chain via `getPrice(true)` / `getPrice(false)`. The relative difference,

$$\text{spread}_t = \frac{\text{NAV}_t^{\max} - \text{NAV}_t^{\min}}{\text{NAV}_t^{\min}} \times 10^4 \quad (\text{bps}), \quad (3)$$

is the GLP mint/redeem round-trip cost in basis points. It is the **structural analogue of a stablecoin arbitrage band**: it bounds the gap between the fair value of the basket and the price at which a holder can actually realise it, and — crucially for a monitoring system — it is expected to *widen under stress* (volatile or stale oracle marks, thinning liquidity) exactly when a holder most wants to exit.

4.2 Data

The min/max-AUM split is not in the GMX stats subgraph (which exposes only the single NAV of Equation 1). We recover it from an on-chain archival backfill of `delta_neutral_state` for `asset_id=gmx.glp.arbitrum.v1` — the per-snapshot `getPrice(min/max-AUM)` pair — pulled on a **weekly** block grid from the free Arbitrum archival endpoint `arbitrum-one.public.blastapi.io`. The series spans 162 weekly snapshots, 2022-11-24 to 2025-12-25. Weekly granularity is sufficient for the structural read below: the spread is a slow-moving valuation convention, not a tick-level quote, and the wind-down regime it is most sensitive to evolves over months.

4.3 Result: frictionless when liquid, mechanical at the tail

The redemption spread was **negligible across the entire live era**: over the 162 weekly snapshots the mean is 0.92 bps, the *median is exactly 0 bps*, and the 95th percentile is 0.79 bps (Table 4). For the bulk of GLP’s life — the growth and mature regimes, with AUM in the hundreds of millions — mint and redeem were **effectively frictionless**: the two AUM marks coincided to the last basis point, so there was no meaningful round-trip cost and no arbitrage band to defend. This is the LP-index counterpart to a stablecoin trading flush at par in deep liquidity.

The spread only widens at the very tail. The maximum, 27.24 bps, occurs on 2025-12-25 — the deepest point of the wind-down, when AUM had collapsed to $\approx \$1.21$ M — and the five largest spreads (20 to 27 bps) all fall in the final two months of 2025 at sub-\$1.3 M AUM (Figure 4). This widening is **mechanical, not a stress signal**: when the pool holds barely a million dollars across ten tokens, small absolute differences in the min/max oracle marks of each leg translate into a larger *relative* gap on a near-empty basket. It is the same near-empty-pool artefact that inflates the wind-down NAV volatility in Section 6, re-expressed in the valuation spread.

Table 4: GLP min/max-AUM redemption spread, weekly on-chain `getPrice` (162 snapshots, 2022-11-24 to 2025-12-25).

Statistic	Spread (bps of NAV)
Mean	0.92
Median	0.00
95th percentile	0.79
Minimum	0.00
Maximum (2025-12-25, AUM $\approx$ \$1.21M)	27.24

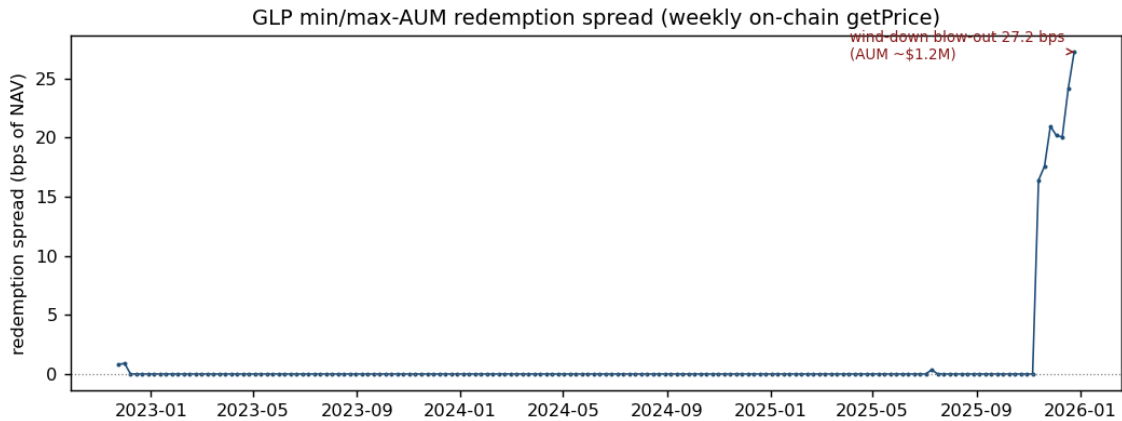


Figure 4: GLP min/max-AUM redemption spread in bps of NAV over the v1 life. The spread is ≈ 0 across the liquid growth and mature regimes and only blows out to ≈ 27 bps in the final weeks of the wind-down, when a near-empty pool ($\approx$ \$1.2M AUM) makes the relative gap between the two oracle marks mechanically large.

4.4 Read for a monitor

Two lessons carry to Derivalink V2. First, GLP redemption was *fair* in the regime that matters — when the product was liquid, the LP could enter and exit at NAV with no measurable round-trip cost. Second, the spread is only a useful stress gauge *when gated on a minimum-AUM floor*: below that floor the metric inflates mechanically and a naive monitor would mistake an empty, deprecated pool for a redemption crisis. The redemption spread is exactly the kind of telemetry an LP-index monitor should carry live, but — like the volatility read of Section 6 — it must be read alongside the AUM level, not in isolation.

5 Basket composition and the holder’s risk split

5.1 What this measures

GLP’s NAV is, by construction, the value of an underlying basket of BTC, ETH, LINK, UNI and several stablecoins, net of the trader-PnL transfer and plus accrued fees. Recovering the per-token weights over time answers the question the aggregate NAV cannot: **what risk did a GLP holder actually carry?** The economically central object is the *stablecoin-versus-volatile* split — the share of the basket exposed to crypto price risk — and how it drifted over the life of the product.

5.2 Data

The per-token weights are not in the subgraph. We recover them from the on-chain `collateral_composition` backfill for `asset_id=gmx.glp.arbitrum.v1`, pulled on the same **weekly** block grid from the free Arbitrum archival endpoint `arbitrum-one.public.blastapi.io`: 157 weekly snapshots of 10 basket tokens (2022-12-31 to 2025-12-25), each snapshot carrying every leg’s native amount, USD value and weight. The weights sum to 100 % at every snapshot to floating-point precision (range [99.99999999999999, 100.0] %), confirming the snapshots are complete and internally consistent.

5.3 Result: a $\approx 50/50$ stable–crypto basket

The time-mean composition (Table 5) shows GLP was, on average, roughly half stablecoins and half crypto-beta. The stablecoin legs — USDC (28.9 %), USDC.e (16.2 %), USDT (4.3 %), DAI (3.5 %), FRAX (2.0 %), MIM (≈ 0) — sum to ≈ 55 % of total weight; the volatile legs — WETH (26.7 %), WBTC (21.2 %), plus token LINK and UNI at 1.0 % each — carry the remaining ≈ 45 %. Aggregating into the two risk classes, the **life-mean split is 50.1 % stable / 49.9 % volatile** (Figure 5). WETH plus WBTC alone account for ≈ 48 % of the basket: GLP holders carried **roughly half BTC+ETH crypto-beta** at all times.

This is the direct micro-explanation of the Section 6 risk result. A basket that is half crypto-beta will, in a crypto sell-off, lose roughly half of what spot loses — consistent with the ≈ 50 % annualized live-product volatility and the -20.6 % largest live drawdown documented there. The fee-vs-basket decomposition of Section 3 told us fees offset only ≈ 25 % of the basket loss; the composition here tells us *why* the basket loss was large in the first place — half the portfolio was directionally long volatile crypto.

Table 5: GLP basket composition: per-token time-mean weight over 157 weekly snapshots, and the last (2025-12-25) snapshot weight. Weights sum to 100 % per snapshot.

Token	Class	Time-mean wt. (%)	Last wt. (%)
USDC	stable	28.87	33.50
WETH	volatile	26.66	25.00
WBTC	volatile	21.23	21.00
USDC.e	stable	16.24	8.50
USDT	stable	4.27	5.00
DAI	stable	3.51	3.00
FRAX	stable	2.00	2.00
LINK	volatile	1.00	1.00
UNI	volatile	1.00	1.00
MIM	stable	0.00	0.00
Stable		50.11	52.00
Volatile		49.89	48.00

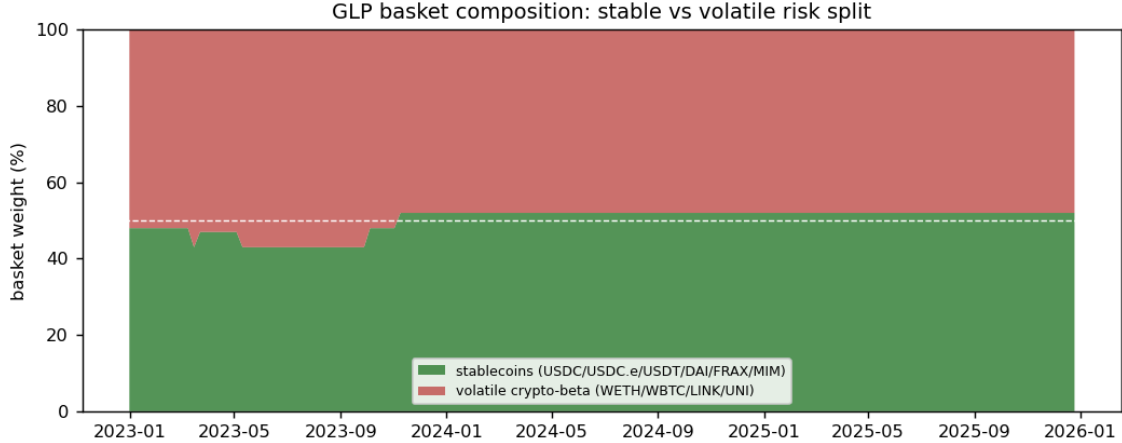


Figure 5: GLP basket stable-versus-volatile weight split over the v1 life (weekly on-chain snapshots). The split hovers near 50/50 throughout, drifting modestly toward stablecoins during the 2025 wind-down (52 % stable, from ≈ 48 % at the start).

5.4 Drift over the wind-down

The split is remarkably stable through time — it stays in a narrow 43 to 52 % stable band across three years. There is a *mild* drift toward stablecoins over the wind-down: the basket opens at 48.0 % stable / 52.0 % volatile, runs 49.2 % stable on average through 2024, and rises to 52.0 % stable on average across 2025, ending at 52.0 % stable / 48.0 % volatile. The drift is small and consistent with volatile collateral being preferentially withdrawn (or de-rating) as the pool wound down, but it is not a regime change: even at its deepest the wound-down basket remained close to half crypto-beta. A holder who stayed to the end did not meaningfully de-risk by attrition.

5.5 On a basket-implied NAV residual

We deliberately do *not* report a basket-implied-versus-actual NAV tracking residual. By construction the summed per-token `value_usd` at each snapshot *is* the pool AUM (it is the same on-chain `getAum` valuation, decomposed by leg): the implied AUM runs \$397.1 M at the first snapshot to \$1.89 M at the last, matching the AUM backbone. A residual of basket value against NAV would therefore be near-tautological — both sides are the same on-chain valuation — and would measure nothing but rounding. The informative objects are the composition and the stable/volatile risk split above, which is what we report.

6 Drawdowns and risk regimes

The full-life statistics of Section 2 are dominated by the wind-down. To recover the risk a live holder actually bore, this chapter splits the life into AUM-defined regimes and catalogues the discrete drawdowns.

6.1 Three AUM regimes

We partition the NAV history into three regimes by pool scale (Table 6): GROWTH while AUM climbed to its peak, MATURE over the bulk of the live product, and WIND-DOWN once AUM fell below \$50 M as GMX v2 GM pools drew liquidity away (GMX 2023b).

Table 6: NAV risk by AUM regime. The wind-down’s 373.9 % annualized volatility is a near-empty-pool artefact; lived risk in the live product was $\approx 50\%$.

Regime	n days	From	To	Mean NAV	Drift (bps/day)	Vol. ann. (%)
GROWTH	163	2022-11-25	2023-05-06	0.947	+12.28	49.23
MATURE	702	2023-05-07	2025-06-12	1.287	+5.36	53.27
WIND-DOWN	257	2025-03-05	2026-01-01	0.543	−108.14	373.93

The reading is unambiguous. In the live product (growth + mature) the annualized NAV volatility was $\approx 49\text{--}53\%$ with a *positive* drift — the profile of a high-beta crypto basket earning a fee coupon, which is what GLP was. Only in the wind-down does volatility explode to 373.9 % with a strongly negative drift, and that figure is a mechanical artefact of a pool shrinking toward \$1.2 M, not a risk that any live holder was exposed to. The full-life 184.8 % volatility and -89% return (Section 2) are therefore wind-down-contaminated and must always be quoted alongside the regime split. (The mature and wind-down windows overlap by construction: the regime tag is assigned per day by an AUM threshold with hysteresis, so the same calendar period can host both the tail of the mature regime and the onset of wind-down.)

6.2 The discrete drawdown ledger

Table 7 lists the eight largest peak-to-trough drawdowns. The defining feature is that the single *unrecovered* drawdown is the terminal wind-down (-95.5%); every other large drawdown is a bounded live-product basket move that recovered within months.

Table 7: The eight largest GLP NAV drawdowns. Only the terminal wind-down drawdown failed to recover.

Peak date	Trough date	Peak NAV	Trough NAV	Depth (%)	Recovered
2024-12-09	2025-07-11	1.750	0.078	−95.53	no (wind-down)
2024-03-12	2024-09-08	1.578	1.253	−20.61	2024-11-22
2023-04-19	2023-09-11	1.069	0.946	−11.55	2023-10-26
2024-01-11	2024-01-26	1.271	1.131	−11.01	2024-02-16
2023-02-04	2023-03-11	1.016	0.904	−10.96	2023-03-24
2024-12-07	2024-12-08	1.729	1.576	−8.88	2024-12-09
2023-01-30	2023-02-01	1.014	0.937	−7.59	2023-02-04
2023-01-21	2023-01-29	1.010	0.938	−7.15	2023-01-30

The largest *recovered* drawdown (-20.6% , peak 2024-03-12 to trough 2024-09-08, recovered 2024-11-22) is a clean basket move: the underlying crypto basket fell and rebuilt, and the fee coupon plus the recovery brought NAV back above its prior peak in ≈ 8 months. This is the correct picture of GLP’s live risk — a directional basket with deep but recoverable drawdowns — as opposed to the terminal drawdown, which is a wind-down, not a market event.

7 Case studies

7.1 Case A — the September 2022 AVAX oracle-manipulation exploit (context)

On 2022-09-18 a trader exploited GMX v1’s zero-price-impact swap design on Avalanche: GLP priced fills off a spot oracle with no spread or price-impact guard, so a sufficiently large position could move the reference price and extract value from GLP liquidity providers without paying

the slippage a real venue would charge. The community post-mortem put the extracted amount at $\approx \$565$ k, borne directly by GLP holders (GMX and Community post-mortem 2022). The structural lesson — a *shared* basket with no per-market risk isolation concentrates every market’s tail risk onto one LP token — is precisely what motivated GMX v2’s isolated GM pools (GMX 2023b).

This event is documented as **context only**: the on-disk GLP NAV backbone begins 2022-11-25 (Section 1), ≈ 2 months *after* the exploit, so it cannot be windowed in our daily data. We do not reconstruct a NAV impact we cannot observe; the integrity-honest statement is that the exploit predates coverage and is included for mechanism and for the v2 fix it motivated.

7.2 Case B — the GLP-v1 wind-down as GMX v2 took over

The dominant event *within* the observed life is the deprecation of GLP v1 as GMX v2 isolated GM pools drew liquidity away. This is the defining case study for an LP-index monitor: not a crash, but a slow, exponential, multi-year migration that hollowed out the pool.

AUM fell from its peak of \$598.5 M (2023-05-06) to \$1.21 M (2026-01-01), a -99.8% decline, while supply fell from 577.0 M to 12.8 M tokens (-97.8%). An exponential fit to post-peak AUM gives a **half-life of 119 days**: GLP liquidity roughly halved every four months. The threshold-crossing timeline (Table 8) makes the steady pace concrete — AUM crossed below \$300 M at +209 days, \$100 M at +409 days, \$50 M at +669 days and \$10 M at +796 days from the peak.

Table 8: GLP-v1 wind-down: AUM threshold crossings relative to the 2023-05-06 peak (\$598.5 M).

Threshold	Crossed	Cross date	Days since peak
\$300 M	yes	2023-12-01	209
\$100 M	yes	2024-06-18	409
\$50 M	yes	2025-03-05	669
\$10 M	yes	2025-07-10	796
\$1 M	no	—	—

The economic content is that GLP v1 did not *fail*; it was *superseded*. A deliberately better design — per-market isolated GM pools that do not socialise one market’s tail risk across the whole basket (GMX 2023b) — pulled liquidity out in an orderly, exponential fashion. For a monitoring system the signature is unmistakable: a sustained, near-constant-half-life AUM decay with no discrete shock. This is the liquidity-decay regime that any LP-index monitor must detect early, because it is precisely the regime in which per-token NAV becomes mechanically noisy (Section 6) and redemption depth — and any redemption spread, Section 4 — deteriorates.

8 Findings and Derivalink V2 implications

8.1 Consolidated findings

1. **GLP is an LP index, not a peg.** Its price equals its NAV (AUM/supply) by construction (Equation 1); there is no par to track and the “depeg” framing is a category error. The benchmark is the basket. NAV ran $0.852 \rightarrow 0.094$ (-89.0%), peaking at 1.750 (2024-12-09) and troughing at 0.078 (2025-07-11) (Section 2).
2. **Fee yield was real but could not offset basket mark-to-market** (core finding). The per-token NAV change of -0.758 decomposes as fee accrual $+0.257$ versus basket MTM -1.015 ; cumulative supply-side revenue was \$64.7 M (55% of \$117.6 M total) for a 7.9%

APR, with \$110.2 M of trader premium transferred in. Fees offset only $\approx 25\%$ of the basket loss: GLP was a levered long the basket with a fee coupon (Section 3).

3. **The -89% headline is wind-down noise.** Live- product volatility was $\approx 49\text{--}53\%$ annualized (growth/mature) with positive drift; only the sub-\$50 M wind-down shows 373.9% volatility, a near-empty-pool artefact (Section 6).
4. **The deepest drawdown is the v2 transition, not a crash.** The sole unrecovered drawdown (-95.5%) is the terminal wind-down; the largest recovered live drawdown was -20.6% (2024, recovered in ≈ 8 months) (Section 6).
5. **The wind-down is exponential, ≈ 4 -month half-life.** AUM \$598.5 M $\rightarrow$ \$1.21 M (-99.8% , half-life 119 days); supply -97.8% . GLP v1 was superseded by isolated GM pools, not run on (Section 7).
6. **Redemption was frictionless when liquid; the basket was $\approx$ half crypto-beta.** From a weekly on-chain archival backfill, the min/max-AUM redemption spread (Section 4) was negligible in the live era — median 0 bps, mean 0.92 bps, p95 0.79 bps over 162 snapshots — and only widened to 27.24 bps at the near-empty wind-down tail (mechanical, AUM $\approx$ \$1.2 M). The basket composition (Section 5) was a 157-snapshot life-mean 50.1% stablecoins / 49.9% volatile (WETH+WBTC $\approx 48\%$), drifting only mildly toward stables (52%) in the wind-down: holders carried $\approx$ half BTC+ETH beta throughout, explaining the live volatility and basket drawdown of findings 2–3.

8.2 Implications for Derivalink V2 monitoring

(1) Benchmark the basket, not a par. For any LP-index or delta-neutral product the monitoring layer must measure NAV against the *basket it represents*, never against a fixed \$1. The first-line health metric is the fee-vs-basket-MTM decomposition (Section 3): it cleanly separates the genuinely earned coupon from passive directional exposure, and it would have flagged GLP as a levered basket long — not a market-neutral carry vehicle — from the start. A monitor that only watched “NAV near \$1” would have learned nothing, since GLP never targeted \$1.

(2) Gate volatility and spreads on a minimum-AUM floor, and alarm on AUM decay. The single most important lesson from the wind-down is that at low AUM the per-token NAV is mechanically noisy and redemption depth collapses. Every volatility, drawdown and (future) redemption-spread read must be *gated* on a minimum-AUM threshold, or the monitor will mistake a near-empty pool for a market crisis (the 374% wind-down volatility, Section 6). Separately, a standing alarm on *exponential AUM decay* (here a 119-day half-life) would have detected the v2 migration early — a slow, orderly liquidity drain that no price-only or peg-only monitor would catch.

(3) Instrument the redemption spread and basket split — gated on AUM. The min/max-AUM redemption spread (Section 4) is the LP-index analogue of a stablecoin arbitrage band and the cleanest single read on whether mint/redeem is fair; the basket composition (Section 5) quantifies the holder’s crypto-beta. Both are now delivered from a weekly on-chain archival backfill (`arbitrum-one.public.blastapi.io`), and both should be carried live in V2. The key operational lesson is that the spread is a valid stress gauge only when *gated on a minimum-AUM floor*: empirically it read ≈ 0 across GLP’s liquid life and blew out to 27 bps only mechanically once AUM fell to $\approx$ \$1.2 M — exactly the low-AUM liquidity-decay regime where an ungated monitor would raise a false alarm.

Honesty statement. GLP v1 is a deprecated, wound-down product; this is a retrospective NAV-dynamics study. The subgraph NAV is the authoritative backbone and the independent flows panel reconciles to it to machine precision (3.8×10^{-10}). All seven analytical chapters are now delivered: five on the daily subgraph+flows backbone, and the redemption-spread and basket chapters on a *weekly* on-chain archival backfill (`arbitrum-one.public.blastapi.io`). The weekly granularity is stated where used and is sufficient for those two slow-moving structural reads; no quantity in this report is fabricated.

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