

Risk Assessment - **yETH** Collateral Asset on FiRM

Useful Links	2
TL;DR	3
Background	4
Protocol Analysis	5
Org. Structure	5
Multisig Structure	6
Influence, Reputation, and Partnerships	7
Audits & Bug Bounties	8
Previous and Ongoing	8
Contracts in Scope	9
Reward Payouts	9
Collateral Analysis	9
Oracles	9
Token Statistics	10
Liquidity	10
Utility & Use Case	12
Competitive Analysis	12
Competitive Markets & Implementation	12
Conclusion	13
Asset Score	13
Parameter Recommendations	13

Useful Links

Documentation and Contract Addresses

- [Yearn Docs](#)
- [yETH Overview](#)
- [yETH Address](#)

GitHub Repositories

- [Yearn Github](#)
- [yETH Github](#)

Community and Social Media

- Discord: <https://discord.com/invite/yearn>
- Telegram: <https://t.me/yearnfinance>
- Twitter: <https://twitter.com/iearnfinance>

Governance and Proposals

- [Governance Forum](#)
- [Snapshot](#)
- [Governance Process](#)

Audits

- [Yearn Audits](#)

Bug Bounty

- [ImmuneFi Program](#)

Additional Information

- Additional information can be found in various sections of the Yearn Finance documentation, including guides on using the Yearn interface, understanding vaults and strategies, and more.

TL;DR

Overview:

- **Protocol:** Assessment of Yearn Finance, focusing on its yETH product, a user-governed liquidity pool token consisting of various Ethereum Liquid Staking Derivatives (LSTs).
- **Proposal:** Adopt st-yETH as collateral in Inverse Finance's FiRM protocol, leveraging its automated yield generation and diversified risk profile.
- **Utility:** By bundling LSTs, st-yETH aims to generate the best risk-adjusted yield from ETH staking. Through protocol governance, st-yETH users can readjust pool weights to maximize yield while mitigating catastrophic scenarios where one or several LSTs in the yETH composition suffer adverse events like de-pegging or security incidents.

Key Points:

- **Governance:** Yearn operates under a multi-DAO system, with governance decisions made collectively by YFI holders and delegated roles assigned to yTeams.
- **Security:** Robust security frameworks (including a pause and kill mode) with multiple audits from reputable firms and an active bug bounty program on the ImmuneFi platform.
- **Regulatory Risks:** Has a proven record of maintaining transparency in operations.
- **Collateral & Liquidity:** yETH showcases decent on-chain liquidity (+\$3M), ensuring stability and lower slippage in larger transactions due to its single-sided withdrawal mechanism. yETH also benefits from the Curve's new stableswap pool for price oracle use.
- **Competitive Edge:** Unique in its automated yield strategy approach and risk diversification/spread.

Conclusion & Recommendations:







- **Asset Score:** Not evaluated using the in-house comprehensive asset scoring model, due to its unique nature as a liquidity pool token with ETH as the underlying asset.
- **Parameter Recommendations:** Include a supply ceiling of 2,000,000 DOLA, an initial daily borrow limit of 250,000 DOLA, and a collateral factor of 75%, among others, to manage exposure and risk efficiently.

Background

Inverse Finance and Yearn Finance, a long time partner, have been exploring collaborative opportunities centered around Yearn's yETH.

The yETH protocol is an AMM for LSTs. Each LST in the yETH pool is priced according to the amount of [beacon chain](#) ETH it represents. This lets users deposit their LSTs into the pool and receive yETH tokens pegged 1:1 with beacon chain ETH. Users can also stake their yETH tokens to mint st-yETH, accrue yield, and participate in yETH governance. This AMM model, combined with the governance and incentive mechanisms of the yETH protocol, aims to provide an optimal risk-adjusted yield for ETH staking by dynamically adjusting the weights of the LSTs in the pool. It also offers users flexibility with single-sided deposits and withdrawals, and maintains the pool's balance and diversification through a weight management system.

The yETH protocol is governed by its users who can vote to adjust the weights of the LSTs in the pool, helping to maximize yield and mitigate risks associated with individual LSTs. All yields generated by yETH go to Staked yETH (st-yETH) holders, making yETH an ideal token for Liquidity Providing in stableswap pools like those on Curve.

LSTs in Pool				
Token	Amount in pool	Composition	Weight	Bands (+/- %)
 swETH	1,636,553,159 ~1,706,034,289 ETH	28.97%	23.83% Target: 22.84%	5.00% - 5.00%
 sfrxETH	1,411,101,692 ~1,502,865,229 ETH	25.52%	26.83% Target: 27.02%	5.00% - 5.00%
 wstETH	1,067,321,648 ~1,224,387,715 ETH	20.79%	23.02% Target: 22.61%	5.00% - 5.00%
 ETHx	768,477,987 ~778,107,266 ETH	13.21%	14.69% Target: 15.29%	5.00% - 5.00%
 cbETH	552,626,849 ~583,403,727 ETH	9.01%	11.02% Target: 11.24%	5.00% - 5.00%
 mevETH	93,893,236 ~93,893,236 ETH	1.59%	0.60% Target: 1.00%	0.00% - 1.00%

This risk assessment will focus on the use of yETH as collateral on FiRM. As such, it will look into Yearn Finance broadly, and the yETH more specifically.

Protocol Analysis

Org. Structure

☐ Is the Protocol a DAO? How is it governed eg. delegates , snapshot ()

Since [YIP-61: Governance 2.0](#) passed on April 25th, 2021, yearn began the transition into a multi-DAO structure. This structure is characterized by a system of constrained delegation and involves several key components:

Multisig: Multisig members have the authority to execute or veto any on-chain decisions. They hold powers like execution, veto, and transitional power, ensuring that decisions made by YFI holders and yTeams are implemented on the blockchain.

Governance Structure:

- **YFI holders** have the ultimate say in the protocol, voting for changes, creating or dissolving yTeams, and defining their limitations. They manage powers, change YFI token contracts, set fees, change Multisig signers, ratify yTeams, spend treasury funds, and have the ability to propose Yearn Improvement Proposals (YIPs). Recently, the governance model transitioned from using YFI to veYFI (voting escrowed YFI) for voting power, reflecting a shift in the governance mechanism.
- **yTeams** focus on specific aspects of the protocol or operations. Each yTeam has objectives and discrete powers defined by token holders. They include groups like yGuard, yBrain, yDev, yPeople, yBudget, yFarm, yTx, and yOps
- **Decision-Making Process:** YFI holders create and define yTeams, which then notify yTx of a decision. yTx creates a delegated transaction, which is sent to the Multisig for execution or veto

Improvement Proposals: There are several types of proposals, including Yearn Improvement Proposal (YIP), Yearn Delegation Proposal (YDP), and Yearn Signaling Proposal (YSP). These cater to executing powers delegated to YFI holders, changing decision-making power delegations, and signaling community intentions or feelings on various issues

☐ Does Protocol publish analytics / transparency via Dune or similar ()

Yes, Yearn Finance publishes analytics and transparency data via [YFI Stats](#) and [Yearn Watch](#) for vaults.

☐ working group structure ()

yTeams are specialized groups focusing on specific aspects of the protocol or operations. Each yTeam has distinct objectives and powers, defined by token holders. Examples of yTeams include yGuard (protecting the vaults), yBrain (managing strategies), yDev (managing the

protocol), yPeople (curating the team), yBudget (financial management), yFarm (growing the treasury), yTx (transaction writing), and yOps (coordinating contributors).

☐ **are core contributors compensated / Doxed ()**

Yearn works with project-based budget requests, which focus on transparency and accountability. Budget requests are approved by the yBudget team and require a 3/5 consensus. All Yearn payments streams can be visualized at our [LlamaPay Streams Dashboard](#).

Regarding the personal identities (doxing) of contributors, Yearn Finance appears to prioritize operational transparency over personal disclosure.

☐ **Any known controversies in crypto space (e.g. Sifu) ()**

Yearn Finance has faced its share of controversies. One recent incident involved a significant drop in \$YFI, which plummeted over 43% in just five hours on November 18, 2023, leading to speculation within the crypto community about a possible exit scam, since refuted. Notably, Yearn Finance was founded by Andre Cronje. He was a central figure in its development, but holds no present role in the DAO. Cronje is a notorious name in DeFi, recently under scrutiny for his role with Fantom and their ongoing struggles re: Multichain incident.

☐ **do they have a security or risk management team ()**

Information about Yearn's security processes, team members, disclosures, PGP keys and more can be found in the [/yearn-security](#) repo on Github. It is clear Yearn takes security very seriously. From preliminary research, Storming0x leads security at Yearn, and dev Wavey is part of Inverse Finance's smart contract review process. Yearn has undergone many audits (covered in the audit section below) by high profile auditors, and has a rich bug bounty program active and recently updated hosted on the ImmuneFi platform.

Multisig Structure

☐ **Is protocol transparent of multisigs and signers, List/links of multisigs, purpose, and setup x of x ()**

Yearn as a protocol hinges on the critical assumption that the governance role is honest. This role is currently controlled by a [6 of 9 Gnosis Safe multisig](#). Multisig membership can be validated from the Gnosis UI [here](#). Signers include some notorious names as Banteg (lead dev at Yearn), Daryl Lau (Not3Lau Capital), 0xngmi (DefiLlama), Lefteris Karapetsas (rotkiapp), Leo Cheng (C.R.E.A.M. Finance).

☐ **Can multisigs interfere with collateral options? EOA minting ()**

A compromised or malicious Governance can cause catastrophic damage across the entire protocol. It is a conscious design decision that this role is not behind a time lock. Priority is given to the ability to rapidly update and iterate on live vaults, strategies, and other components. Both so as not to advertise new investment strategies in advance, but also to rapidly improve our existing components without interruption. It also avoids downtimes whenever there is a bug or security vulnerability that needs to be fixed.

Influence, Reputation, and Partnerships

☐ **How long has the protocol been around , have they endured long bear markets ()**

Yearn Finance has been around since early 2020, meaning it has been operational for approximately 3 years. They solidified their name in DeFi as a major topic during “crypto summer”. However, unlike many other protocols of the time, they continue to build (recently yETH, yPRISMA, new vault strategies, etc) and have grown into their role as a blueprint and lead example of transparent and operationally successful DAO.

☐ **Have they been exploited and how was it handled , was value restored to users ()**

Yearn Finance has experienced at least one significant exploit, which was handled with prompt actions to restore value to users: In April 2023, a vulnerability hidden in Yearn’s smart contract for about three years was exploited, resulting in a loss of approximately \$10 million. [The exploit](#) was due to a misconfiguration in the project’s immutable yUSDT token contract, which was essentially a copy-paste error causing the contract to miscalculate its pool ratio. The attacker exploited this to mint a large amount of yUSDT tokens after depositing only a small amount.

Following the exploit, Yearn Finance [took steps](#) to restore its yDAI vault and compensate the victims of the hack. The protocol returned \$9.7 million in DAI funds to users who had their stablecoins deposited in the vault at the time of the attack. The DAI was minted using a MakerDAO vault with Yearn’s native token, YFI, as collateral. Yearn plans to pay off the debt incurred from this compensation through fees generated by the protocol. Additionally, 16 insurance claims were filed with the insurance protocol Nexus Mutual for payouts related to the Yearn hack. Out of these, 12 claims were accepted for payouts totaling approximately \$2.1 million, and 3 claims worth \$223K remained pending at the time of the report, with the expectation that they would also be accepted. These actions demonstrate Yearn Finance’s commitment to security and user protection, illustrating their ability to respond effectively to adverse events within the DeFi space.

☐ **Current and notable past partnerships , are they a net positive on the DEFI space ()**

In short, Yearn Finance’s impact on DeFi is substantial, with advantages in automation, risk management, community governance, liquidity aggregation, and innovative strategies. The

platform's approach to yield farming, decentralized lending, and risk management has inspired other projects and contributed to the growth and maturation of the DeFi industry.

[Yearn's Partnership Program](#), launched in early 2021, has been a significant contributor to the DeFi ecosystem. It allows developers to integrate yield-generation into their services and offers profit shares based on yield generated across all vaults. This program has been a net positive for the DeFi space, encouraging growth and innovation through collaborative efforts

Audits & Bug Bounties

Previous and Ongoing

☐ Previous and Ongoing audits & bounties with links ()

One can easily find the list of audits Yearn Finance has undergone by visiting the provided GitHub repository [here](#).

yETH has undergone the following audits:

- yETH Core - [ChainSecurity: June 26th, 2023](#)
- yETH Bootstrap - [MixBytes: July 11th, 2023](#)
- yETH Periphery - [ChainSecurity: August 29th, 2023](#)

Yearn Finance's bug bounty program, hosted on the ImmuneFi platform, can be found [here](#).

Rewards by Threat Level:

- Critical Level: Rewards range from \$20,000 to \$200,000 for critical vulnerabilities.
- High Level: Rewards between \$5,000 and \$20,000.
- Medium Level: Rewards vary from \$1,000 to \$5,000.
- Low Level: Amounts ranging from \$100 to \$1,000.

Contracts in scope includes those relating to yETH, including: [yETH token](#), [st-yETH](#), [yETH PoL](#), [yETH Bootstrap](#), [yETH Curve Model](#), [yETH Shutdown Model](#), [yETH Stake Module](#), [yETH Merkle Incentives](#), [yETH Bootstrap v2](#), [yETH Pool](#).

☐ Reputation, Qualifications and Industry Experience of Audit Firm

MixBytes and ChainSecurity have been the two primary auditors of Yearn Finance. Trail of Bits, Debaub, and Quantstamp have also been engaged in the past. Generally, these are all considered to be reputable auditing firms.

Contracts in Scope

- ☐ **Is the scope a comprehensive list of contracts including collateral and wrappers**

The bug bounty program lists 19 smart contracts in the scope list. Yearn adds and removes Vaults and Strategies from Production on an ongoing basis. As such, the list is comprehensive in that it includes contracts pertaining to current products that hold funds. Furthermore, it is mentioned that other contracts, outside of the ones mentioned, might be considered on a case by case basis, as long as economic damage can be achieved.

Reward Payouts

- ☐ **Rewards paid, vulnerabilities found with severity**

Per the ImmuneFi Bounties board, Yearn has, to date, paid out a total of \$207k in rewards for vulnerability disclosures through their ImmuneFi bug bounty program, which has been active since July 1st, 2021. It is not disclosed what the severity of these reports were, nor how many there were in number.

Collateral Analysis

Oracles

- ☐ **Available Chainlink Oracles**

N/A

- ☐ **Any advanced oracle or market implementation required**

Yearn utilizes Curve's new stableswap pool for yETH liquidity ([Curve.fi Factory v2-347](#)), paired with wETH and with \$3.55MM in liquidity. This is suitable for our price oracle.

- ☐ **Peg Risk if any**

Pause mode: This mode is to be activated in the event of extreme market conditions or detected suspicious behavior, either in the protocol itself or in the underlying LST tokens that back it.

- No user may swap assets with the contract.
- No user may deposit assets into the contract.
- Users may only withdraw assets in a balanced manner, single-sided withdrawals are not allowed.
- Weights, rates, and rate providers cannot be updated during this mode.
- Management or guardian can undo pause mode to resume normal operation.

Killed mode: This mode is to be activated in the event of critical failures, whether in the protocol itself or in any of the underlying LST tokens that back it. This can also be used to migrate to a new version of the yETH protocol.

- No user may deposit assets into the contract.
- Users may only withdraw assets in a balanced manner.
- The reward controller may not update the beacon chain amounts.
- Pause mode may not be undone.
- There is no way to undo killed mode.

Token Statistics







☐ Contracts

yETH - [0x1bed97cbc3c24a4fb5c069c6e311a967386131f7](#)

st-yETH - [0x583019ff0f430721ada9cfb4fac8f06ca104d0b4](#)

☐ Price / Market Cap / Circulating Supply / Locked Supply / True Circulating / Total / Max

As of Nov 22, [yETH pool](#) TVL is \$11.8M, or ~5,959 ETH. The LSTs that make up the pool are the following:

LSTs in Pool				
Token	Amount in pool ▾	Composition ▾	Weight ▾	Bands (-/+ %)
 swETH	1,655.512767 ~1,726.006034 ETH	28.97%	23.65% Target: 22.84%	5.00% - 5.00%
 sfrxETH	1,411.101692 ~1,502.865229 ETH	25.22%	26.87% Target: 27.02%	5.00% - 5.00%
 wstETH	1,052.039746 ~1,207.091640 ETH	20.26%	22.95% Target: 22.61%	5.00% - 5.00%
 ETHx	799.772351 ~810.728509 ETH	13.61%	14.80% Target: 15.29%	5.00% - 5.00%
 cbETH	580.215157 ~612.681898 ETH	10.28%	11.06% Target: 11.24%	5.00% - 5.00%
 mevETH	99.202256 ~99.202256 ETH	1.66%	0.67% Target: 1.00%	0.00% - 1.00%

Liquidity

The on-chain liquidity figures presented below are all pertaining to yETH.

☐ Mainnet Dex Liquidity

LP	Protocol	Liquidity (\$)	24 Hour Volume (\$)
yETH/wETH	Curve	\$3.5MM	\$30k

☐ On-Chain Slippage

Users can mint and redeem yETH with underlying as they wish. [Example](#) of a user redeeming for a single LST (swETH in this case). [Example](#) of a user doing a balanced redemption.

Trade	yETH	ETH	DOLA	Slippage (%)
\$50,000	25.19	25.08	50174	0.35
\$100,000	50.38	50.13	100251	0.25
\$200,000	100.76	100.14	200243	0.12
\$500,000	251.89	249.22	498214	-0.36
\$1,000,000	503.77	491.60	982380	-1.76
\$1,500,000	755.67	698.93	1396259	-6.92
\$2,000,000	1007.56	778.18	1554401	-22.28

☐ Token Holders

Virtually the entirety of yETH is either staked (st-yETH, ~85%) or deposited in the yETH Curve LP (~15%).

Transfers	Holders	Info	Contract	Analytics	Comments	
Token Holders Chart						
A total of 26 token holders						
Rank	Address	Quantity	Percentage	Value	Analytics	
1	Yearn: st-yETH Token	5,420.498085273764416058	84.9965%	\$10,839,749.46	Analytics	
2	0x69ACcb...3A91aF22	952.415510108063338798	14.9344%	\$1,904,611.96	Analytics	

st-yETH holders: 167

Transfers	Holders	Info	Contract	Analytics	Comments
Token Holders Chart					
A total of 167 token holders					
First < Page 1 of 4 > Last					
Rank	Address	Quantity	Percentage	Analytics	
1	0x7cf484...0136d491	1,654.348448016680372732	30.9556%		
2	0x02cA76...8b9ea68C	298.265829509220446948	5.5810%		
3	0x20EADf...731576A4	248.474319303829068219	4.6494%		
4	0x992dac...03c37D9d	209.881981494623074116	3.9272%		
5	0x15977e...EDd78618	194.285144616270309694	3.6354%		
6	0x2f4636...a9A99586	191.179350619887183851	3.5773%		
7	hashcredits.eth	188.299870853273089205	3.5234%		
8	0x603B82...F5D8B9d2	180.679026017956867291	3.3808%		
9	0x96E3e3...B2e4B428	166.241826316228645676	3.1107%		
10	0xbe4781...9F35bF32	154.205662499397161251	2.8854%		

Utility & Use Case

☐ Does the Token have utility ()

\$yETH is a liquidity pool token backed by 5 LSTs. However, yETH itself doesn't earn yield but is used for providing liquidity in pools like Curve. To accrue yield, you need to stake yETH into st-yETH. The yield comes from whitelist fees, buying LSTs at a discount, and staking yield. At the moment, yETH has no utility beyond this. However, its potential for integration in compatible lending markets such as FiRM can lead it to have utility as a collateral option.

☐ Goal of the token, where is value derived from ()

The primary goal of the yETH token is to provide a passive yield-generating instrument for ETH holders. yETH achieves this by pooling ETH deposits and strategically allocating them across various LSTs. This process is automated by Yearn Finance's smart contracts.

The value of yETH is derived from its ability to earn yield from multiple DeFi strategies while spreading the risks associated with individual protocols. It simplifies the process of yield farming for users, eliminating the need for in-depth knowledge of the underlying protocols and active management, and socializes gas costs.

Competitive Analysis

Competitive Markets & Implementation

☐ Competitor Markets with supply & borrow capacity

As of November 22nd, 2023, no competitor protocol has integrated yETH into their lending market.

☐ **Competitor Oracle Solutions**

N/A

☐ **Notable competitor failures**

N/A

Conclusion

The assessment of yETH as collateral in Inverse Finance's FiRM reveals its substantial potential and relative security as a yield-generating DeFi product. yETH's design, which pools Ethereum and allocates it across various liquidity staking tokens, offers an innovative approach to diversify risk and maximize returns. The utilization of Curve.fi's stableswap as a price oracle for yETH provides a reliable mechanism for real-time valuation. However, continuous monitoring of market dynamics, smart contract security, and liquidity depth remains crucial. Overall, RWG believes yETH to be a solid collateral option, one that we expect to bring substantial borrow demand whilst also carry an appropriate risk profile.

Asset Score

Nov 20th, 2023: The RWG opted not to evaluate yETH utilizing our in-house comprehensive [asset scoring model](#). This framework evaluates the relative “risk” of an asset, using wETH as a benchmark, by considering six essential factors: market capitalization, trading volume, price volatility, token distribution, project fundamentals, and token utility. In this case, yETH, being a liquidity pool token with wETH as its underlying value, is not a suitable asset to score according to the model.

Parameter Recommendations

When considering the onboarding of yETH as a collateral in FiRM, a meticulous approach toward parameter settings is crucial to ensure stability and risk mitigation in the protocol.

Supply Ceiling: The supply ceiling for yETH should be established based on its market liquidity and the TVL in yETH vaults. Setting an appropriate ceiling mitigates the risk of overexposure and ensures adequate market depth to support redemptions. Careful consideration of the current and historical TVL, along with market conditions, should guide the determination of this limit.

Daily Borrow Limit: This limit should be set to balance user demand with the protocol's capacity to sustain withdrawals without affecting the underlying yield strategies adversely. Analyzing daily transaction volumes and liquidity patterns can inform a prudent borrow limit.

Collateral Factor: The collateral factor for yETH must reflect its volatility and the diversification of underlying assets. A balanced collateral factor ensures that the lending protocol remains adequately collateralized, even during market downturns. This factor should be set by analyzing the historical price stability and risk profile of yETH and its constituent LSTs.

Liquidation Factor: This factor is pivotal in ensuring that the loan remains sufficiently collateralized, especially in rapidly changing market conditions. It should be set to trigger liquidation before the value of the collateral falls below the loan value, thereby safeguarding both the borrower's and lender's interests. An optimal liquidation factor balances the need for security with the desire to offer borrowers enough leeway to avoid premature liquidations. RWG carries out a data-driven analysis which assumes a minimum debt amount, and utilizes the collateral factor along with the cost to liquidate the position in order to derive the value. This analysis was carried out [here](#).

Liquidation Incentive: The liquidation incentive is essential for encouraging third parties to participate in the liquidation process, thus maintaining the protocol's health. This incentive must be attractive enough to prompt action while ensuring it does not excessively penalize borrowers. The incentive should be aligned with industry standards and consider the liquidity and volatility of yETH.

Minimum Debt Amount: Setting a minimum debt amount is crucial for maintaining operational efficiency and preventing spam loans. This limit should be high enough to discourage trivial borrowing but low enough to keep the platform accessible. The minimum debt amount could be based on transaction cost analyses and user behavior patterns. Like the liquidation factor, minimum debt amount stems from a data-driven analysis which assumes a value for liquidation factor, and utilizes the collateral factor along with the cost to liquidate the position in order to derive the value. This analysis was carried out [here](#).

Supply Ceiling	4,000,000 DOLA
Daily Borrow Limit	200,000 DOLA
Collateral Factor	75%
Liquidation Factor	40%
Liquidation Incentive	10%
Minimum Debt Amount	2000 DOLA