

MixBytes()

Lido WstETH Staker Security Audit Report

SEPTEMBER 10, 2025

Table of Contents

1. Introduction	2
1.1 Disclaimer	2
1.2 Executive Summary	2
1.3 Project Overview	3
1.4 Security Assessment Methodology	4
1.5 Risk Classification	6
1.6 Summary of Findings	7
2. Findings Report	8
2.1 Critical	8
2.2 High	8
2.3 Medium	8
2.4 Low	8
3. About MixBytes	9

1. Introduction

1.1 Disclaimer

The audit makes no statements or warranties regarding the utility, safety, or security of the code, the suitability of the business model, investment advice, endorsement of the platform or its products, the regulatory regime for the business model, or any other claims about the fitness of the contracts for a particular purpose or their bug-free status.

1.2 Executive Summary

`WstethStaker` is a compact, stateless, and immutable helper contract that allows anyone to stake native ETH into Lido, credit a referral address, and instantly receive non-rebasable `wstETH` in a single transaction.

The codebase was audited in 1 day by 4 auditors using a combination of manual review and automated tooling.

During the audit, the following attack vectors and potential risks were examined:

Calculation of the `stETH` amount. The algorithm uses an uncommon approach where the amount of `stETH` passed as an argument to `wstETH.wrap()` may, in some cases, exceed the contract's actual `stETH` balance. This is intended to compensate for the internal rounding behavior of `wrap()`. We verified that this approach does not cause underestimation or overestimation that could lead to reverts or leave residual dust in the contract.

Protection against accidental Ether transfers to the contract. The contract must accept Ether only through the `stakeETH()` function. Transferring Ether by any other means could result in funds being frozen. We validated that the contract blocks receiving funds via `receive()`.

Correctness of integration with `stETH` and `wstETH`. We verified that user funds are processed correctly and that the contract behaves as documented.

Funds locking or theft. We confirmed that the contract's architecture and implementation do not allow user funds to be locked or stolen.

The contract demonstrates high code quality with clear, well-documented functions and robust test coverage, evidenced by the fact that no bugs were found during the audit.

1.3 Project Overview

Summary

Title	Description
Client Name	Lido
Project Name	WstETH Staker
Type	Solidity
Platform	EVM
Timeline	09.09.2025 – 10.09.2025

Scope of Audit

File	Link
si-contracts/0.8.25/WstethStaker.sol	WstethStaker.sol

Versions Log

Date	Commit Hash	Note
09.09.2025	97e0f166baf638e082a2dcf72fe2ec3ba73e5ddb	Initial Commit

Mainnet Deployments

File	Address	Blockchain
WstethStaker.sol	0xa88f0329C2c4ce51ba3fc619BBf44efE7120Dd0d	Ethereum

1.4 Security Assessment Methodology

Project Flow

Stage	Scope of Work
Interim audit	Project Architecture Review: <ul style="list-style-type: none">• Review project documentation• Conduct a general code review• Perform reverse engineering to analyze the project's architecture based solely on the source code• Develop an independent perspective on the project's architecture• Identify any logical flaws in the design <p>OBJECTIVE: UNDERSTAND THE OVERALL STRUCTURE OF THE PROJECT AND IDENTIFY POTENTIAL SECURITY RISKS.</p>
	Code Review with a Hacker Mindset: <ul style="list-style-type: none">• Each team member independently conducts a manual code review, focusing on identifying unique vulnerabilities.• Perform collaborative audits (pair auditing) of the most complex code sections, supervised by the Team Lead.• Develop Proof-of-Concepts (PoCs) and conduct fuzzing tests using tools like Foundry, Hardhat, and BOA to uncover intricate logical flaws.• Review test cases and in-code comments to identify potential weaknesses. <p>OBJECTIVE: IDENTIFY AND ELIMINATE THE MAJORITY OF VULNERABILITIES, INCLUDING THOSE UNIQUE TO THE INDUSTRY.</p>
	Code Review with a Nerd Mindset: <ul style="list-style-type: none">• Conduct a manual code review using an internally maintained checklist, regularly updated with insights from past hacks, research, and client audits.• Utilize static analysis tools (e.g., Slither, Mythril) and vulnerability databases (e.g., Solodit) to uncover potential undetected attack vectors. <p>OBJECTIVE: ENSURE COMPREHENSIVE COVERAGE OF ALL KNOWN ATTACK VECTORS DURING THE REVIEW PROCESS.</p>

Stage	Scope of Work
	<p>Consolidation of Auditors' Reports:</p> <ul style="list-style-type: none"> • Cross-check findings among auditors • Discuss identified issues • Issue an interim audit report for client review <p>OBJECTIVE: COMBINE INTERIM REPORTS FROM ALL AUDITORS INTO A SINGLE COMPREHENSIVE DOCUMENT.</p>
Re-audit	<p>Bug Fixing & Re-Audit:</p> <ul style="list-style-type: none"> • The client addresses the identified issues and provides feedback • Auditors verify the fixes and update their statuses with supporting evidence • A re-audit report is generated and shared with the client <p>OBJECTIVE: VALIDATE THE FIXES AND REASSESS THE CODE TO ENSURE ALL VULNERABILITIES ARE RESOLVED AND NO NEW VULNERABILITIES ARE ADDED.</p>
Final audit	<p>Final Code Verification & Public Audit Report:</p> <ul style="list-style-type: none"> • Verify the final code version against recommendations and their statuses • Check deployed contracts for correct initialization parameters • Confirm that the deployed code matches the audited version • Issue a public audit report, published on our official GitHub repository • Announce the successful audit on our official X account <p>OBJECTIVE: PERFORM A FINAL REVIEW AND ISSUE A PUBLIC REPORT DOCUMENTING THE AUDIT.</p>

1.5 Risk Classification

Severity Level Matrix

Severity	Impact: High	Impact: Medium	Impact: Low
Likelihood: High	Critical	High	Medium
Likelihood: Medium	High	Medium	Low
Likelihood: Low	Medium	Low	Low

Impact

- **High** – Theft from 0.5% OR partial/full blocking of funds (>0.5%) on the contract without the possibility of withdrawal OR loss of user funds (>1%) who interacted with the protocol.
- **Medium** – Contract lock that can only be fixed through a contract upgrade OR one-time theft of rewards or an amount up to 0.5% of the protocol's TVL OR funds lock with the possibility of withdrawal by an admin.
- **Low** – One-time contract lock that can be fixed by the administrator without a contract upgrade.

Likelihood

- **High** – The event has a 50-60% probability of occurring within a year and can be triggered by any actor (e.g., due to a likely market condition that the actor cannot influence).
- **Medium** – An unlikely event (10-20% probability of occurring) that can be triggered by a trusted actor.
- **Low** – A highly unlikely event that can only be triggered by the owner.

Action Required

- **Critical** – Must be fixed as soon as possible.
- **High** – Strongly advised to be fixed to minimize potential risks.
- **Medium** – Recommended to be fixed to enhance security and stability.
- **Low** – Recommended to be fixed to improve overall robustness and effectiveness.

Finding Status

- **Fixed** – The recommended fixes have been implemented in the project code and no longer impact its security.
- **Partially Fixed** – The recommended fixes have been partially implemented, reducing the impact of the finding, but it has not been fully resolved.
- **Acknowledged** – The recommended fixes have not yet been implemented, and the finding remains unresolved or does not require code changes.

1.6 Summary of Findings

Findings Count

Severity	Count
Critical	0
High	0
Medium	0
Low	0

2. Findings Report

2.1 Critical

Not Found

2.2 High

Not Found

2.3 Medium

Not Found

2.4 Low

Not Found

3. About MixBytes

MixBytes is a leading provider of smart contract audit and research services, helping blockchain projects enhance security and reliability. Since its inception, MixBytes has been committed to safeguarding the Web3 ecosystem by delivering rigorous security assessments and cutting-edge research tailored to DeFi projects.

Our team comprises highly skilled engineers, security experts, and blockchain researchers with deep expertise in formal verification, smart contract auditing, and protocol research. With proven experience in Web3, MixBytes combines in-depth technical knowledge with a proactive security-first approach.

Why MixBytes

- **Proven Track Record:** Trusted by top-tier blockchain projects like Lido, Aave, Curve, and others, MixBytes has successfully audited and secured billions in digital assets.
- **Technical Expertise:** Our auditors and researchers hold advanced degrees in cryptography, cybersecurity, and distributed systems.
- **Innovative Research:** Our team actively contributes to blockchain security research, sharing knowledge with the community.

Our Services

- **Smart Contract Audits:** A meticulous security assessment of DeFi protocols to prevent vulnerabilities before deployment.
- **Blockchain Research:** In-depth technical research and security modeling for Web3 projects.
- **Custom Security Solutions:** Tailored security frameworks for complex decentralized applications and blockchain ecosystems.

MixBytes is dedicated to securing the future of blockchain technology by delivering unparalleled security expertise and research-driven solutions. Whether you are launching a DeFi protocol or developing an innovative dApp, we are your trusted security partner.

Contact Information



<https://mixbytes.io/>



https://github.com/mixbytes/audits_public



hello@mixbytes.io



<https://x.com/mixbytes>