

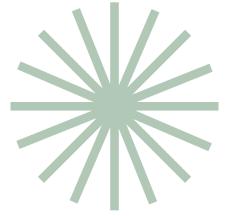


AI - DRRD

Future-Proofing Finance: Navigating Climate Risk with AI- Powered Analytics

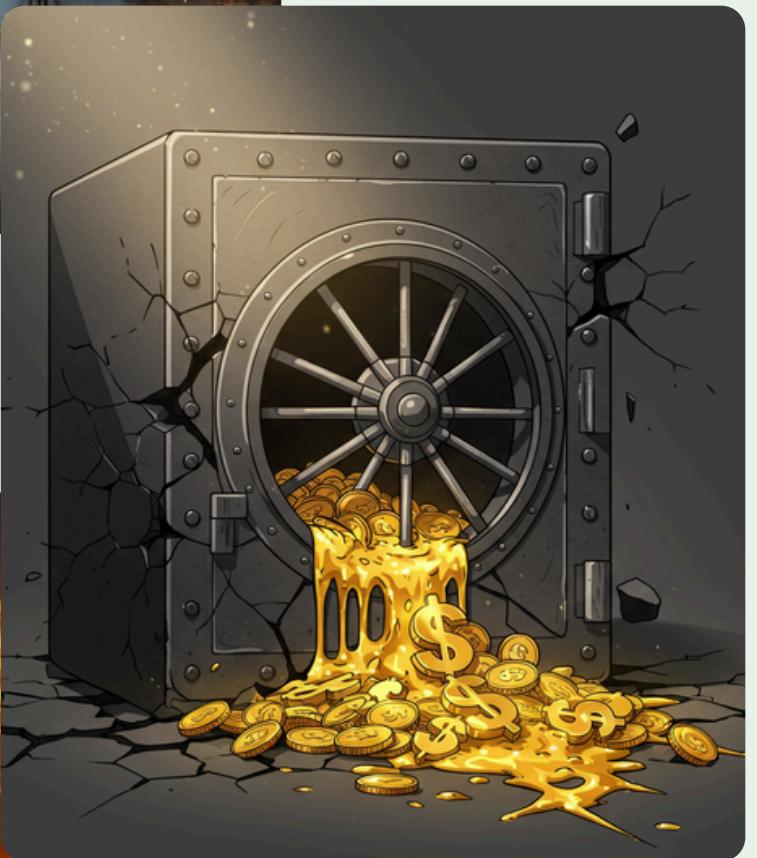
Enhancing Banking Resilience Through Real-time
Physical Risk Intelligence

SHAISTA AMAN
TEAM: BLACK ROCK

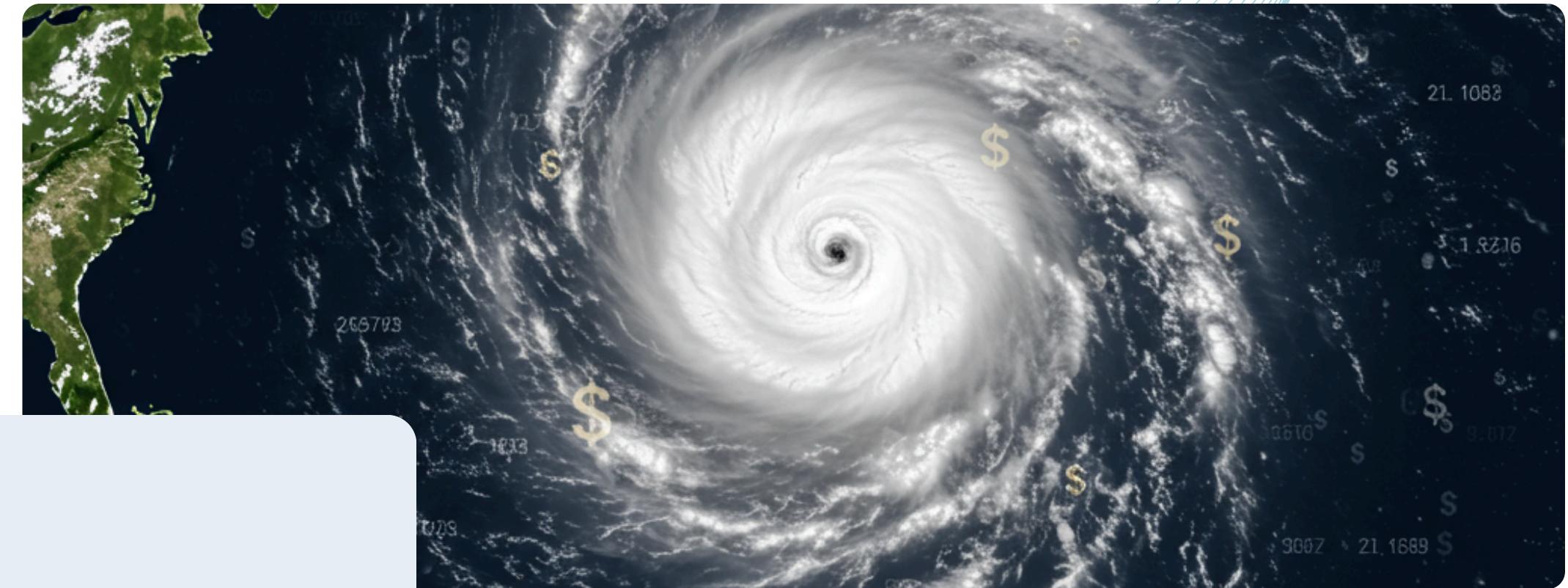


The Unseen Tsunami: Climate Risk's Billions-Dollar Threat to Financial Institutions

- **The Silent Crisis:** Climate change isn't just an environmental issue; it's a rapidly escalating financial risk. Floods, wildfires, heatwaves, and windstorms are no longer theoretical. They are directly impacting property values, disrupting supply chains, and threatening the stability of financial portfolios.
- **A Regulatory Imperative:** Regulators globally are mandating that banks embed physical risk metrics into their core operations, from trading books to capital adequacy assessments. Compliance is no longer optional; it's critical.
- **The Data Gap:** Besides powerful forecasting platforms, financial institutions lack tools to connect hazard forecasts to their property-level exposures, quantify portfolio losses, and make actionable decisions. This gap leads to manual processes, siloed data, and reactive strategies.



The Cost of Inaction: Why This Matters



Eroding Asset Values

Unanticipated physical risks can wipe billions off balance sheets. A single major flood event could render thousands of mortgages in a portfolio underwater, literally and financially, leading to defaults and significant loan losses.



Capital Inefficiency

Without precise risk quantification, banks are forced to hold excessive liquidity buffers, tying up capital that could be deployed for growth. This is a direct drain on profitability.



Regulatory Penalties

Non-compliance with evolving climate risk regulations carries substantial fines and reputational damage, impacting investor confidence and market standing.

Turn Blind Spots to Opportunities with AI-DRRD:

Empower financial institutions to transform climate threat into an opportunity for resilience, enabling smarter, data-driven decisions that protect and optimize their portfolios.



AI-DRRD: Your Compass in the Climate Storm



AI-Powered Disaster Risk Resilience Dashboard is an innovative, end-to-end application designed to provide financial services institutions with real-time, actionable insights into their climate-driven physical risk exposure.



Mission: To bridge the critical gap between cutting-edge climate data and the financial decisions that protect your assets and future-proof your business.



Built for Action: Translates complex hazard forecasts into clear, quantifiable financial impacts, delivering intelligence directly to the hands of bank analysts and risk officers.



Bank Analyst's New Edge: See Risk -> Adjust Portfolios Instantly!



The Analyst's Dilemma

As a Bank Analyst,
"I need to see real-time climate risk exposure on a map to adjust portfolios."

Currently, a slow, manual process, making timely adjustments impossible.

Benefits

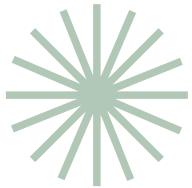
- Dynamic Hotspot Identification
- Granular Detail
- Real-time Insights



Monetary Benefits

- Proactive Risk Mitigation
- Optimized Portfolio Allocation
- Reduced Operational Costs

Risk Officer's Strategic Advantage: Plan Liquidity -> Optimize Capital Proactively!



The Analyst's Dilemma

As a Risk Officer

"I need 'What-If' simulations to plan liquidity buffers and ensure capital adequacy."

Current models are static, making dynamic stress testing a bottleneck.

Benefits

- "What-If" Slider
- Return Period Selector
- Vulnerability Curves



Monetary Benefits

- Precise Capital Planning
- Avoided Regulatory Fines
- Enhanced Financial Stability

Seamless Integration, Powerful Analytics

AI-DRRD is not just a hackathon project, but a foundational step towards integrating climate intelligence into the very fabric of financial decision-making.

Data Ingestion & Normalization

Efficiently ingest diverse data sources – from public APIs (leaflet and openweathermap) to proprietary mortgage books – normalizing them for consistent analysis.

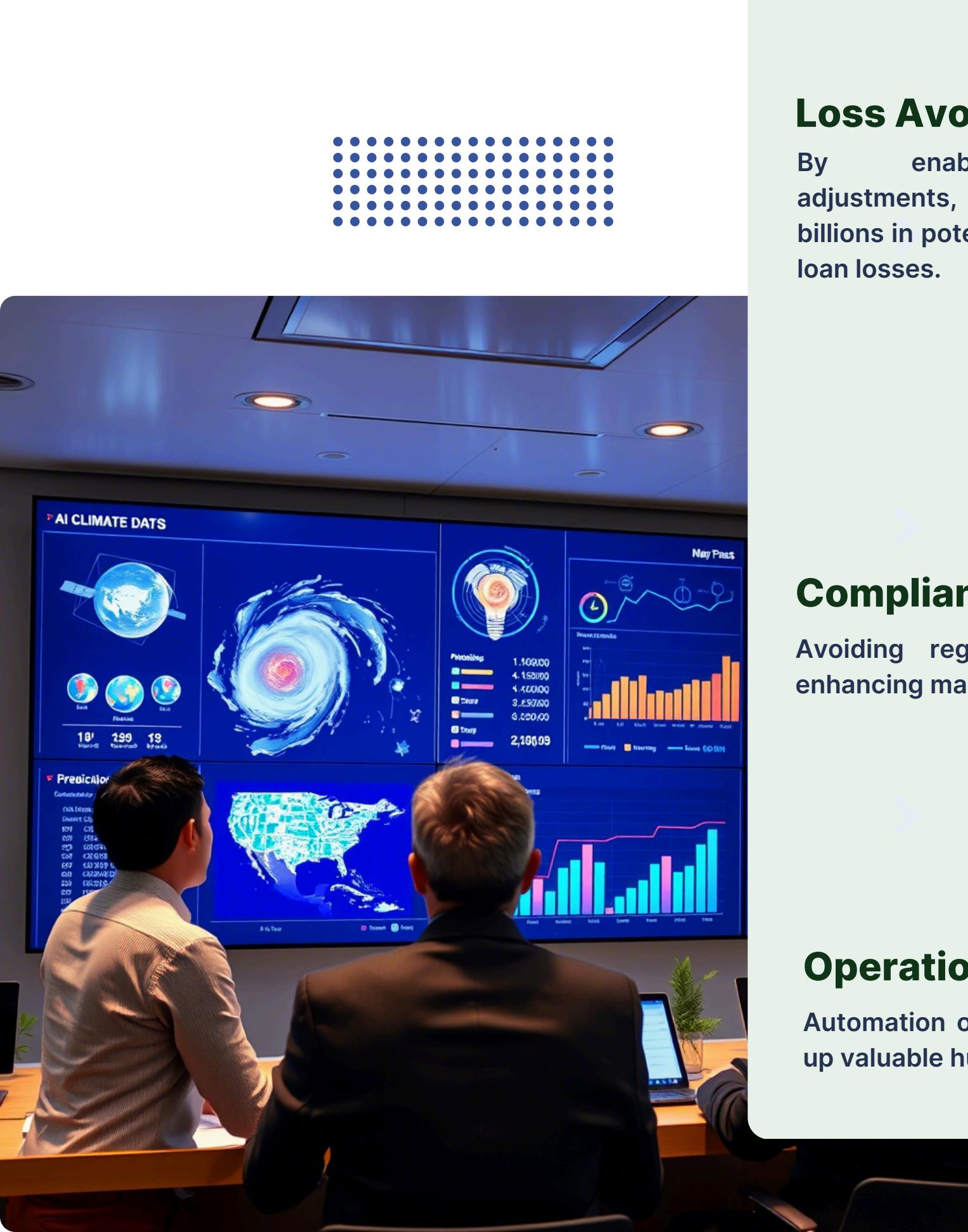
Impact Modeling

Core logic applies vulnerability curves to translate hazard severity at the property level into expected loss or damage ratio. Then intelligently aggregated at loan, postcode, and whole-portfolio levels.

Scalable Architecture

Designed for performance, ensuring real-time processing even with large datasets.





Loss Avoidance

By enabling proactive adjustments, we help prevent billions in potential climate-driven loan losses.

Capital Optimization

More accurate risk assessment means less capital tied up unnecessarily, boosting return on equity.

Compliance & Reputation

Avoiding regulatory fines and enhancing market perception.

Strategic Advantage:

Provides a competitive edge in a rapidly evolving risk landscape.

Operational Efficiency

Automation of risk analysis frees up valuable human capital.

The Imperative for Innovation: **Protect, Optimize, Comply**

AI-Powered Disaster Risk Resilience Dashboard (AI-DRRD) isn't just a tool; it's a strategic asset for a more resilient, profitable, and compliant financial future.





Risk Dashboard

[Generate Report](#)

⚠ Hurricane warning active for Southeast region. 127 properties potentially affected.

Total Portfolio Value

Number of Loans

Average LTV

\$375.0M

1250

72.0 %

Physical Risk Exposure

Flood Risk

\$42.5M

Fire Risk

\$28.7M

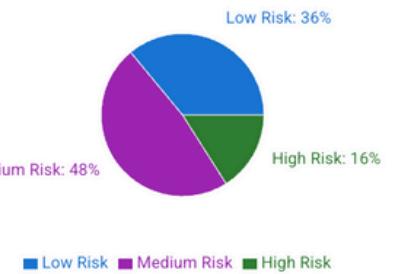
Wind Risk

\$35.2M

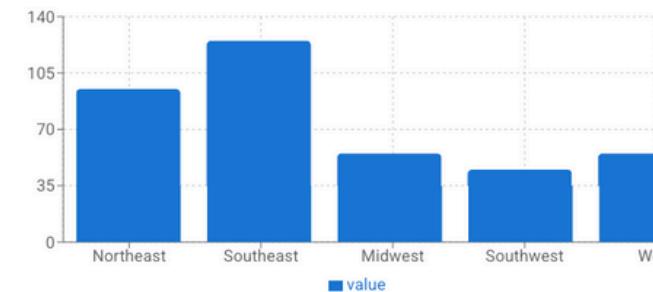
Heat Risk

\$18.9M

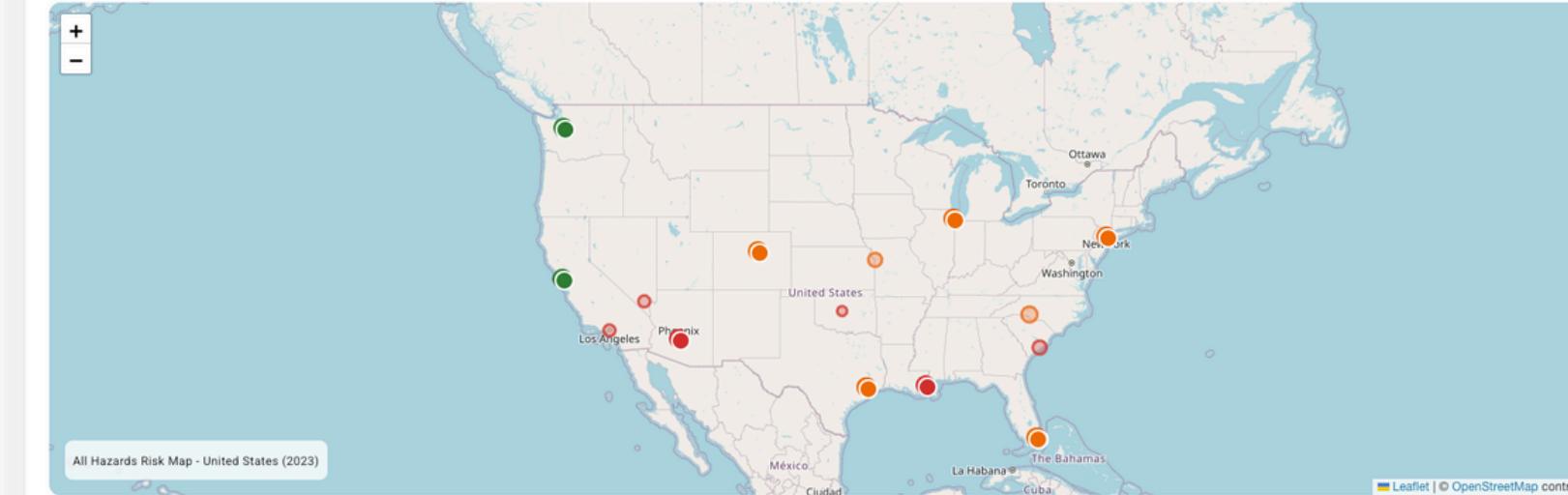
Portfolio Risk Distribution



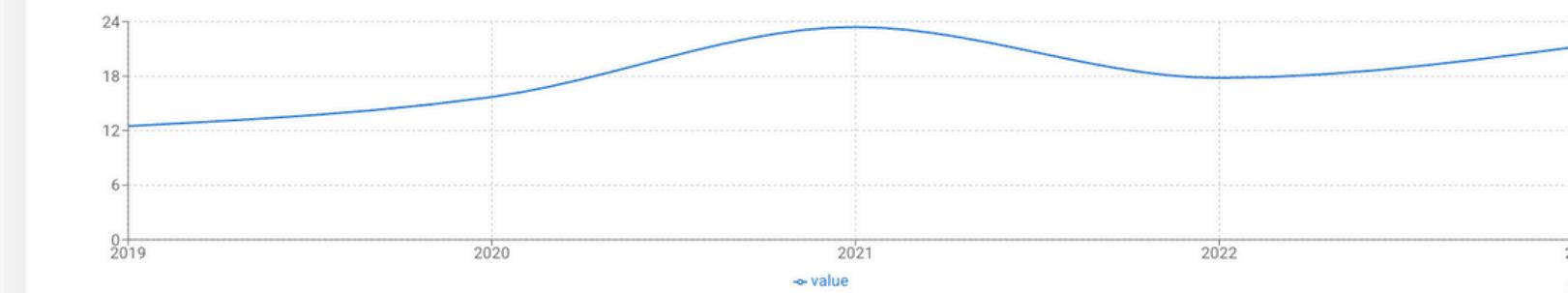
Regional Exposure (\$M)



Risk Hotspots



Historical Losses by Year (\$M)



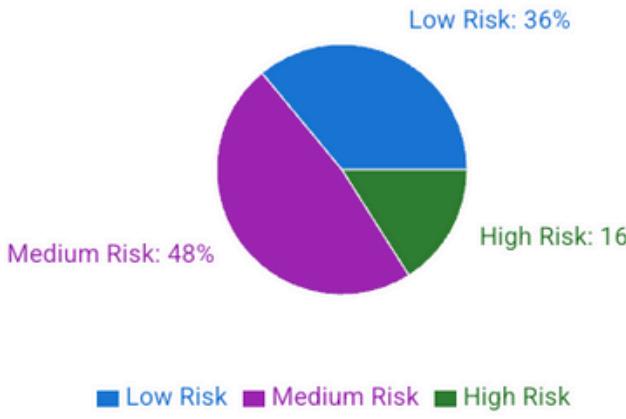


Portfolio Analysis

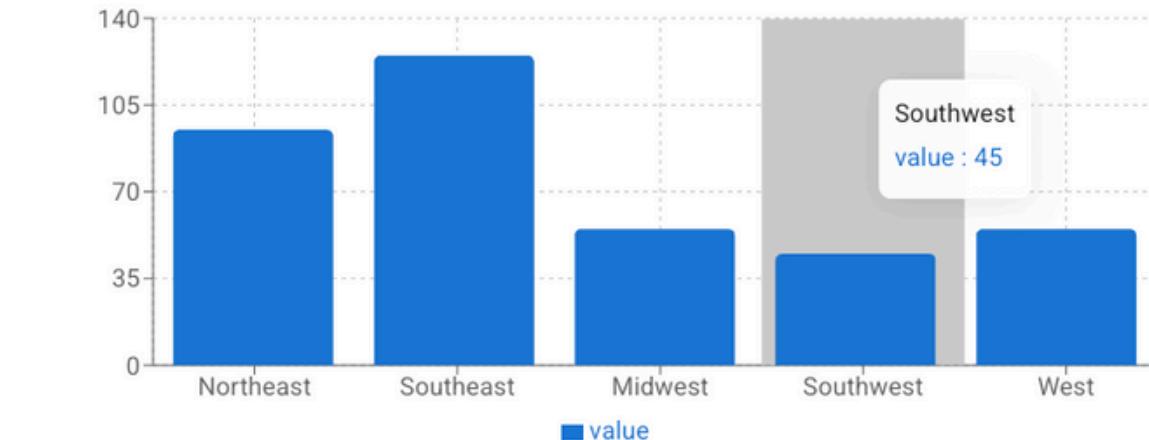
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- [Dashboard](#)
- [Portfolio Analysis](#)
- [Upload Portfolio](#)
- [Risk Map](#)
- [Weather Risk](#)
- [Scenario Builder](#)
- [Reports](#)

Risk Distribution



Regional Distribution (\$M)



Loan Portfolio

[Export](#) Search by loan ID or address

Loan ID	Property Address	Value	LTV	Risk Level
L001	123 Ocean Dr, Miami, FL	\$450,000	68.0%	HIGH
L002	456 Biscayne Blvd, Miami, FL	\$320,000	72.0%	MEDIUM
L003	789 Collins Ave, Miami, FL	\$275,000	65.0%	LOW
L004	321 Main St, Houston, TX	\$380,000	75.0%	HIGH
L005	654 Travis St, Houston, TX	\$290,000	70.0%	MEDIUM
L006	987 Market St, San Francisco, CA	\$850,000	80.0%	MEDIUM
L007	543 Pine St, Seattle, WA	\$520,000	75.0%	LOW
L008	876 Broadway, New York, NY	\$920,000	78.0%	MEDIUM
L009	234 Michigan Ave, Chicago, IL	\$410,000	72.0%	LOW
L010	567 Peachtree St, Atlanta, GA	\$350,000	71.0%	HIGH





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Dashboard

Portfolio Analysis

Upload Portfolio

Risk Map

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Upload Portfolio

Upload Mortgage Portfolio Data

Select File

or drag and drop file here

Selected: portfolio.csv (0.6 KB)

Upload Portfolio

Supported formats: CSV, Excel, JSON

Portfolio data uploaded successfully!

Upload Summary

Loans Processed
1250Total Portfolio Value
\$375,000,000Valid Loans
1242Invalid Loans
8[View Details](#)

File Requirements

 CSV, Excel, or JSON format
Make sure your file is in one of these formats Required columns
Loan ID, Property Address, Value, Balance, LTV, Coordinates Maximum file size
50MB maximum file size

Sample Data Format

```
id,address,value,balance,ltv,lat,lng
L001,123 Main St,450000,306000,0.68,25.7617,-80.191
L002,456 Oak Ave,320000,230400,0.72,25.7827,-80.209
...
```

What Happens Next?

 Data Validation
We'll check your data for completeness and accuracy Risk Assessment
Properties will be analyzed for climate risk exposure Portfolio Dashboard
Your portfolio will be available in the dashboard Weather Risk Analysis
Current weather conditions will be applied to assess immediate risks



Risk Map



Risk Map

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- Dashboard
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- Reports

Map Controls

Region

Miami, FL

Hazard Type

Flooding

Timeframe

2023 2050 2100

Map Style

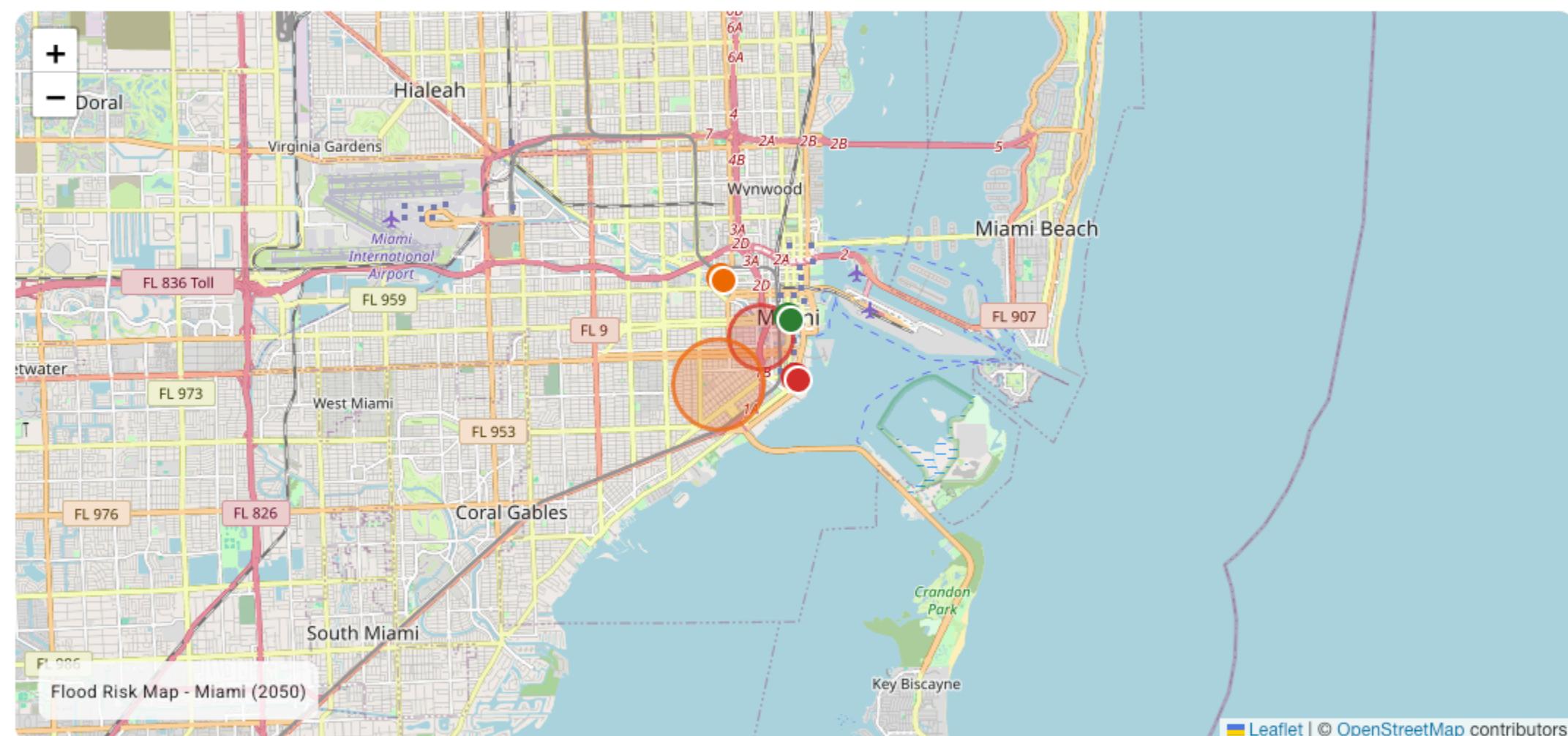


Legend

- High Risk
- Medium Risk
- Low Risk

Viewing flood risk in Miami, FL for Mid-century scenario.

Flood Risk Map



This map shows the projected flood risk for properties in Miami, FL based on climate models for Mid-century. Click on markers to see property details.





Weather Risk Assessment

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Select Region

Region

[Select](#)

2024 Loan Plans

Current loan plans with climate risk considerations:

30-Year Fixed Rate

Standard 30-year fixed rate mortgage
Rate: 6.5%
Min. Down: 3%
Risk Level: LOW

15-Year Fixed Rate

Lower rate 15-year fixed mortgage
Rate: 5.75%
Min. Down: 5%
Risk Level: LOW

5/1 ARM

5-year fixed rate, then adjustable annually
Rate: 5.25%
Min. Down: 5%
Risk Level: MEDIUM

FHA Loan

Government-backed loan with lower down payment
Rate: 6.25%
Min. Down: 3.500000000000004%
Risk Level: MEDIUM

VA Loan

For veterans and service members
Rate: 6%
Min. Down: 0%
Risk Level: LOW

Jumbo Loan

For high-value properties exceeding conforming limits
Rate: 6.75%
Min. Down: 10%
Risk Level: MEDIUM

Climate-Resilient Property Loan

Special rates for properties with climate resilience features
Rate: 5.9%
Min. Down: 5%
Risk Level: LOW

[View All Loan Plans](#)

Current Weather Risk Assessment

Current Weather

Heavy rain

Temperature: 28°C
Humidity: 85%
Wind: 15 m/s
Rainfall: 25 mm/h

Portfolio Risk Summary

Total Portfolio Value

\$1,045,000

Expected Loss (Current Weather)

\$470,250

Percentage at Risk

45.0%

Properties at High Risk

3 of 3

Properties at Risk

123 Ocean Dr, Miami, FL
Value: \$450,000

Loss: \$202,500 HIGH

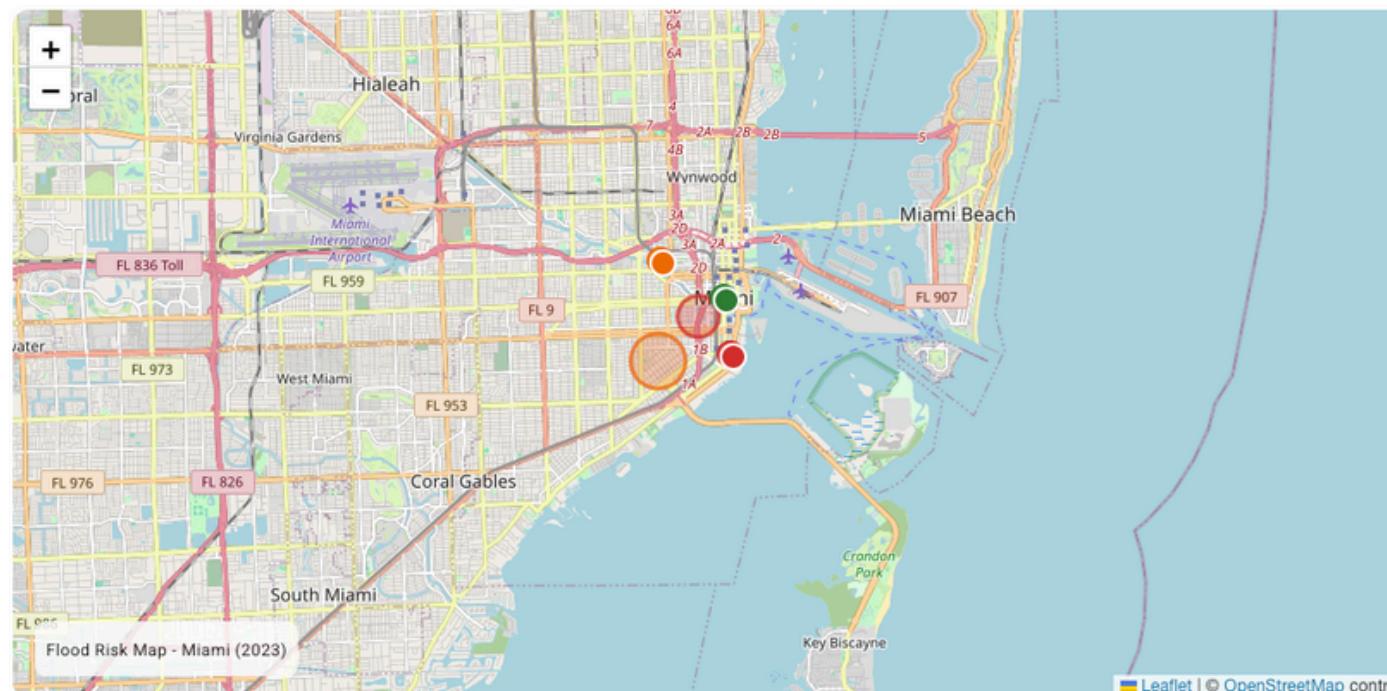
456 Biscayne Blvd, Miami, FL
Value: \$320,000

Loss: \$144,000 HIGH

789 Collins Ave, Miami, FL
Value: \$275,000

Loss: \$123,750 HIGH

Weather Risk Map





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Scenario Builder

Scenario Parameters

Hazard Type
Flooding

Return Period
1-in-20 year

Hazard Intensity

Significant
3.0 / 5.0

This scenario simulates a significant flood event with a 20-year return period.

[Run Analysis](#)

Analysis Results

Total Expected Loss
\$48,536,069

Affected Properties
445

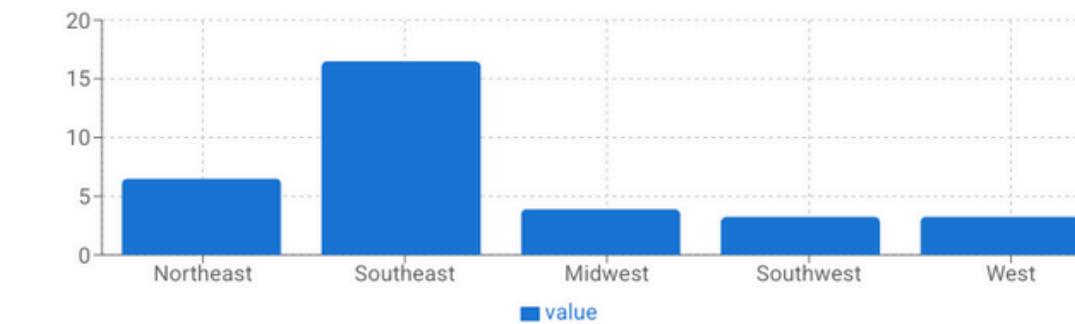
Portfolio Impact
11.6%

LTV Impact
+3.7%

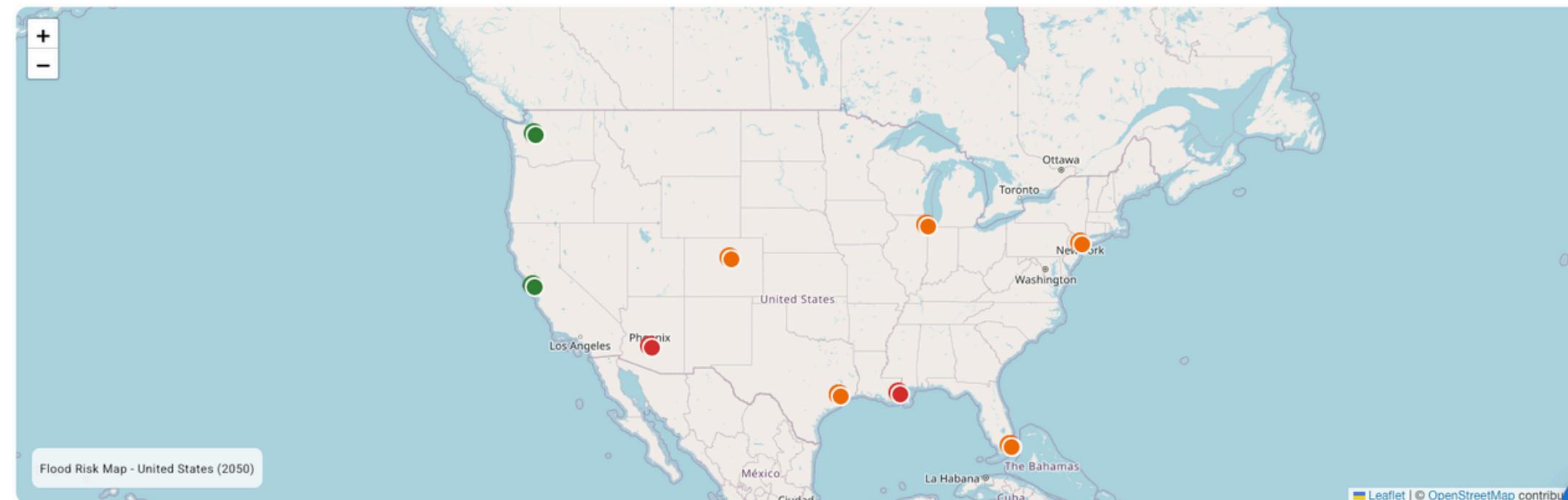
ID: analysis-1...

Regional Impact

Expected Loss by Region (\$M)

[Export Results](#)[Save Scenario](#)

Risk Hotspots





Reports



Reports

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Generated Reports

[Generate New Report](#) Search reports by name, ID, or type

Report ID	Name	Date	Type	Format	Size	Actions
R001	Q3 2023 Portfolio Risk Assessment	Oct 15, 2023, 07:30 PM	QUARTERLY	PDF	2.4 MB	
R002	Hurricane Ian Impact Analysis	Sep 28, 2023, 02:15 PM	EVENT	XLSX	1.8 MB	
R003	California Wildfire Exposure	Aug 12, 2023, 09:45 PM	ANALYSIS	PDF	3.2 MB	
R004	Flood Risk Stress Test	Jul 5, 2023, 04:20 PM	STRESS-TEST	JSON	0.9 MB	
R005	Annual Climate Risk Disclosure	Jun 30, 2023, 08:00 PM	REGULATORY	PDF	5.7 MB	
R006	Mortgage Portfolio Heat Exposure	May 22, 2023, 03:30 PM	ANALYSIS	XLSX	2.1 MB	
R007	Q2 2023 Portfolio Risk Assessment	Apr 15, 2023, 06:45 PM	QUARTERLY	PDF	2.3 MB	





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AI Assistant



Hello! I'm your AI assistant. I can help you analyze your portfolio's climate risk exposure and provide recommendations. How can I assist you today?

10:23

property value

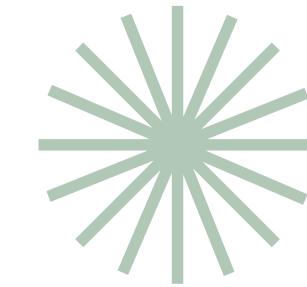
11:35

Property values in high-risk areas may experience volatility due to increasing insurance costs and climate-related concerns.

11:35

Ask me about your portfolio risks...

 <https://github.com/Shaistaaman/AI-DRRD>



THANK YOU!

Questions?

