



Enhancing Resilience, Prediction, and Response  
WV Floodplain Management Association Conference

AI Technology & Flooding

June 2025



Flooding is WV's most common hazard.

Traditional tools lack real-time decision support.

AI offers faster, smarter insights.

Why We're Here



The background of the slide is a close-up photograph of a spiral-bound notebook. The notebook's pages are white with faint horizontal lines. On the left side, the black metal spiral binding is visible, looping through two holes in the paper. A semi-transparent blue rectangular box is positioned on the right side of the notebook, serving as a container for the agenda items. The word 'Agenda' is written in a white, sans-serif font in the upper left area of the notebook page.

# Agenda

- **Why AI?**
- **Real-World Examples**
- **Tools We Can Use**
- **Challenges & Next Steps**

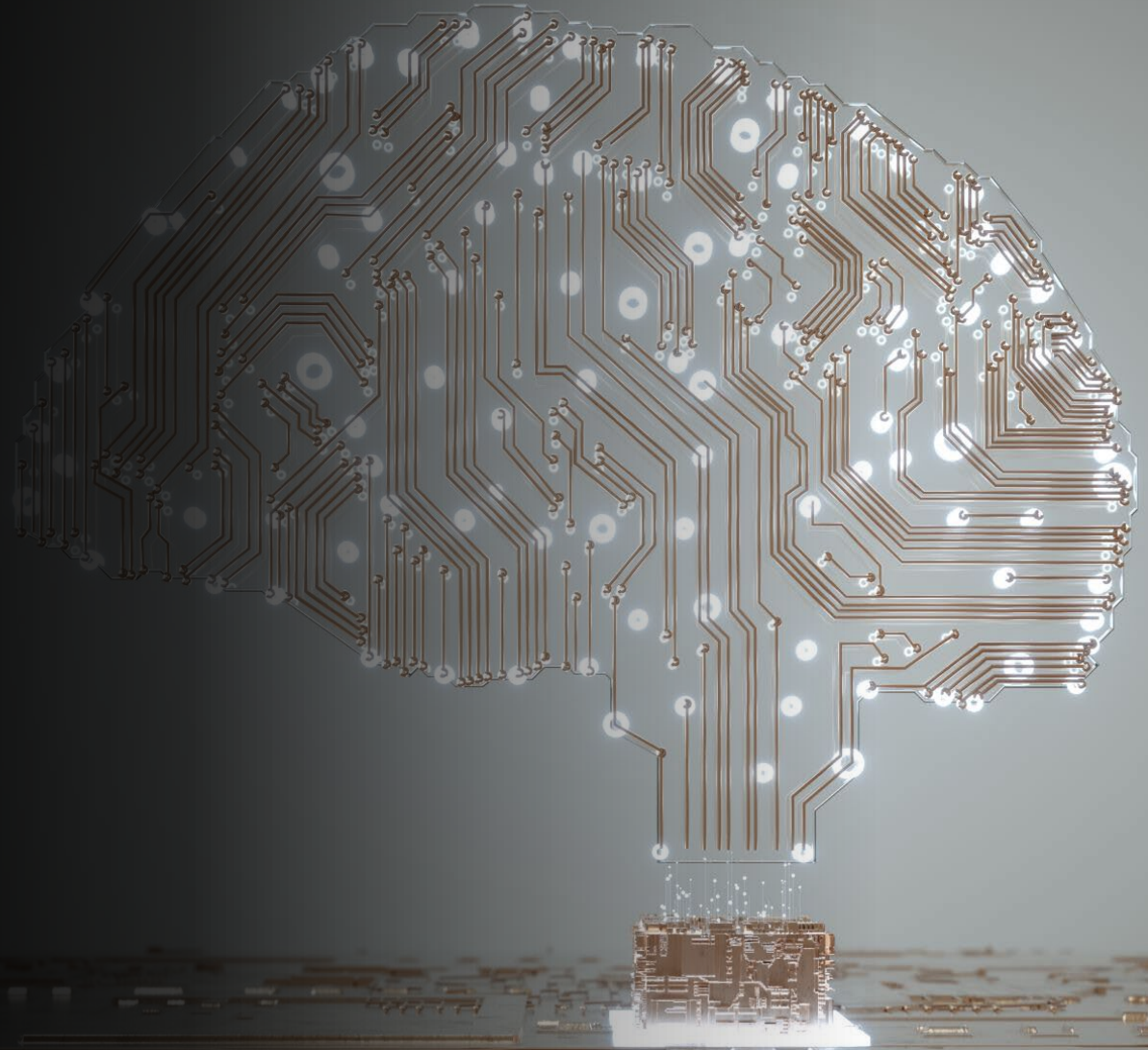
# What is AI?

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Definition of AI

Types of AI: Narrow AI and General AI

Everyday Interaction with AI







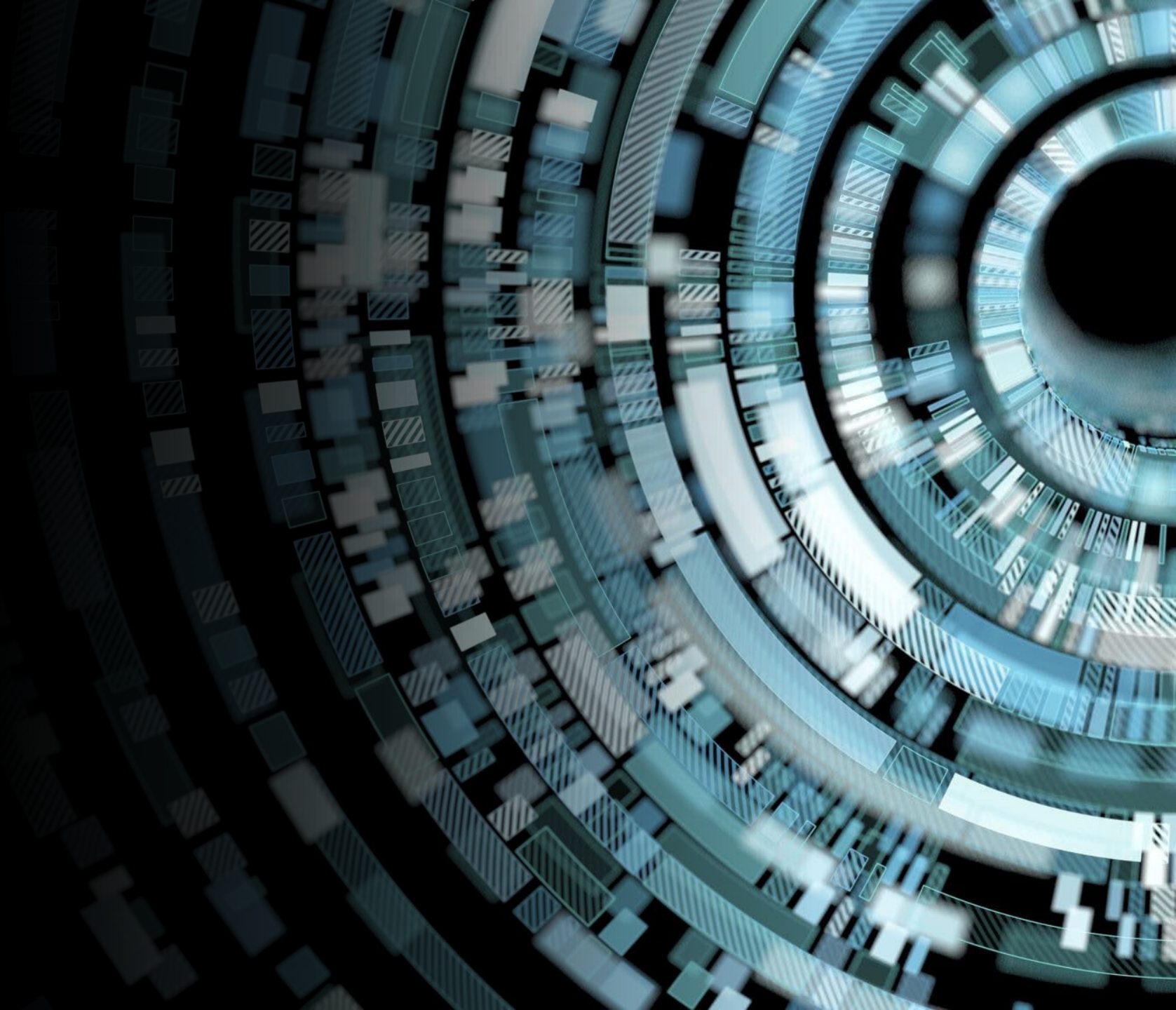
# How AI Works Behind the Scenes

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Machine Learning

Natural Language Processing  
(NLP)

- Computer Vision







# AI in Daily Life – Home and Personal Devices

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Voice Assistants (e.g., Siri, Alexa)

Streaming Services (e.g., Netflix, Spotify)

- Smart Home Devices



An aerial night view of a city, likely New York City, with the Empire State Building prominent on the right. Overlaid on the city are numerous glowing yellow and orange arcs and dots, representing a global network or data flow. In the top left corner, there is a solid orange horizontal bar.

# AI in Daily Life – Online and Social Media

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Search Engines

Social Media

- E-commerce





## AI in Daily Life – Transportation and Navigation

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GPS and Navigation (e.g., Google Maps, Waze)

Ride-Sharing Services (e.g., Uber, Lyft)

- Autonomous Vehicles

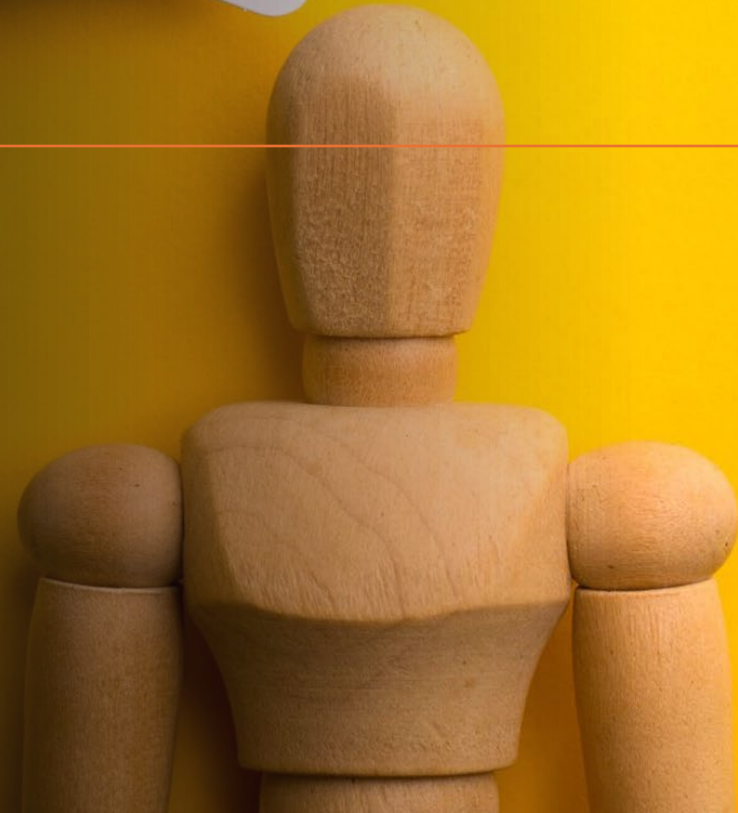


# Why AI? Why Now?

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More data + more weather volatility = greater risk.

AI enables real-time processing of radar, sensors, satellite, and social media.



# What AI Brings to Flood Management

- NIWA: Flood forecasts in 1–2 minutes
- Google: 7-day flood forecasts in 80+ countries

[Link](#)





# Google Flood Forecasting Overview

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Launched in India, now covers Africa, Asia, Latin America

Over 100M alerts sent

[Live Tool](#)








# India/Bangladesh Case Study

2021: 350M+ people reached

## Alerts sent via SMS, YouTube, Maps, and Android push



# NeuralFlood Example



County-level susceptibility mapping (~87% accuracy)

Link:  
<https://www.frontiersin.org/journals/water/articles/10.3389/frwa.2023.1291305/full>





# Takeaway: AI = Faster, Smarter, Broader

Real-time, scalable, and supports  
human decision-making





# West Virginia's Current Tools

WV Flood Tool: FEMA NFHL + LiDAR + parcel risk

[WV Flood Tool Link](#)

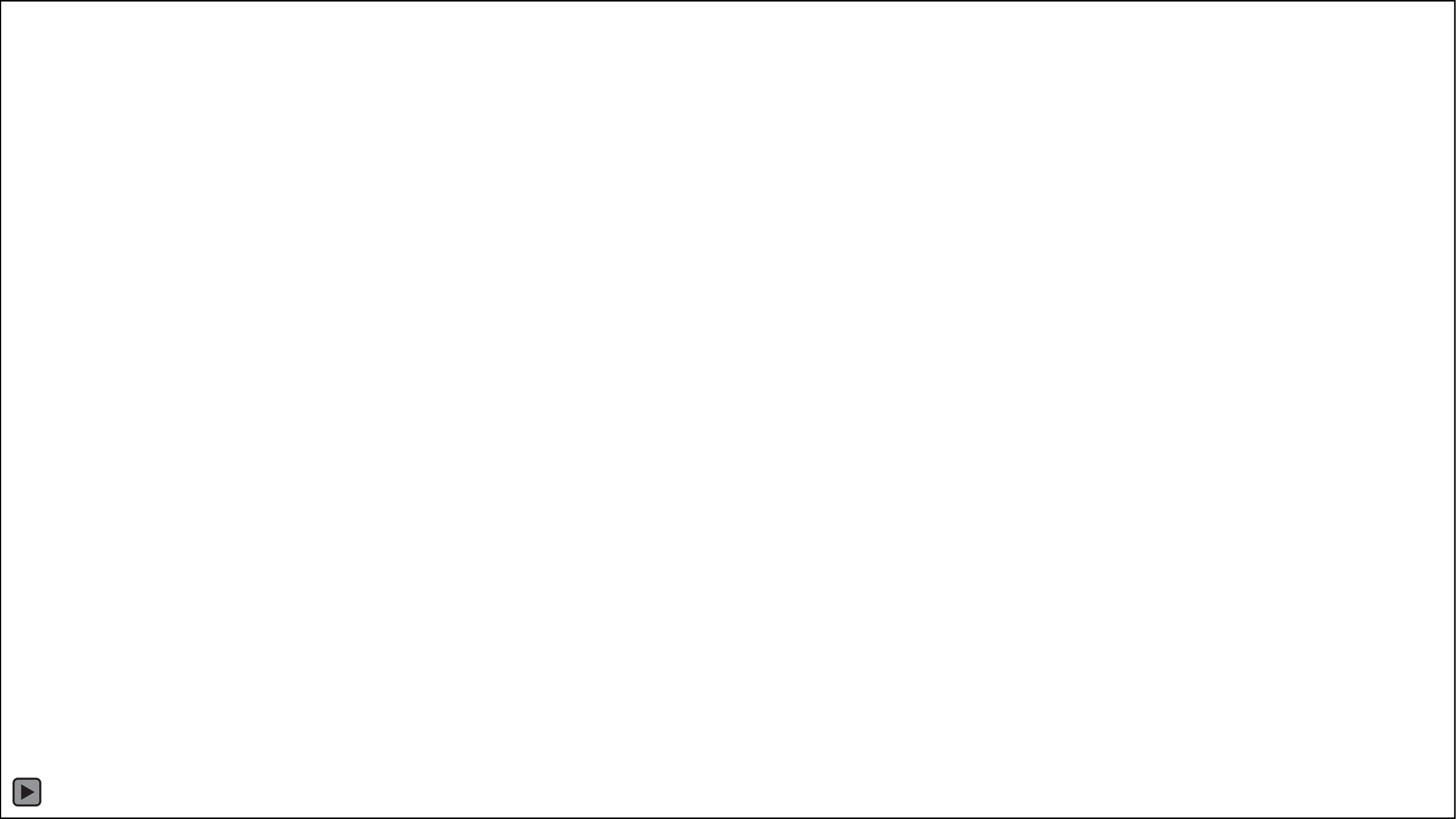
# WV Flood Tool + AI Potential


Add predictive  
overlays for 10-year or  
50-year events

Real-time simulation  
and alerting possible







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# What AI Can't Do (Yet)

Does not predict dam/levee failures or  
underground drainage collapse

Still requires expert validation

A solid purple circle located at the bottom-right edge of the white circle, partially overlapping the orange background.

# Explainability and Trust

Complex models = difficult to interpret

Use NIST AI RMF for transparent AI practices

Link: <https://www.nist.gov/itl/ai-risk-management-framework>

# Resource Constraints



AI requires data, compute, skills

Use cloud platforms like Google Earth Engine

Link:  
<https://earthengine.google.com/>



# Ethical and Equity Considerations

Ensure rural and vulnerable communities are not excluded

AI should be used transparently and inclusively





# Summary of Use Cases

- Google Flood Forecasting
- NeuralFlood risk mapping
- Urban flash flood AI
- WV Flood Tool enhancements



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# Key Takeaways

AI is already being used effectively worldwide

WV is well-positioned to take advantage

Let's lead in AI-enhanced flood resilience



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