Verisk's Commercial Lines Program Initiatives: Emerging Issues and Predictive Models from ISO and AIR

CAS Ratemaking and Product Management Seminar
March 15, 2016

Verisk Analytics | ISO

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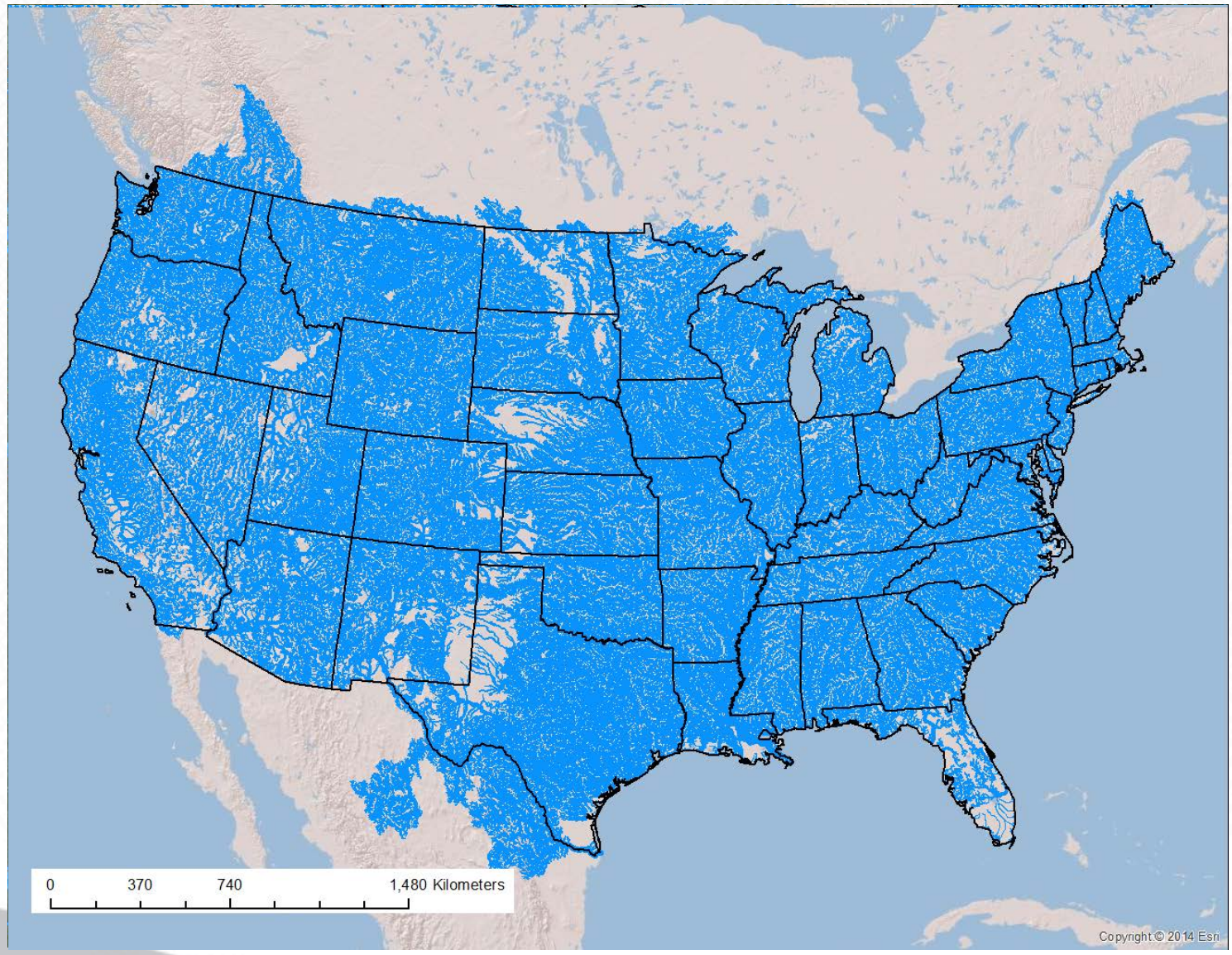
Agenda

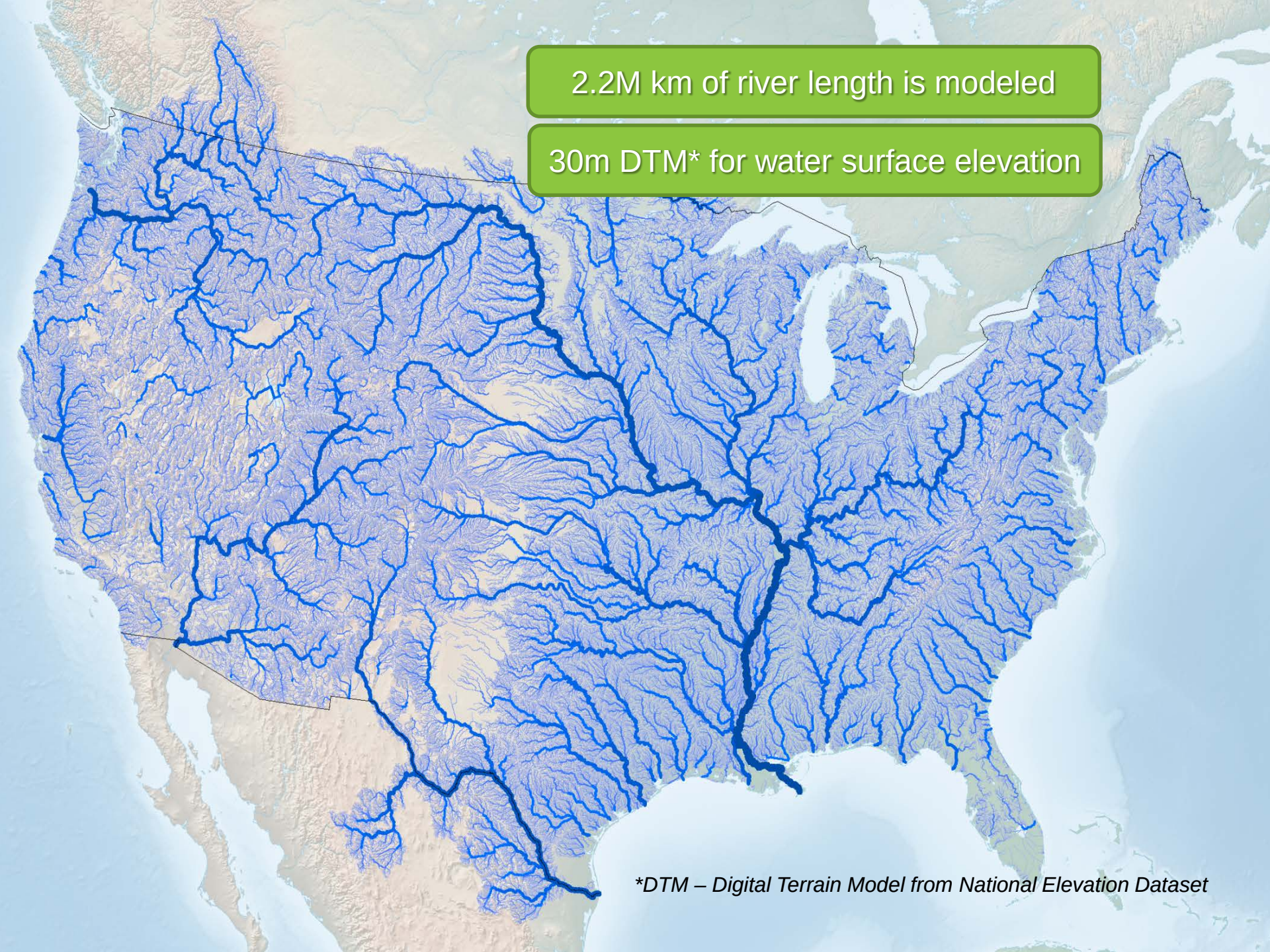
- Private Market Commercial Flood
- Optional Commercial Auto Class Plan
- Drones
- Professional Liability
- Cyber

US Flood Model

AIR

A Model That Is Robust at Multiple Scales Is Necessary for Developing Accurate Views of Risk




2.2M km of river length is modeled
30m DTM* for water surface elevation
*DTM – Digital Terrain Model from National Elevation Dataset

A Flood Hazard Model Contains Three Main Components

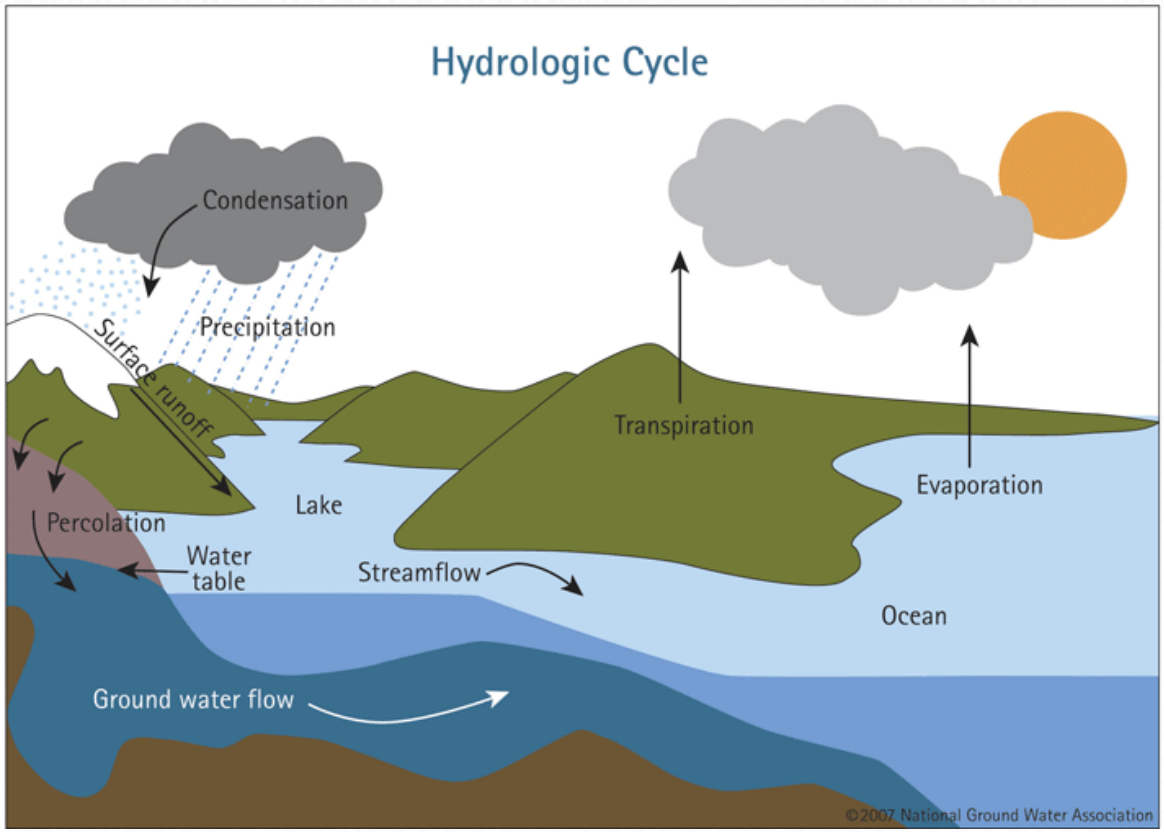


Illustration source: http://www.ngwa.org/Fundamentals/use/PublishingImages/hydrologic_cycle.gif

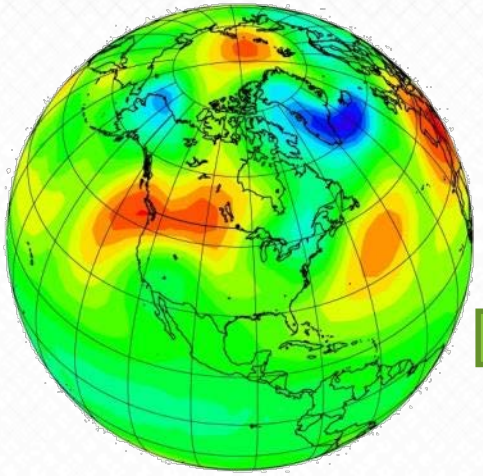
Precipitation

Runoff & Flow

Flood Extent Mapping

Precipitation Is Simulated by Coupling Global Circulation and Numerical Weather Prediction Models

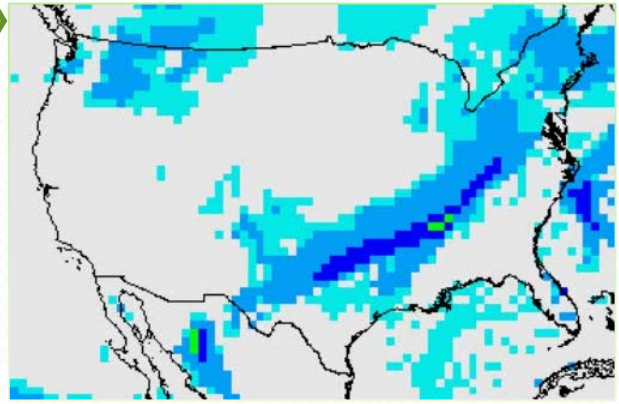
Global Circulation Model



~ 300 km x 300 km

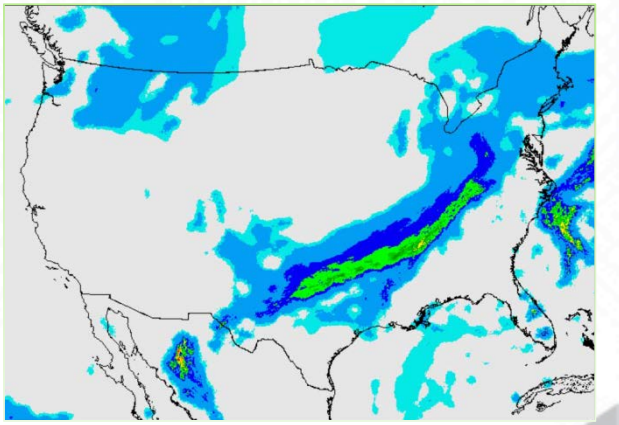
Precipitation pattern is consistent with observed data at multiple scales

Numerical Weather Prediction Model



64 km x 64 km

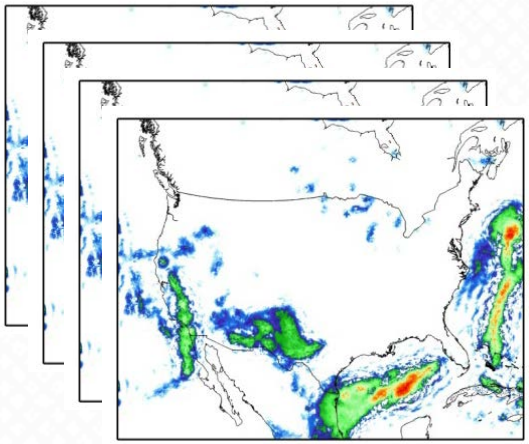
Downscaled



8 km x 8 km

Well Established Approaches Are Used to Transform Precipitation to Flow

Precipitation
i= 1…10,000 years



Runoff & Flow Generation Model

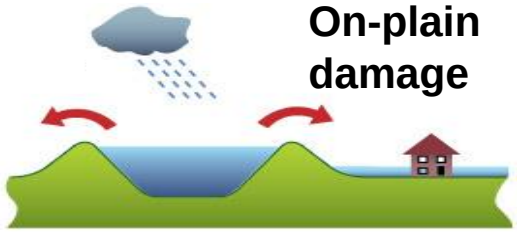
Excess Runoff

Flow

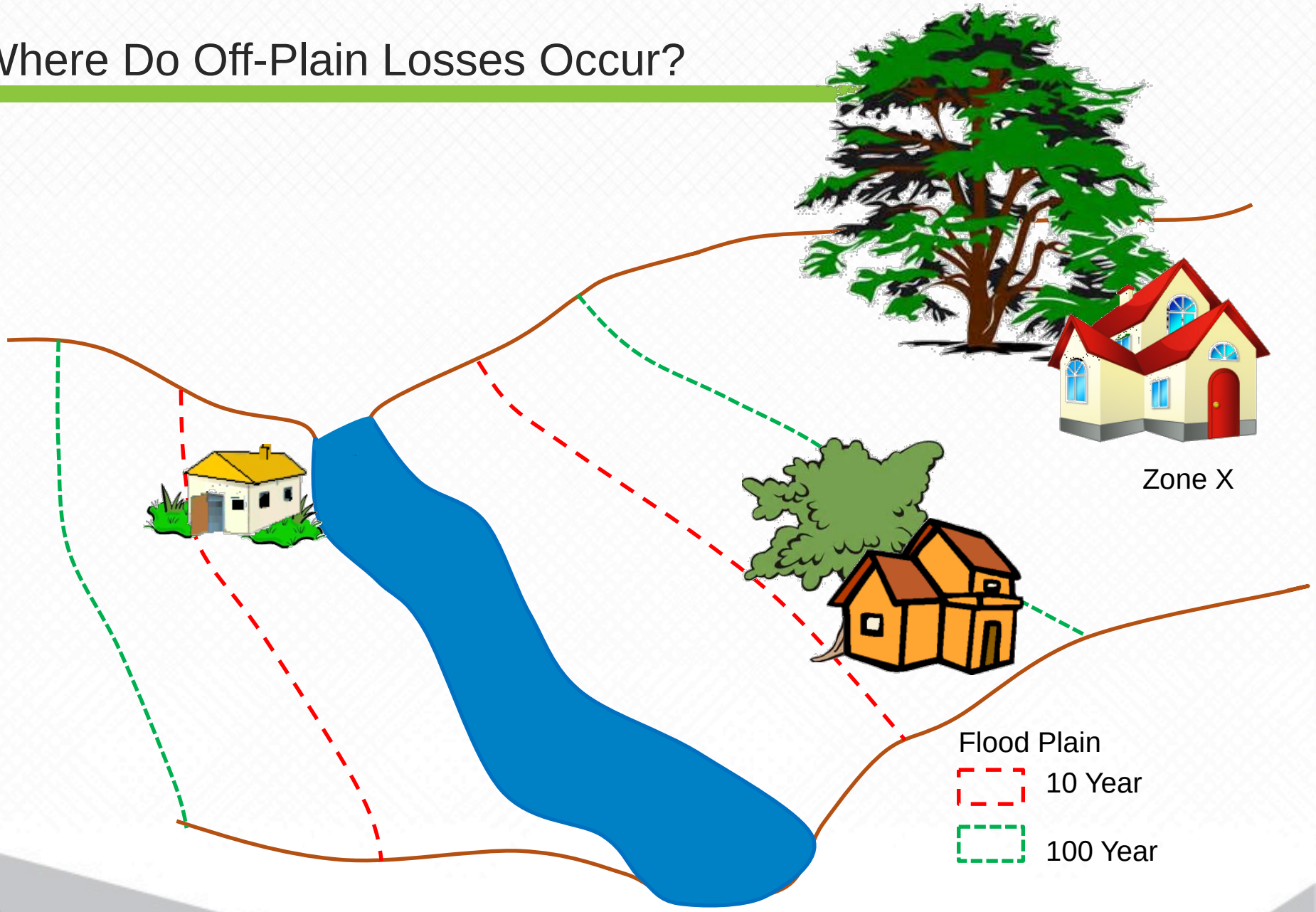
Off-plain damage

Sewers blocked

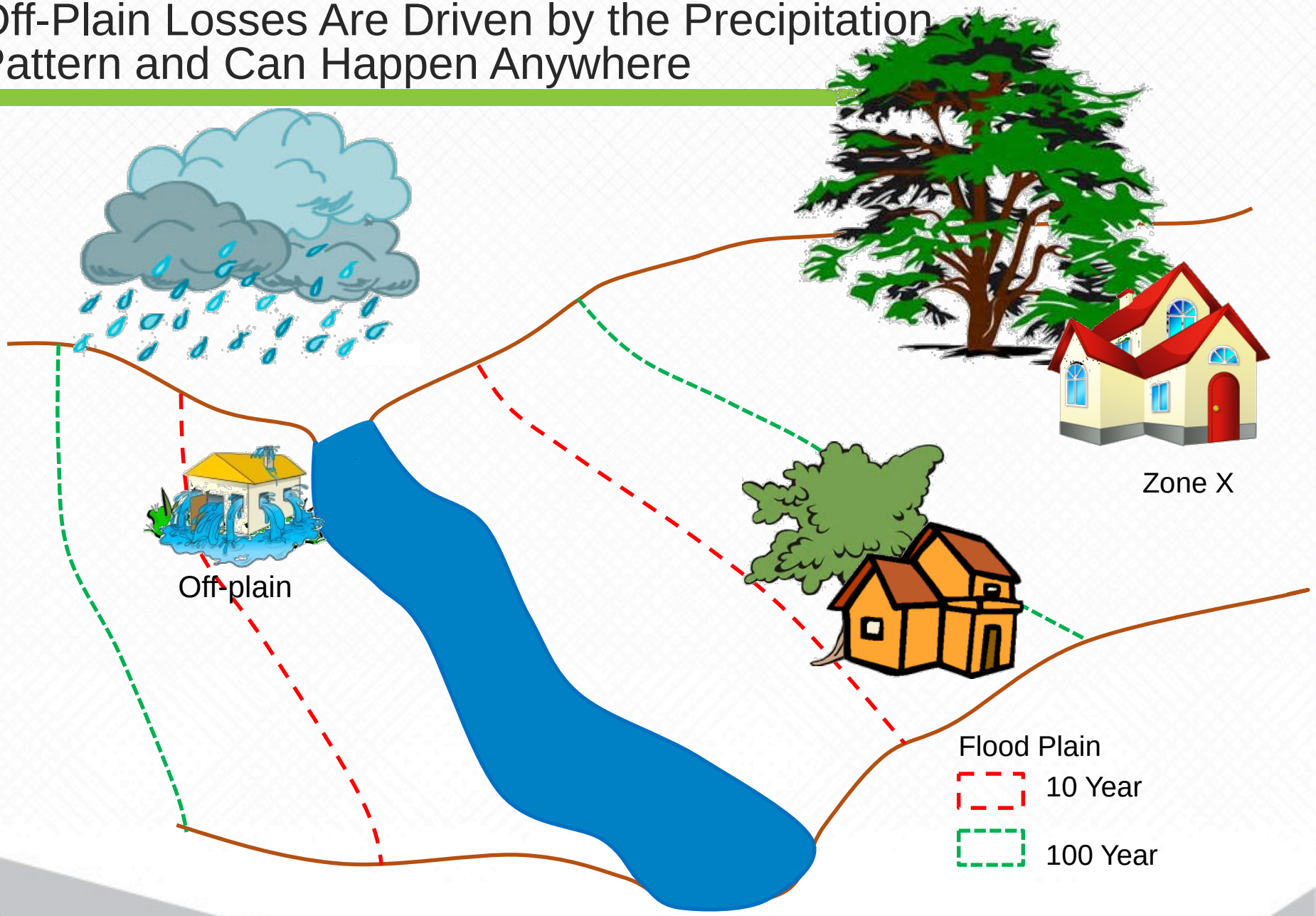
On-plain damage



Where Do Off-Plain Losses Occur?



Off-Plain Losses Are Driven by the Precipitation Pattern and Can Happen Anywhere



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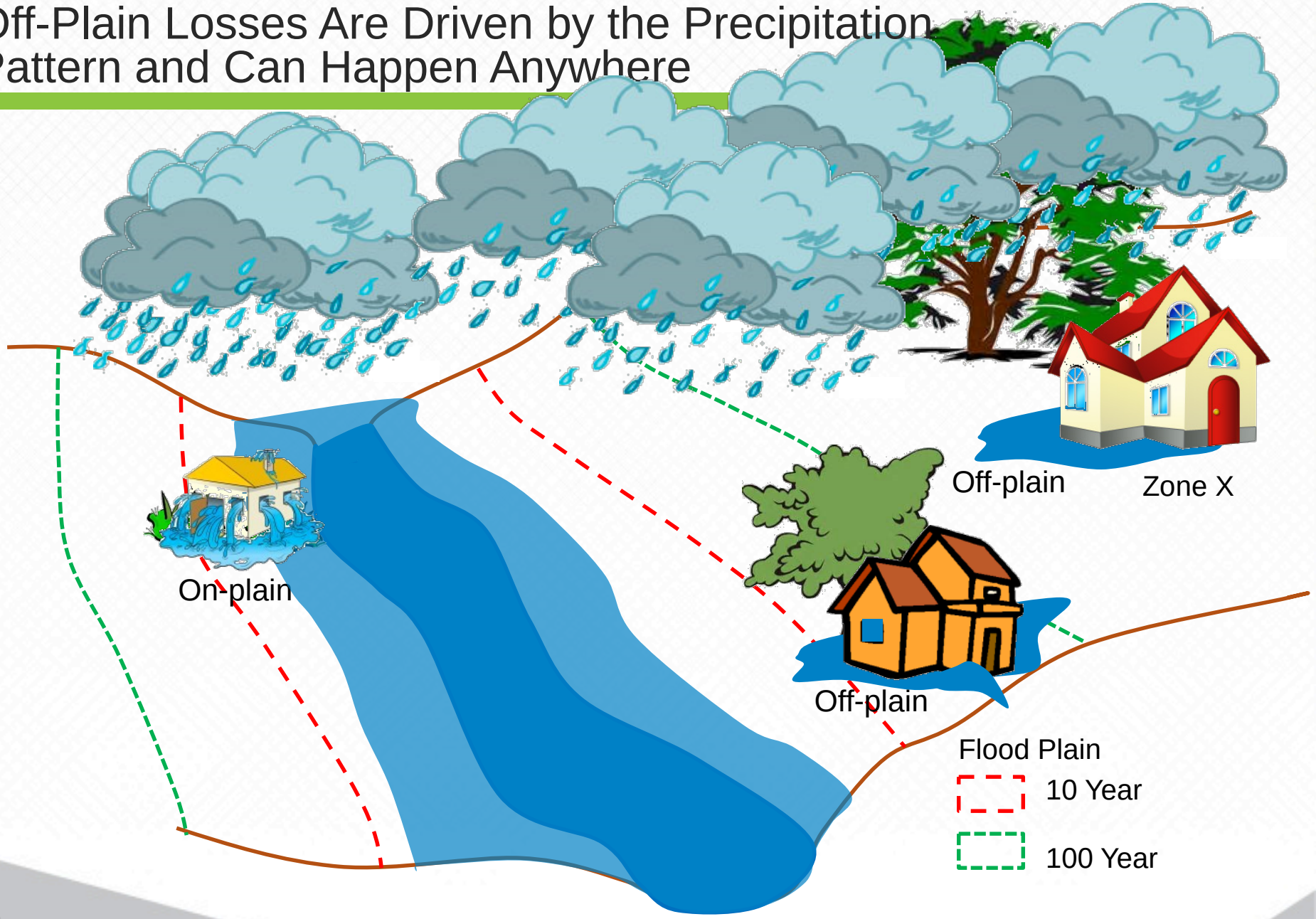
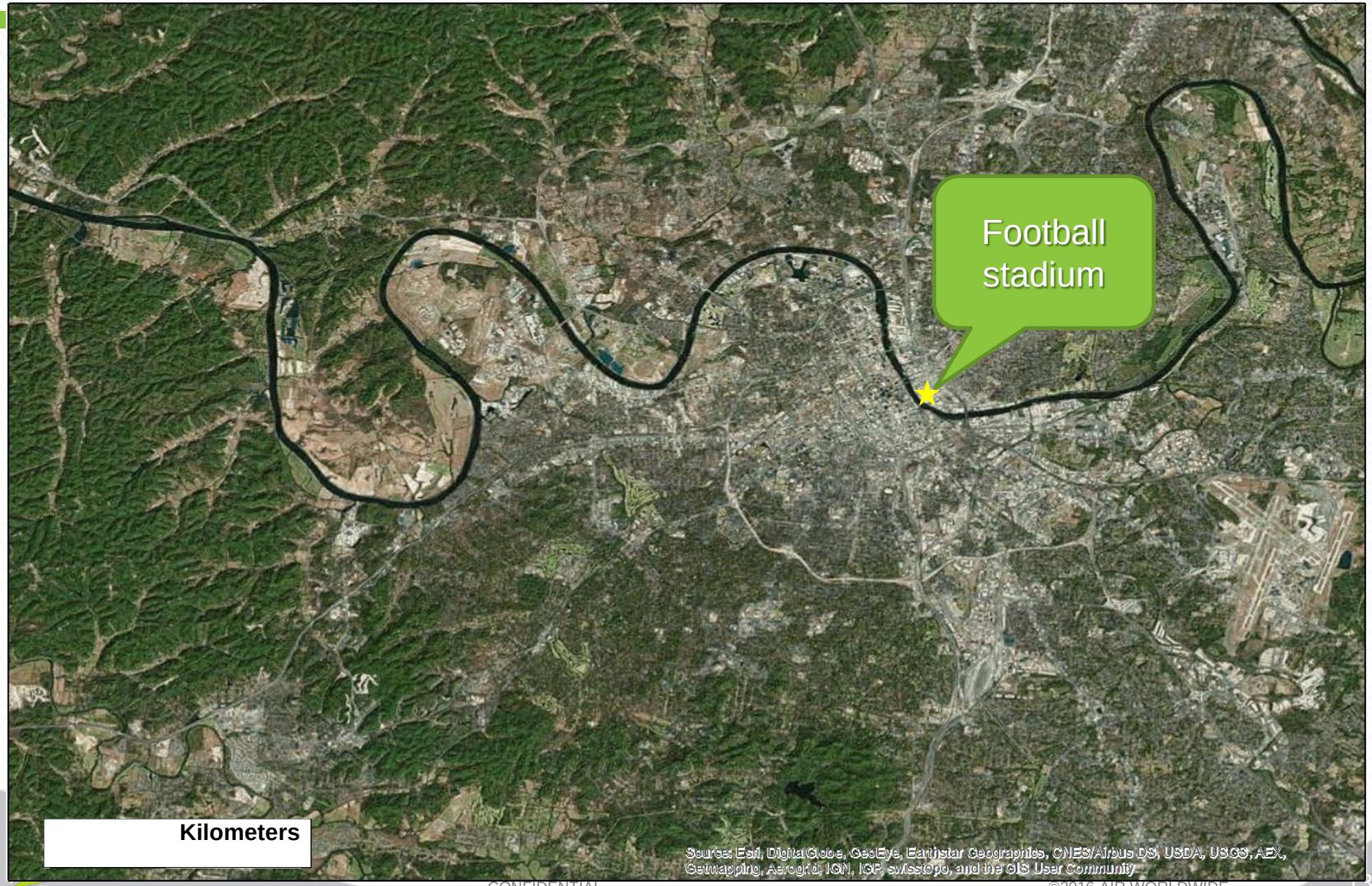


Off-Plain Flood Vulnerability Relates to Excess Runoff and Relative Elevation



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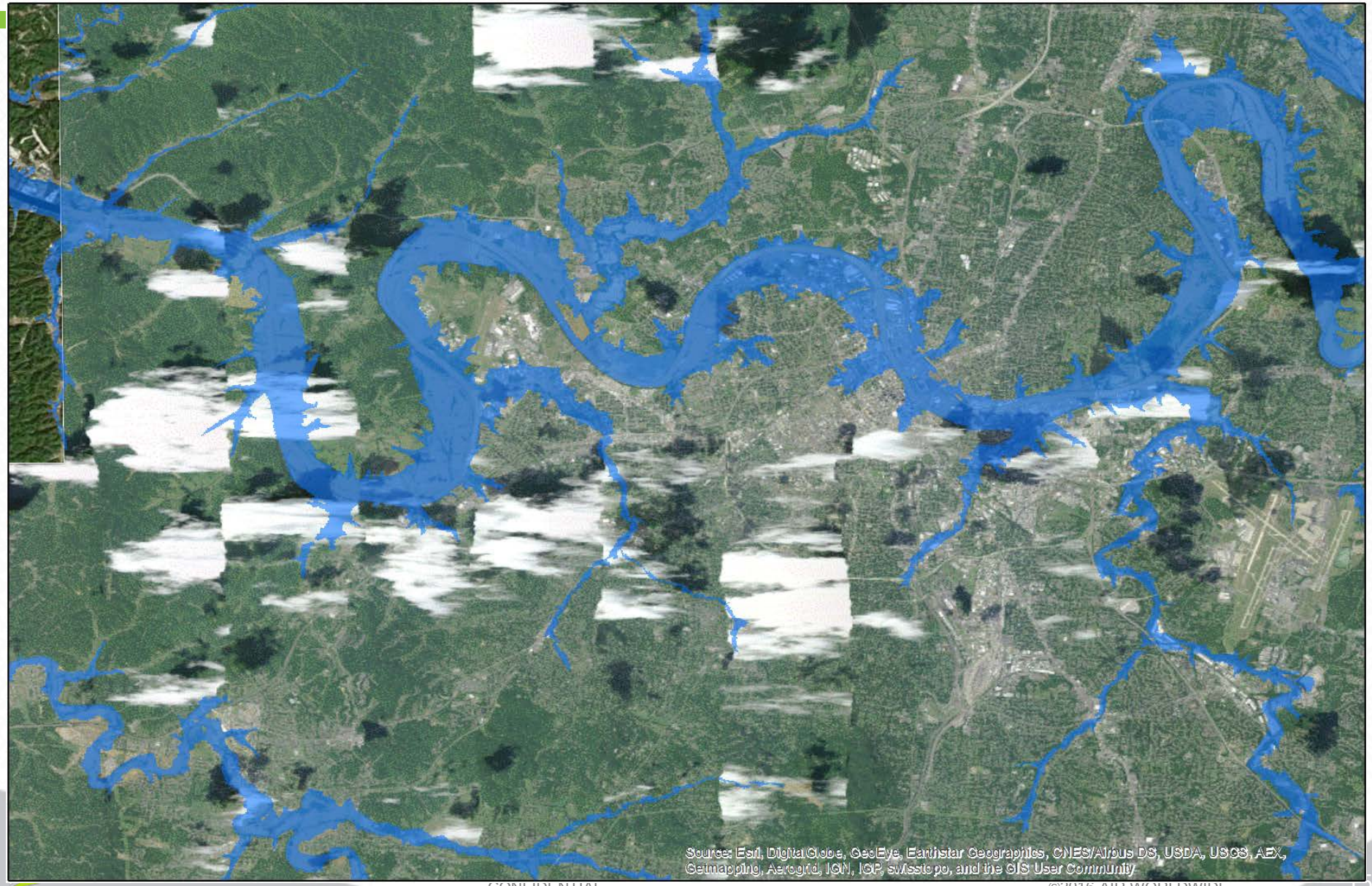

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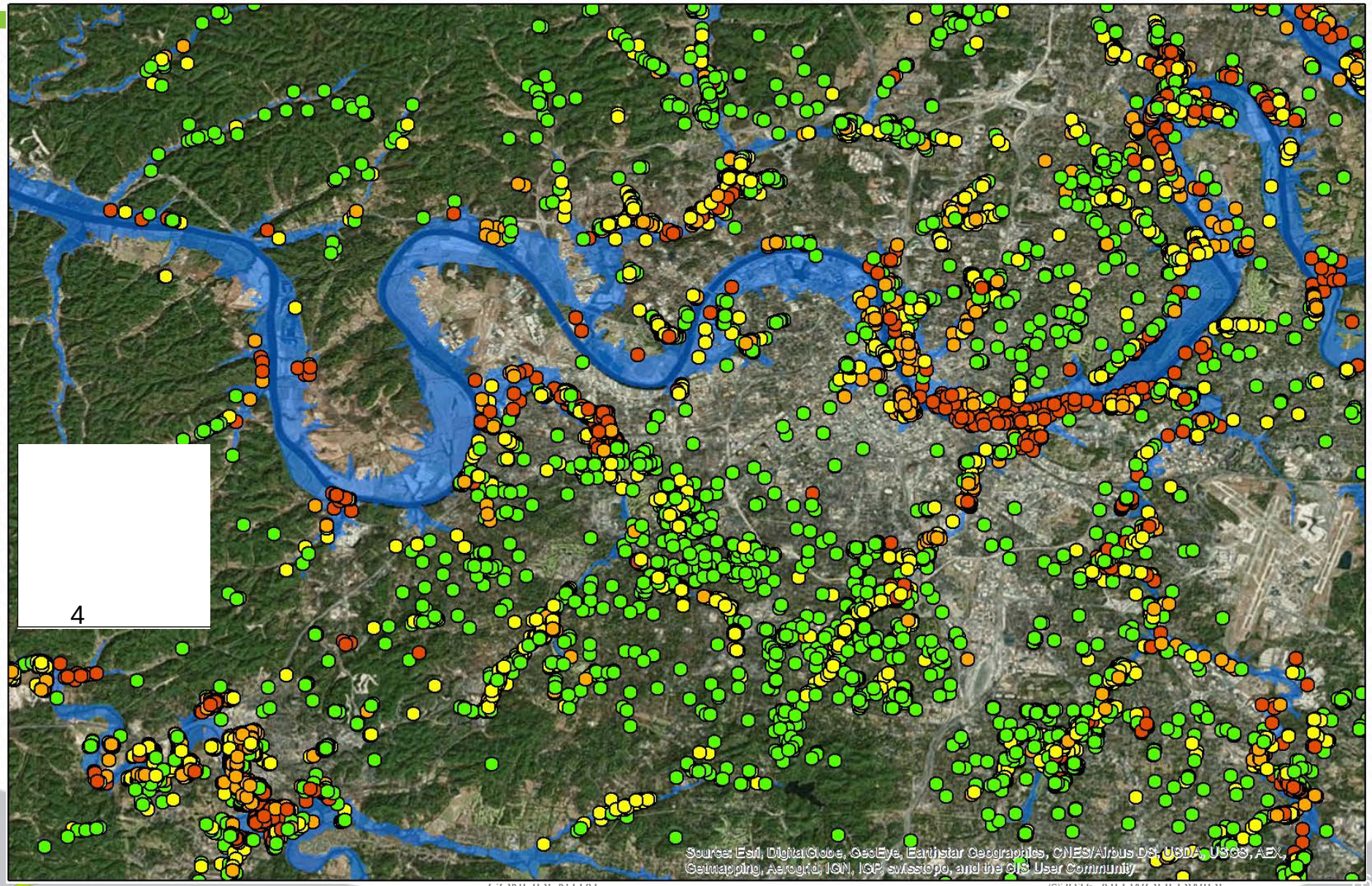

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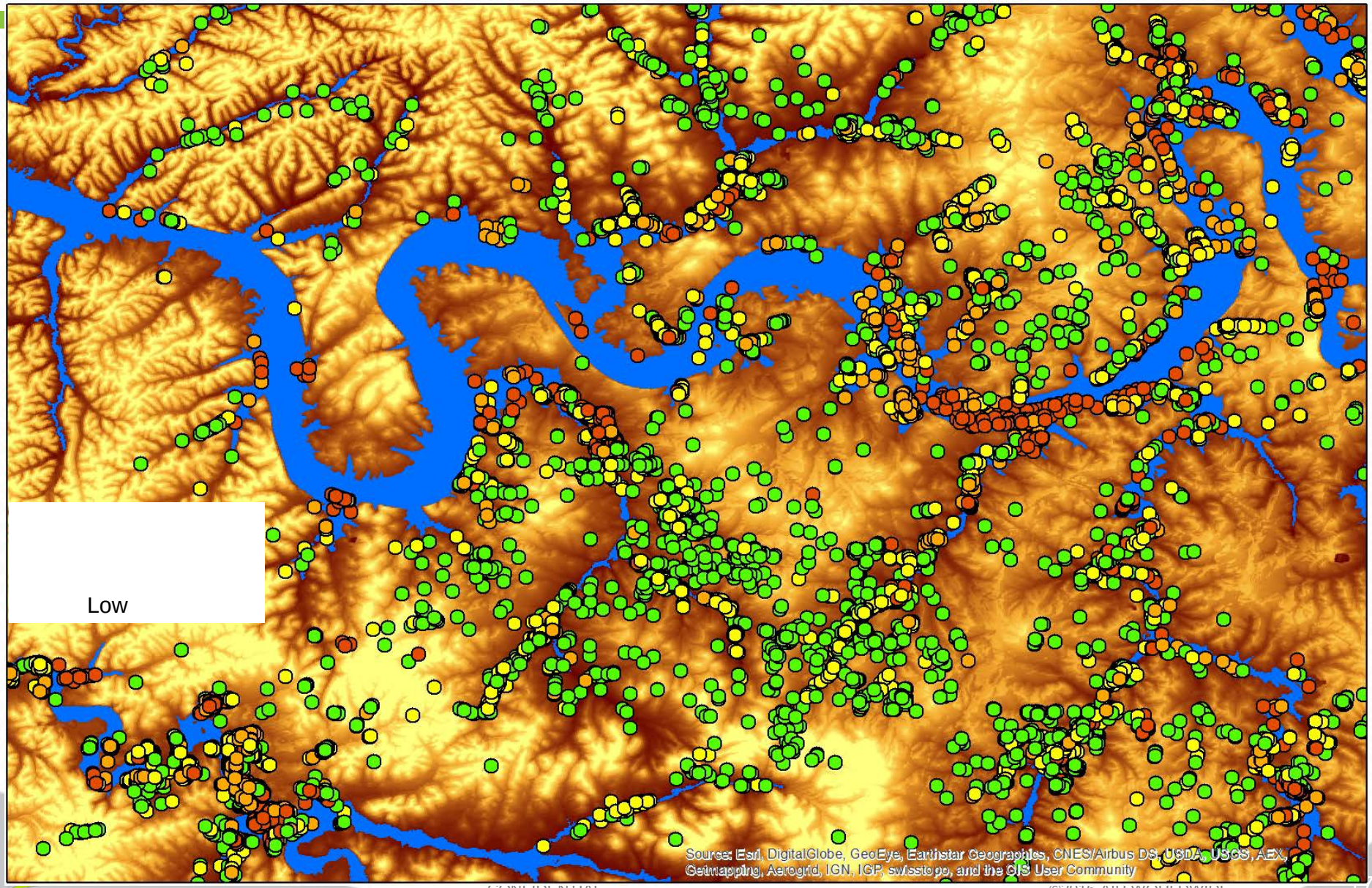
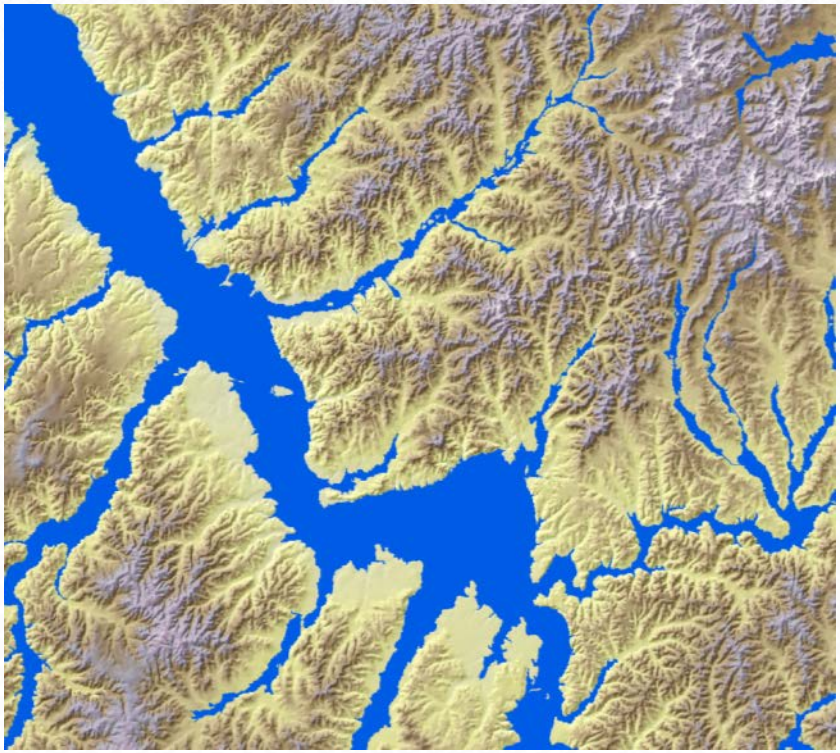
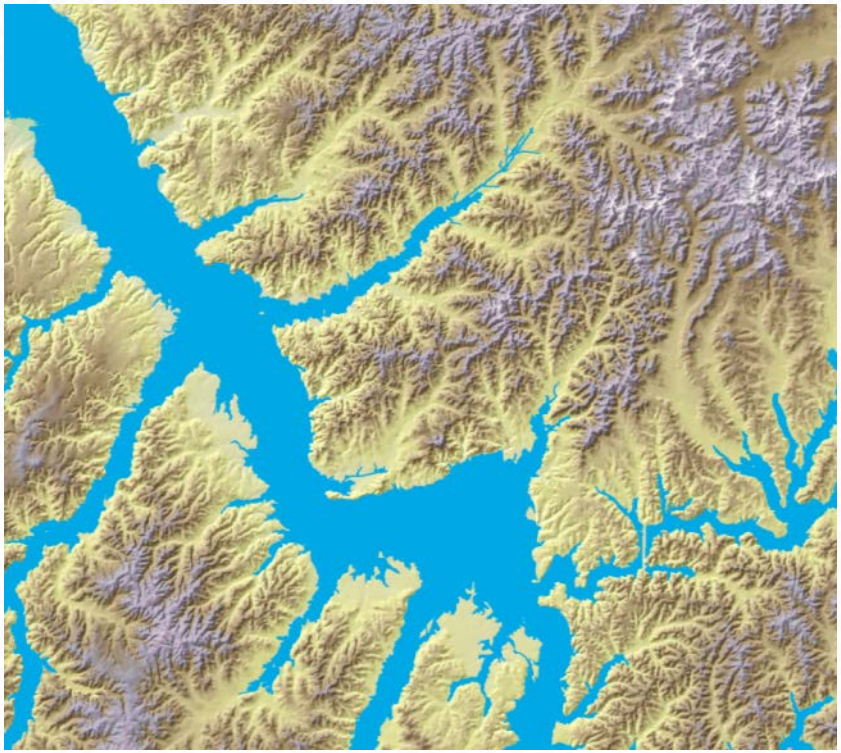


AIR Flood Maps Are Compared with FEMA Flood Extent Maps

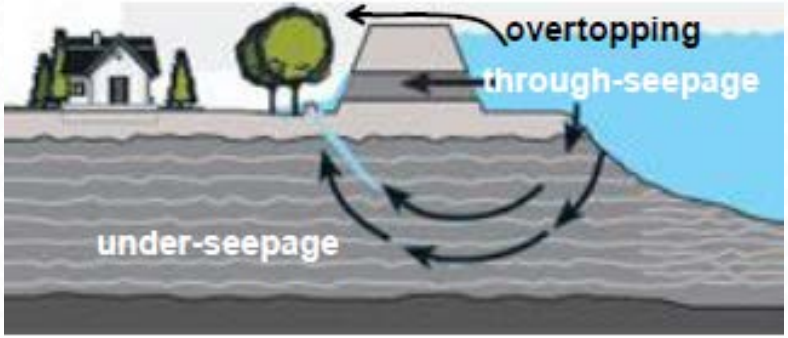


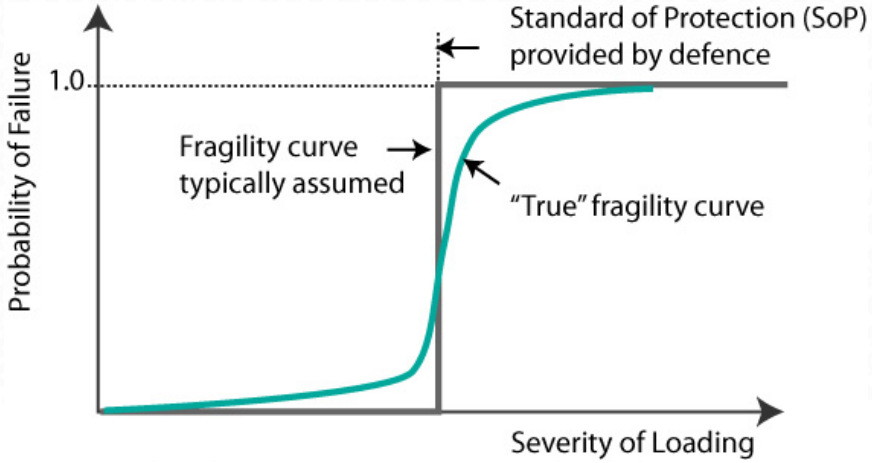
Modeled 100-Year Flood Map
Bolivar, TN



FEMA 100-Year Flood Map
Bolivar, TN

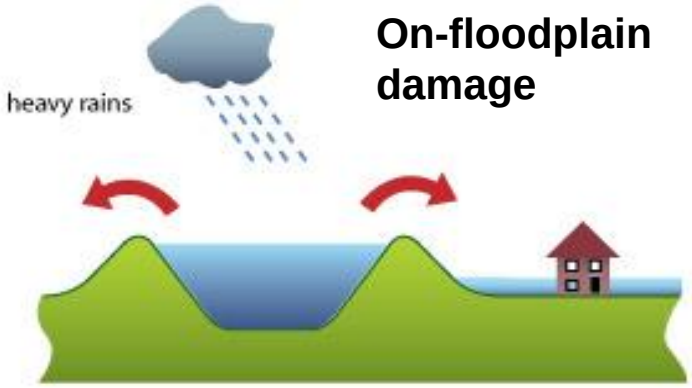
AIR Takes a Probabilistic Approach to Modeling Flood Defenses



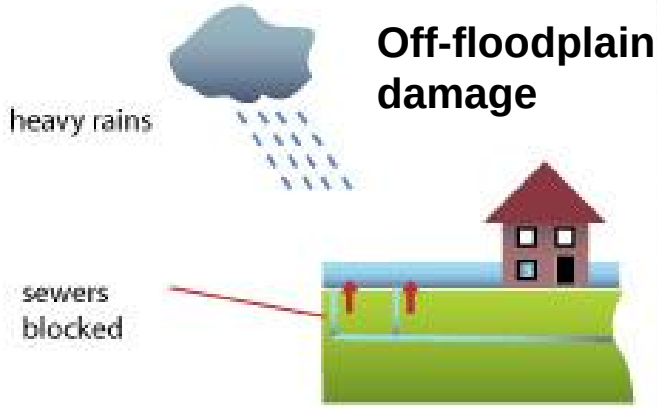


The AIR Inland Flood Model Includes Separate Damage Functions for Modeling On- and Off-Floodplain Losses

On-floodplain damage



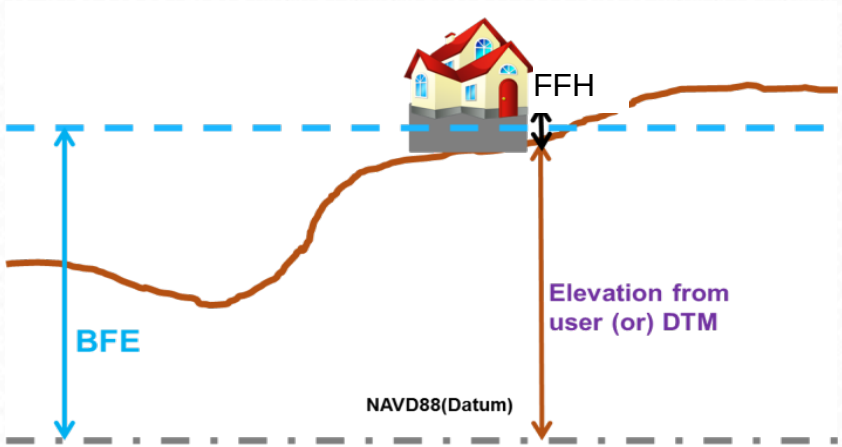
Off-floodplain damage



Primary and Secondary Risk Features Enable Improved Loss Estimates

Primary

- Occupancy, construction, height
- Year-built, location (in case of unknowns)

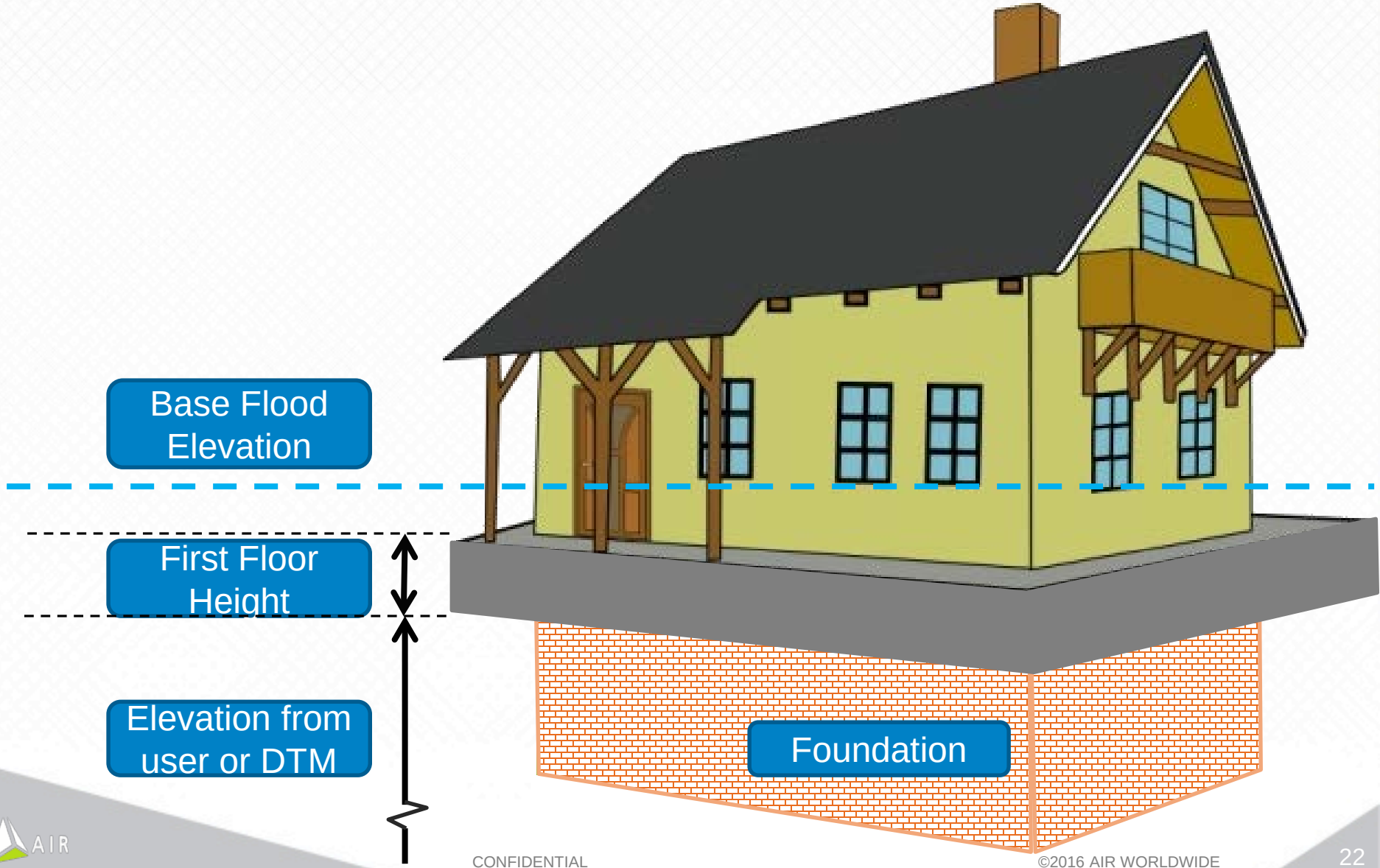


Secondary*

- Foundation type, including basement
- Number of basement levels
- Nature of finish in basements—finished/unfinished
- Height of the first floor in the building and/or BFE
- Service equipment flood-protection level
- Content relative vulnerability level
- Elevation of the local ground surface
- Custom standards of protection

*List is identical to that supported in the new U.S. Hurricane Model for storm surge

Secondary Modifiers Play a Key Role in the Accuracy of Loss Estimates



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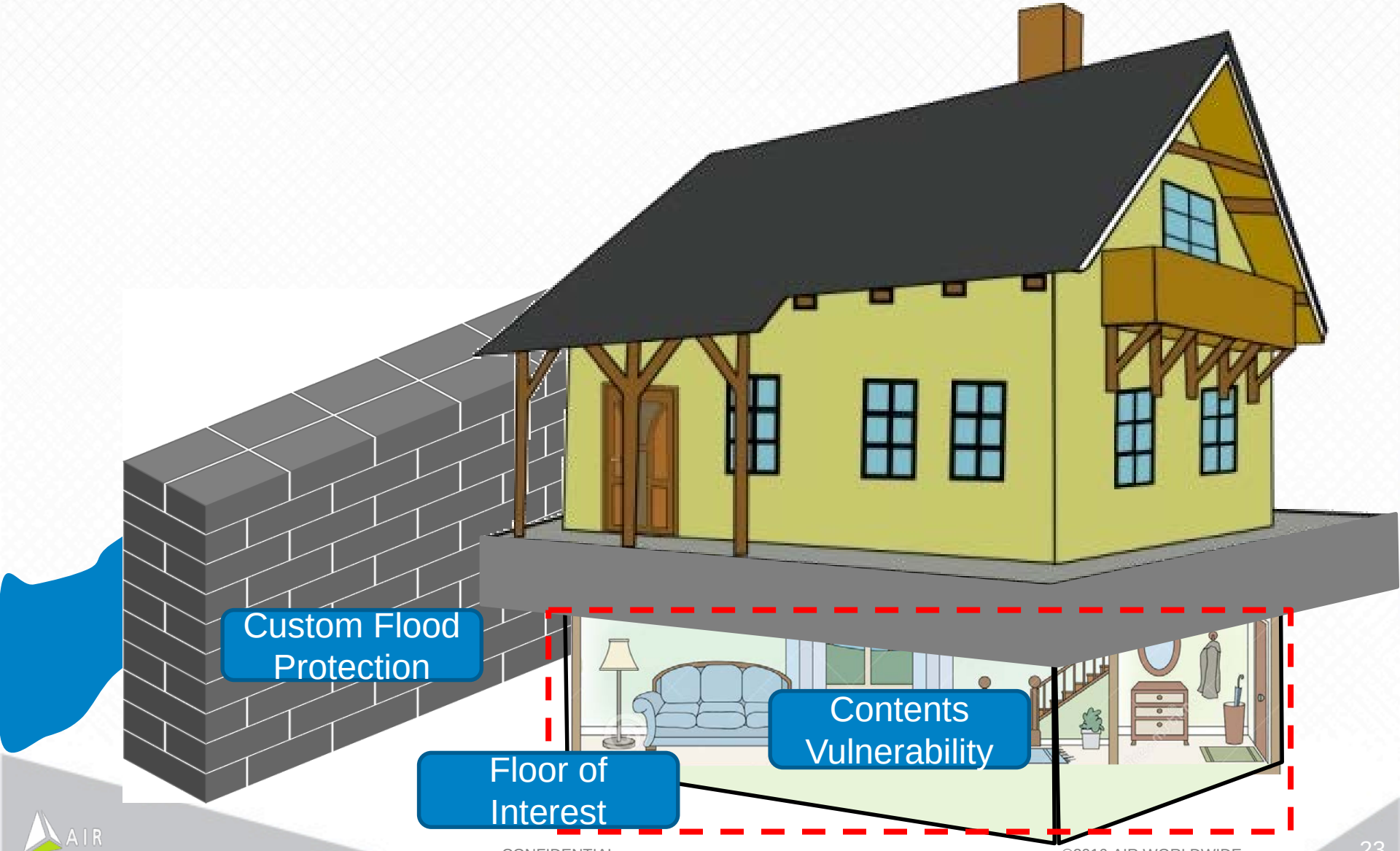
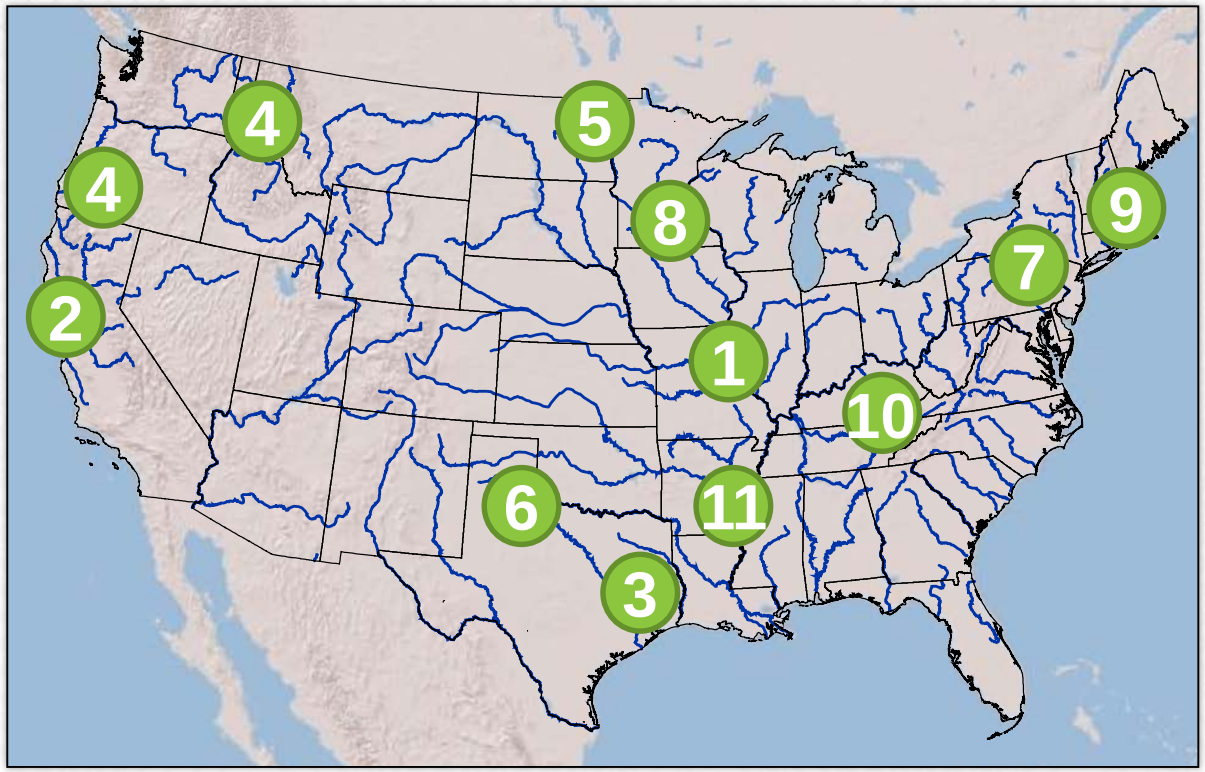
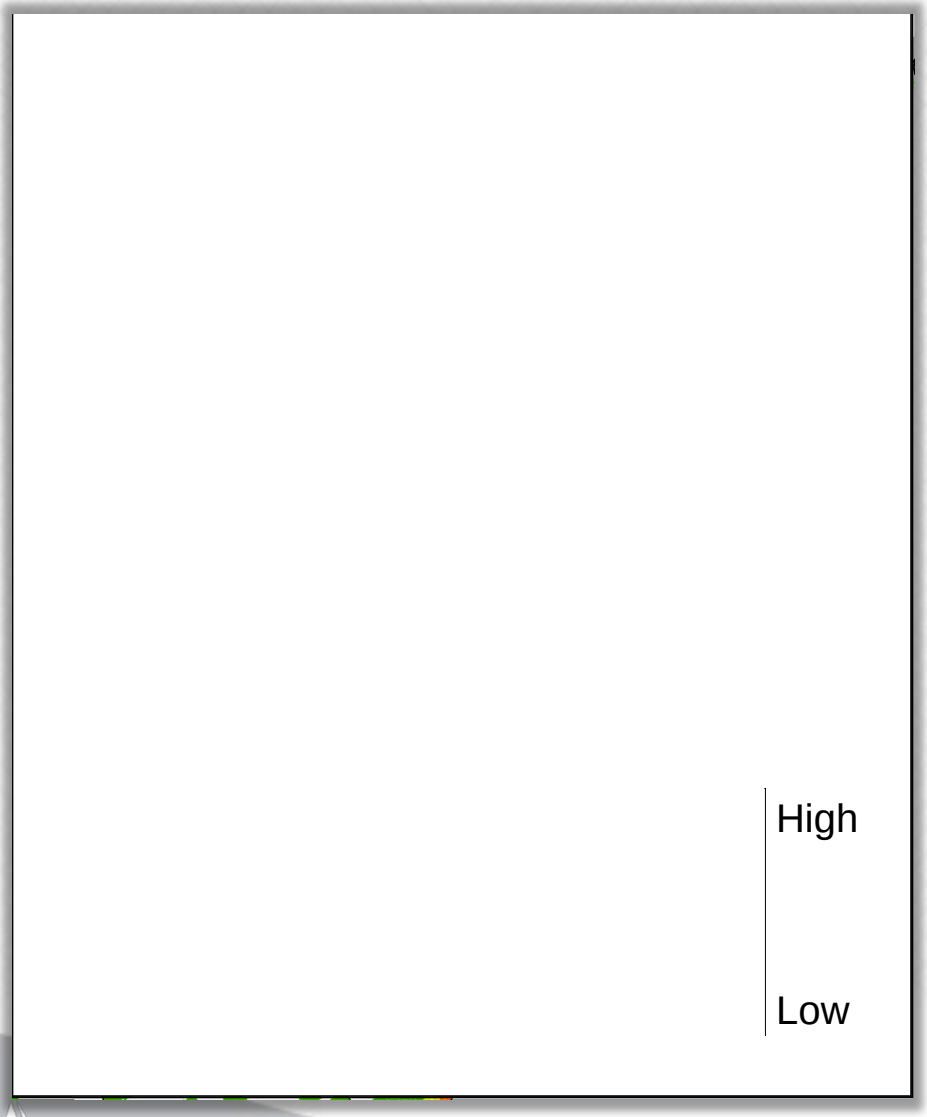


Historical Events Used for Validation



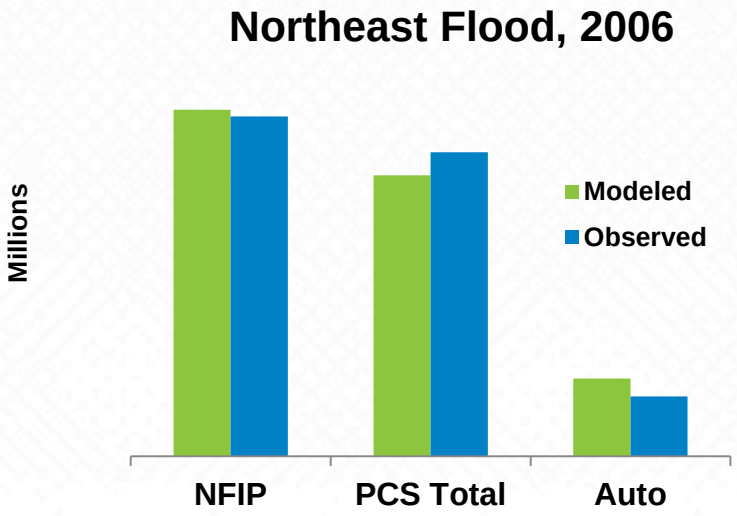
1. The Great Flood, 1993
2. California Flood, 1995
3. Gulf Coast Flooding, 1995
4. Pacific Northwest, 1996-97
5. Red River Flood, 1997
6. Texas Flood, 1998
7. Northeast Flood, 2006
8. Midwest Flooding, 2008
9. Rhode Island Flooding, 2010
10. Tennessee Flooding, 2010
11. Lower Mississippi River, 2011

Industry Exposure Database (IED) Enables AIR to Validate the Model at the Industry Level

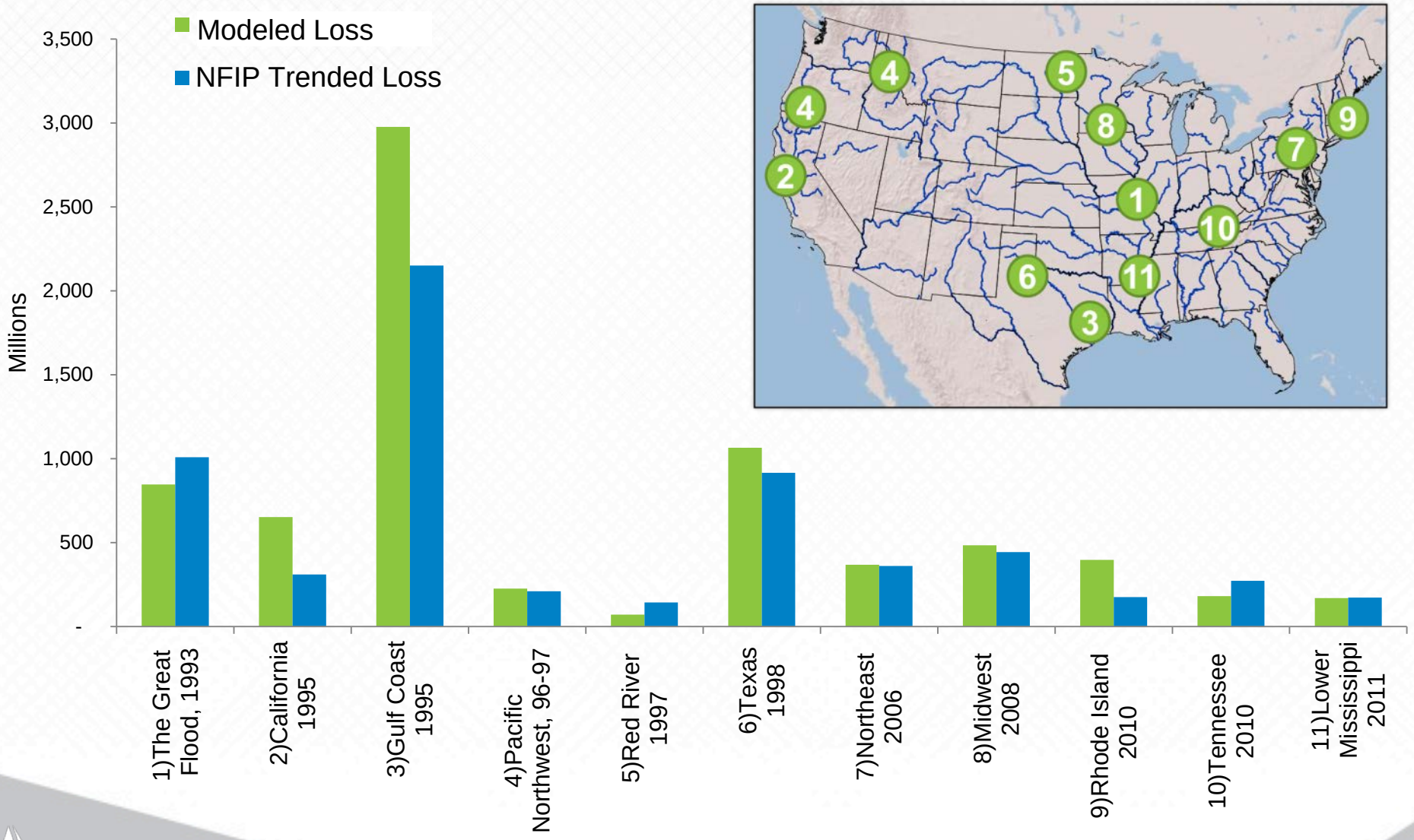


Data sources

- NFIP insured losses
- PCS® insured losses
- National Weather Service economic losses
- Claims data from Xactware®

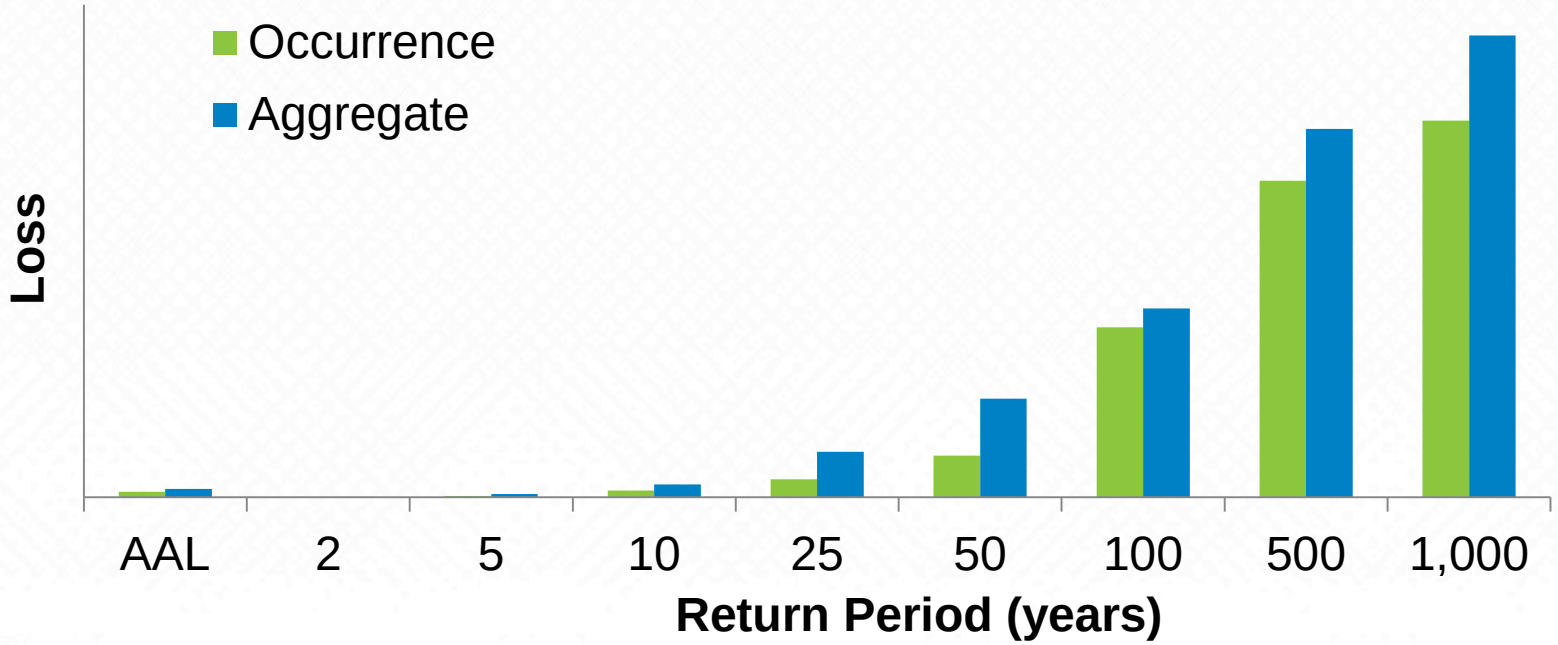


Comparison of Model and Trended NFIP Losses for All Marquee Events

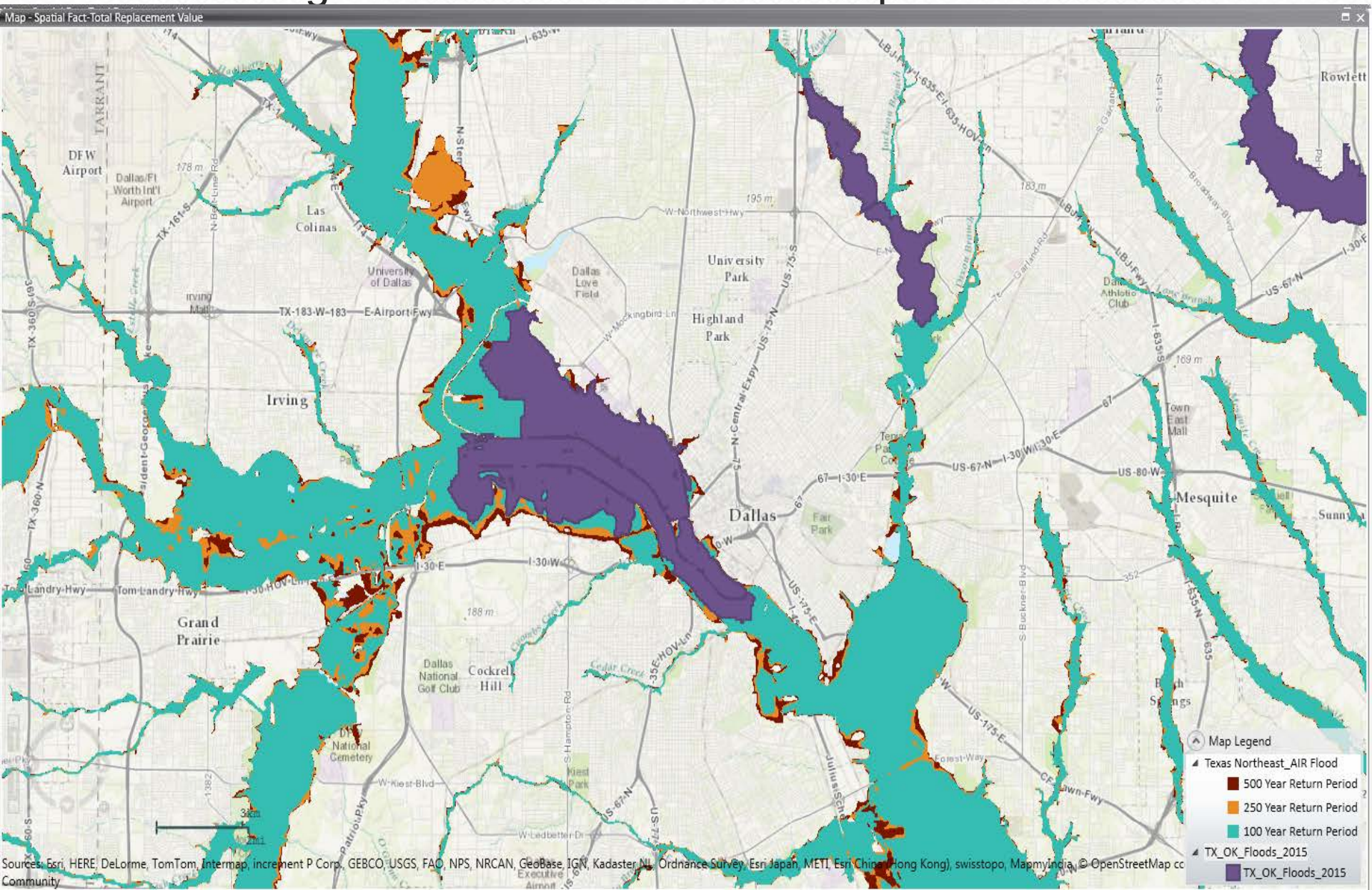


Losses Can Be Aggregated with Other Perils

- Produces full distribution of loss on your portfolio
- Quantifies tail risk, determines AAL
- Solves issue of combining “flood scores” with probabilistic modeling



Accumulate Against AIR Flood Hazard Maps



Advantages of the AIR U.S. Inland Flood Model

- Obtain absolute loss, not just binary or relative risk
- Differentiate between multiple risks
- AIR's flood maps offer a consistent and complete national view
- Simulation method gives you the advantage:
  - Account for correlations between locations in flood scenarios
  - Aggregate losses with hurricane, earthquake, and other perils
  - Apply insurance terms accurately

Commercial Lines Private Flood Insurance – ISO Solutions

Private Flood Insurance – Commercial Lines

- **ISO currently makes available commercial lines flood endorsements**
- **These endorsements may be used in three ways:**
  - Primary
  - Excess of NFIP
  - Wrap-Around (Difference in Conditions)
- **Refer-to-company rating subject to regulatory requirements**
- **Rating information under development**

Private Flood Insurance – Commercial Lines

Source of Data:

- **AIR model will be key component of loss cost development**
- **ISO statistical data from use of ISO endorsements**
  - Approx. $800 million in premium reported
  - Loss data heavily influenced by Sandy
- **FEMA data**

Optional Commercial Auto Class Plan

Scope

The Optional Class Plan provides different loss costs for the following:

- **Vehicles**
  - Trucks, Tractors, and Trailers (but not zone-rated)
  - Private Passenger Types
- **Coverages**
  - Combined Single Limit Liability
  - Collision
  - Comprehensive

Predictive Modeling

- Generalized Linear Models
- Continuous Treatment of Numeric variables
- Extensive Co-validation

Class Plan Key Results

- **Updated mostly multiplicative rating algorithm**
- **Introduction of new variables**
- **Further refinement of existing variables**
  - Additional segmentation of variable itself
  - Varying the factors by coverage in more places
- **Provided as an optional rating rule**

New Variables

- **NAICs Code**
  - Industry classification
  - Hierarchical six-digit structure
  - Allows additional differentiation in rating by type of business

- **Original Cost New (OCN) and Vehicle Age**
  - Current – reflected for physical damage
  - Optional plan – reflected for both physical damage and liability

Further Refinement of Existing Variables

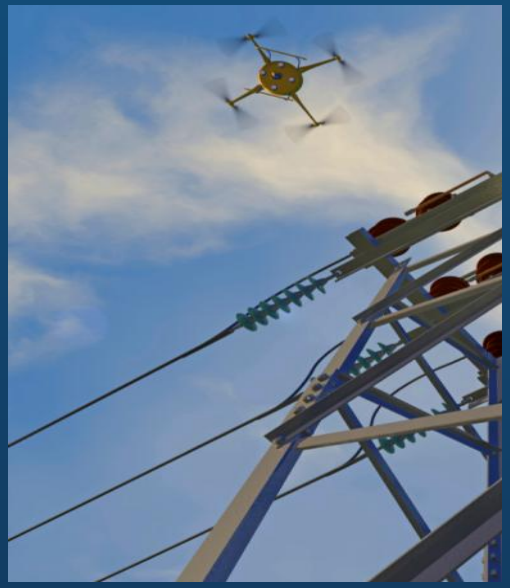
- Allow the primary and secondary factors to differ in more places for liability, comprehensive, and collision
- Expand size of fleet buckets from current fleet and non-fleet categories to include additional groupings
- Expand number of OCN ranges
- Expand number of Age ranges
- Trailers vs. Trucks

Timing and Mechanics

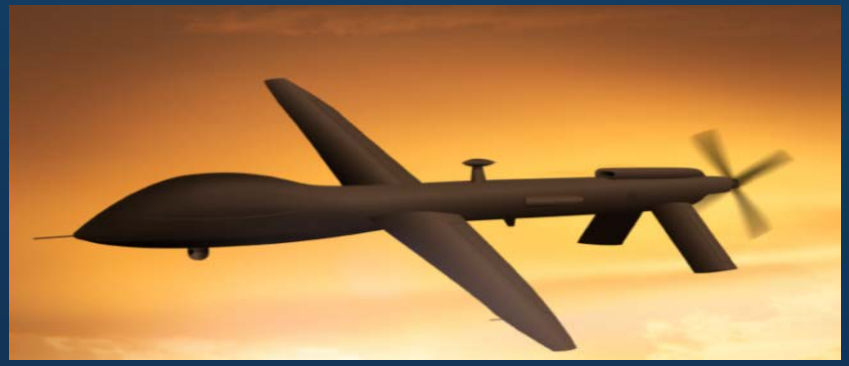
- **<u>Optional</u> rating rule**
  - Filing Began in October 2015
  - Companies choosing to use this rule need to determine their own effective date and are responsible to independently notify regulatory authorities, as appropriate

- **Longer Term:**
  - Optional rating rule replaces current rating rule in ISO Commercial Auto Program
    - Will not occur prior to 2020

Drones – The Short Story



Regulatory/Applications



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FAA Modernization And Reform Act

- Creation and publication of a five-year Roadmap to support safe and efficient UAS operations
- Section 333 Exemption process
- Proposed rules for commercial use published February 2015
  - In part, limit flights to daylight and visual-line-of-sight operations
- Recreational Use

Review of Approved Exemptions (Section 333)

- Key findings[1]
  - 247 unique platforms
  - 90% are **rotary wing**
  - All (but one) **weigh less than 55 lbs**
  - Nearly all rely on **electrical propulsion**
  - Median endurance of **25 minutes**

1 Association for Unmanned Vehicle Systems International (AUSVI) reviewed the first 1,000 approved FAA Section 333 exemptions
Source: http://auvsilink.org/advocacy/Section333.html

Top 10 Industries Using UAS via Exemption

Industry / Operation	# of Exemptions
Aerial photography	512
Real estate	350
Aerial survey	301
Aerial inspection	242
Agriculture	164
Construction	134
Infrastructure inspection	102
Film and TV	91
Utility inspection	78
Environmental	61

Source: AUVSI, The First 1,000 Commercial UAS Exemptions, September 2015

Drone Rating Considerations

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Drone Rating Considerations

- **Limited Data on Non-military Drone Losses**
- **Crashes**
  - Bodily Injury
  - Property Damage
  - Will all crashes yield one or the other -- or both?

Drone Rating Considerations (Cont'd)

- **Location**
  - Rural
  - Urban
  - Weather

- **Drone Characteristics**
  - Size
  - Capabilities and Operations (photography, spraying, payload capabilities)

- **Operator**
  - Experience
  - Training

ISO Drone Options

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ISO Drones Options

- **Liability endorsements implemented 6/1/2015**
  - 3 exclusionary endorsements
  - 3 limited coverage endorsements
- **Commercial Lines Property currently planned timeframes**
  - Commercial Inland Marine to be released Q1 2016
  - Commercial Property and Capital Assets to be filed in Q2 2016
  - Farm endorsements to be filed Q4 2016
  - Businessowners to be filed during 2016

New ISO Liability Endorsements

- **Optional exclusion endorsements - GL**
  - Coverage A only
  - Coverage B only
  - Coverage A and B
- **Optional coverage endorsements - GL**
  - Coverage A only
  - Coverage B only
  - Coverage A and B
- **Similar options for use with the ISO CU Program**
  - No option for designated aggregate limit

Professional Liability – Other than Medical

Growth of Professional Liability Programs

- **Errors and Omissions coverage generally not provided under other liability policies**
- **Additional Licensed Professions**
- **Tasks Performed by Some Professionals Grow**
  – Increased Potential Exposure to Liability

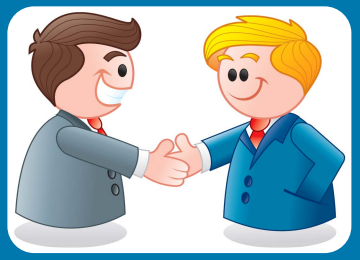
Professional Liability (Other Than Medical) – Current ISO Programs

Lawyers – March 2011

- Defense within limits

Real Estate Agents & Brokers – January 2014

- Defense outside the limits of insurance
- Optional defense within limits available



Insurance Agents & Brokers – May 2014

- Defense outside the limits of insurance
- Optional defense within limits available

Miscellaneous Professional Liability – ISO Activity

- Base Policy
- Class-specific Endorsements
- ~20 Initial Classifications
- Additional Classifications – Ongoing Introduction

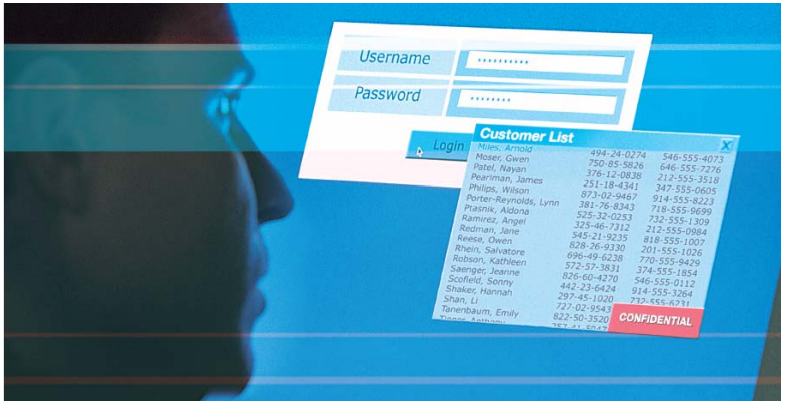
Miscellaneous Professional Liability – Sample Classifications

- Corporate Trainer
- Court Reporter
- Photographic Studios
- Salon Services
- Tour Operators

Cyber

Increased Consumer Awareness

- News reports
- Personal experiences
- Education (Agents | Brokers | Insurers)
- Executive/Board of Directors Priority
- Government activity



Cyber Insurance

- **Insurance coverage approaches**
  - Stand-alone insurance policies
  - Commercial Package Policies
  - Roll-on coverage to existing insurance policies (e.g., Businessowners, D&O, Professional Liability, etc.)
- **Typical coverages and rating approaches**
  - 1st and 3rd Party coverages
  - Revenue/Assets | Number of Records

Cyber Insurance Market Overview

- **Admitted Market vs. Nonadmitted Market**
  - Standard policies | Manuscript policies
- **Cyber insurance – in its infancy, but maturing**
  - Increasing number of carriers are writing cyber insurance
- **Cyber insurance take-up rate**
- **Marketplace capacity**
  - Currently estimated to be $1B – $2B
  - Industry experts project it to grow to $20B by 2025

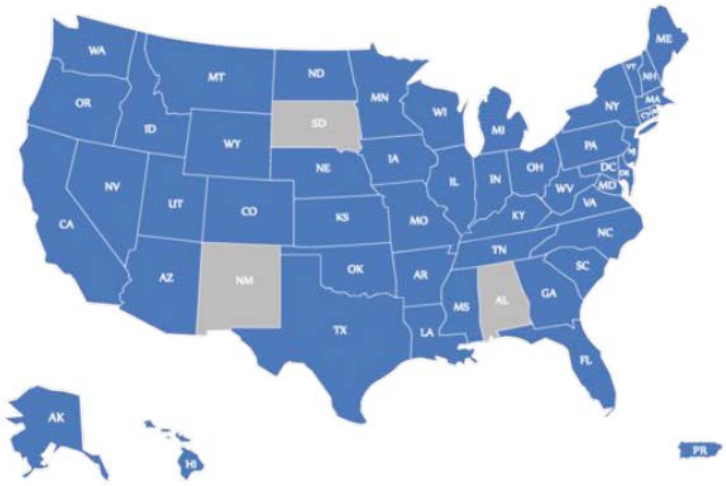
Emerging Cyber Issues

- Cloud Computing
- Medical Devices
- Internet of Things (IoT)
- Autonomous Cars
- Broadening coverage expectations
- Black Hat Hackers – more creative and relentless

Regulatory Landscape

Regulatory Landscape

- **State Laws / Regulations**
  - Data Breach-related and Notification Laws in 47 States, the District of Columbia, Puerto Rico, U.S. Virgin Islands and Guam (as of September 2015)



California was first state (2003).

Today, Alabama, New Mexico and South Dakota are the only states without a current law

U.S. Regulatory Landscape

- **Federal Legislative and Regulatory Initiatives**
  - The Health Insurance Portability and Accountability Act (HIPAA) and Health Information Technology for Economic and Clinical Health (HITECH) Act
  - Graham-Leach-Bliley
  - Efforts to encourage development of Information Sharing and Analysis Organizations (ISAOs)
  - Monitor how Financial institutions manage cyber threats
- **NAIC – Cybersecurity Task Force**

Cyber Data

Cyber Data Considerations

- What is the intended use of the data?
- Who is going to contribute the data?
- How is the data going to be contributed?
- How is the data going to be aggregated?
- How is the raw data going to be turned into useful information?
- What is the desired data?

Cyber Database Examples

Cyber Threat (Live/Occurring) Database

A real-time compendium of known and emerging threats within the cyber realm, including mitigation recommendations and threat analysis (to assist in the mitigation of cyber threats).

Post Incident Database

A compendium of post-cyber incident event details.

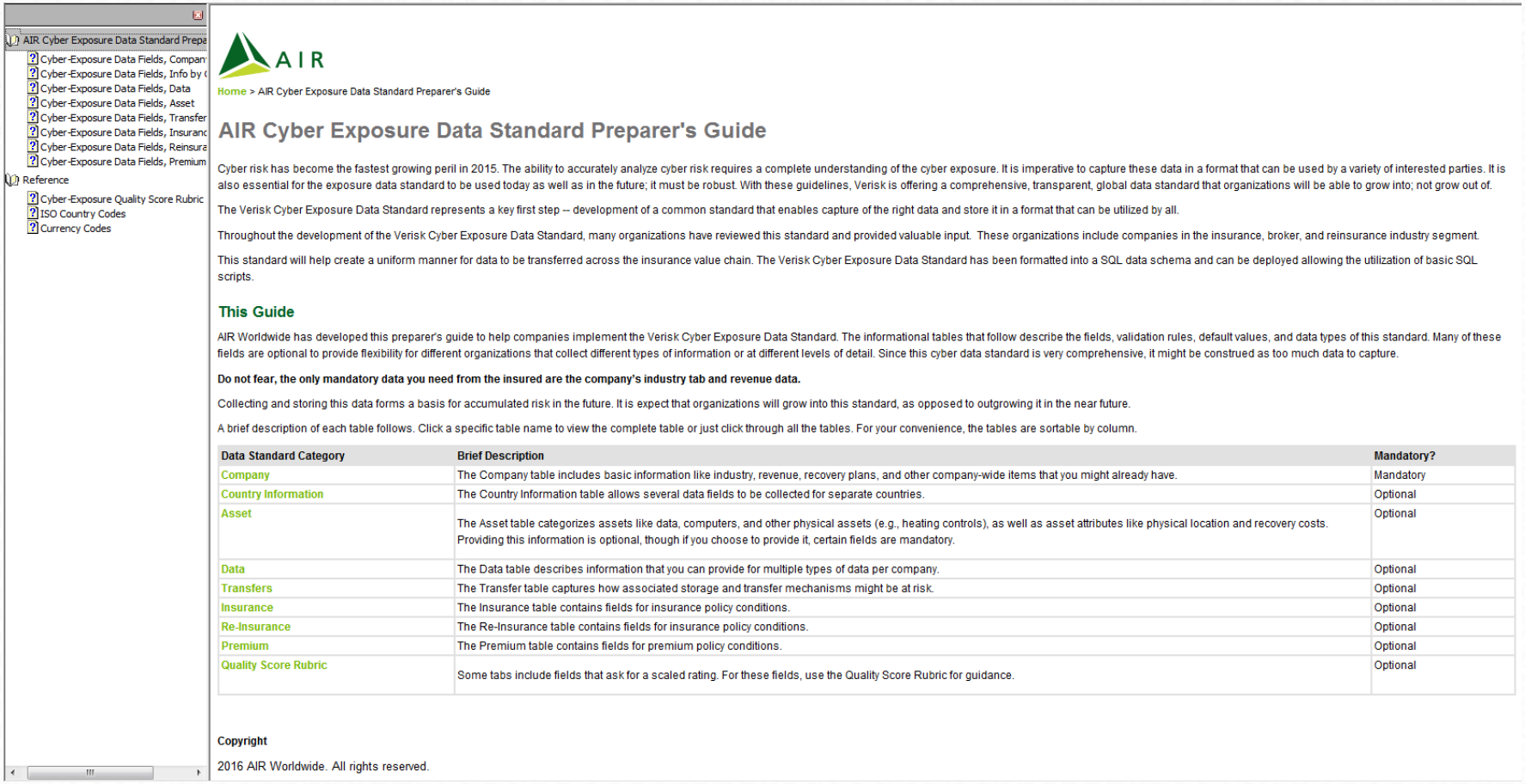
Insurance Claims and Pricing Database

A tool for the centralized reporting of insurance policy, premium and claims information, to assist insurers in underwriting and pricing risk.

Publicly Available Cyber Resources

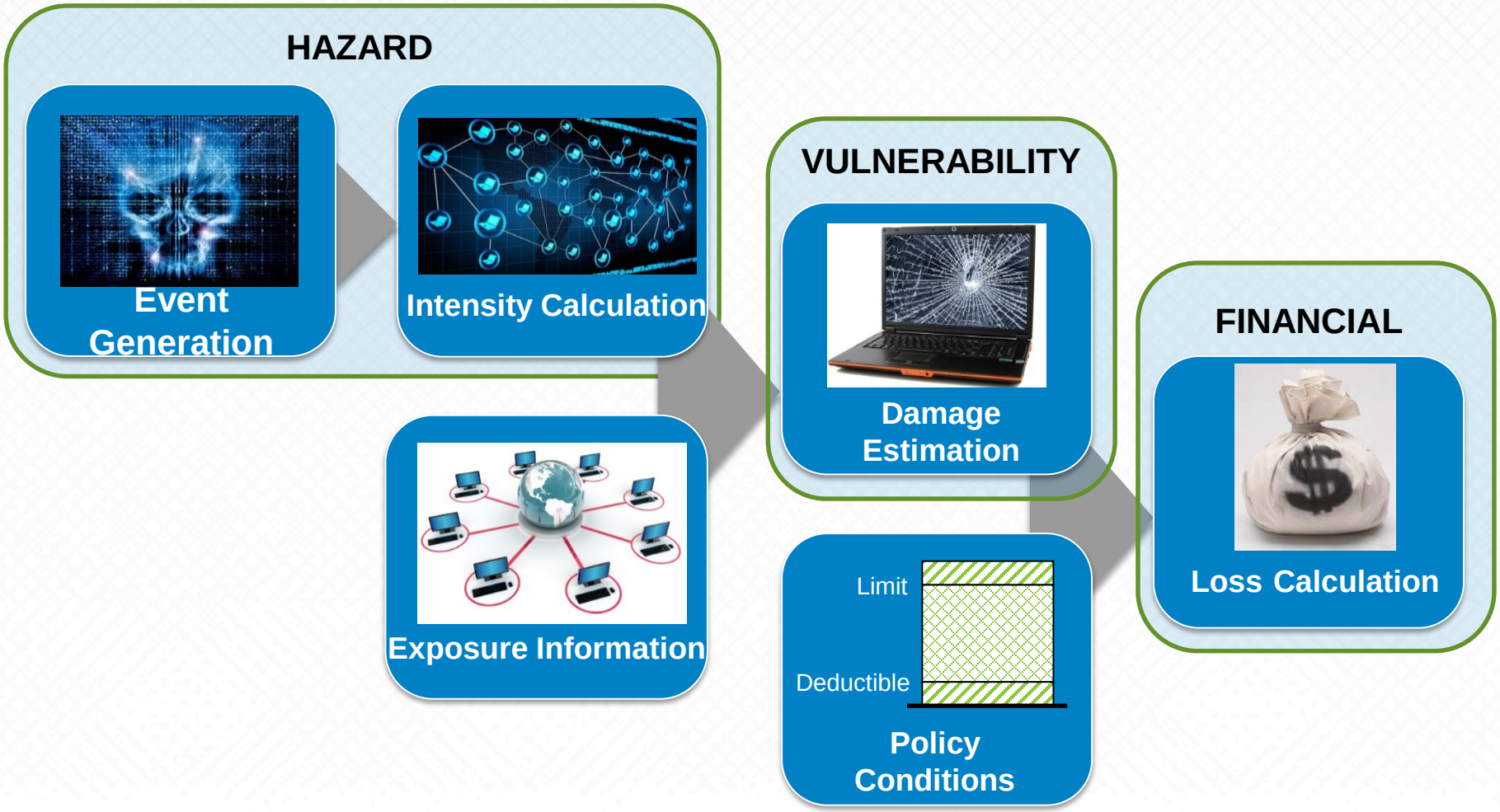
- Betterley Reports (Cyber Risk | Tech E&O | Media Liability)
- Data Loss Data Breach (http://datalossdb.org/)
- Identity Theft Resource Center (http://www.idtheftcenter.org/IN-THE-NEWS/Alerts/)
- Insurance Information Institute (*Cyber Risks: The Growing Threat* [June 2014])
- NetDiligence (*2014 Cyber Claims Study [December 2014] and other studies*)
- Ponemon Institute (May 2015 *Cost of Data Breach Study* | September 2014 *Is Your Company Ready For A Big Data Breach?* Study, and other studies)
- Verizon (April 2015 *Data Breach Investigations Report*)
- ISO Cyber Risk Solutions (http://www.verisk.com/iso/cyber-risk/iso-cyber-risk-solutions.html)
- Industry and cyber-specific conferences

The Verisk Standard Has Been Implemented with an AIR Preparer's Guide



Cyber Model

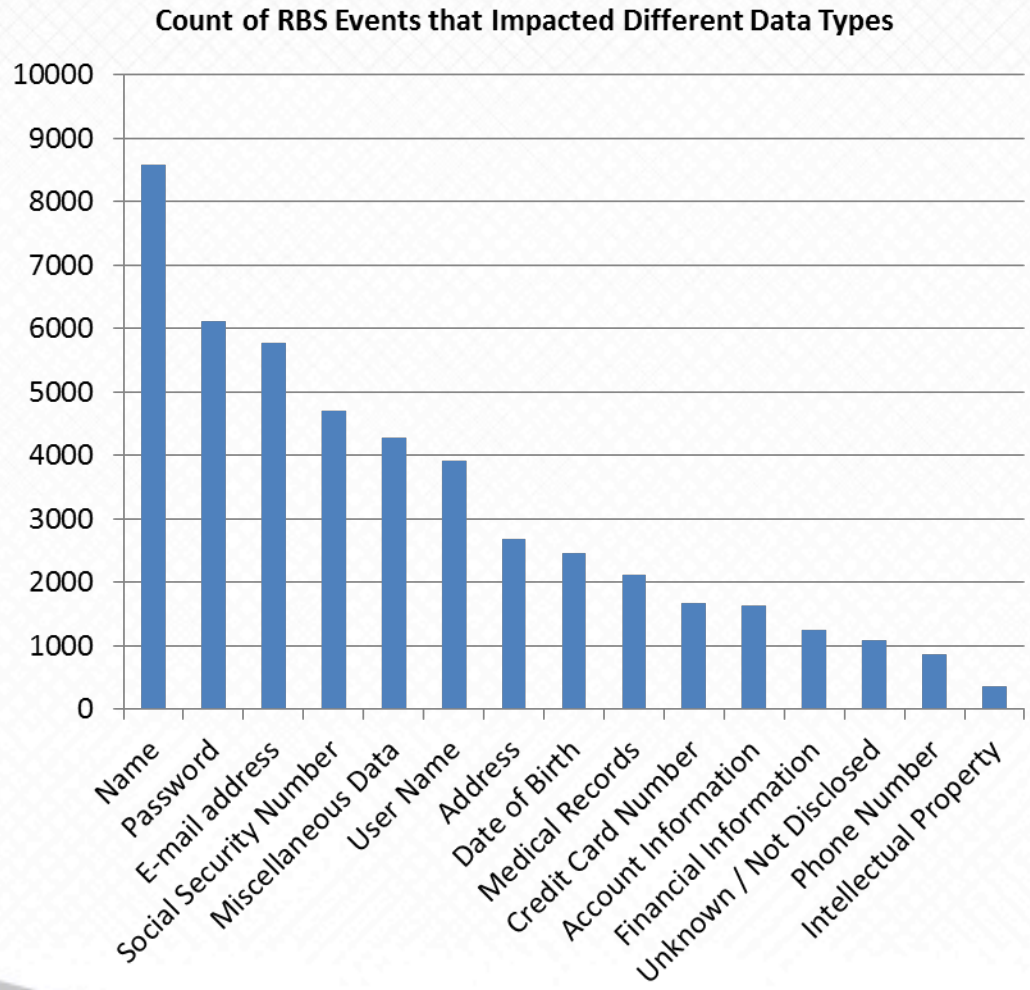
AIR's Stochastic Modeling Framework Can Be Applied to Cyber

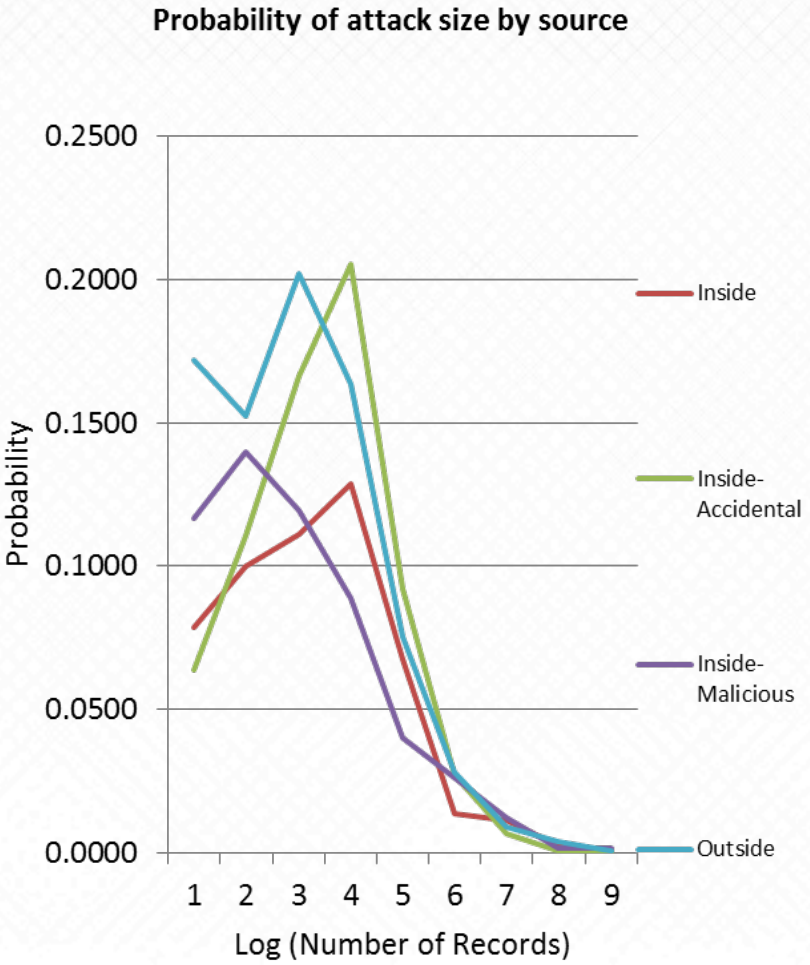


Risk Based Security (RBS) Selected as Incident Data Provider

- Has developed a database of over 16,000 historical worldwide cyber incidents
- Based in Richmond, Virginia
- Publically disclosed clients include AIG and Willis

Risk Based Security Data Examples





BitSight Collaboration will Give the AIR Model Several Key Benefits

- Analyzes public traffic on the Internet to unobtrusively give scores to companies
- Based in Cambridge, Massachusetts
- Founded by several MIT graduates
- Publically disclosed clients include AIG and Liberty

BitSight Will Provide Clients a Real-Time View of the Risk Directly Within the AIR Model in Touchstone

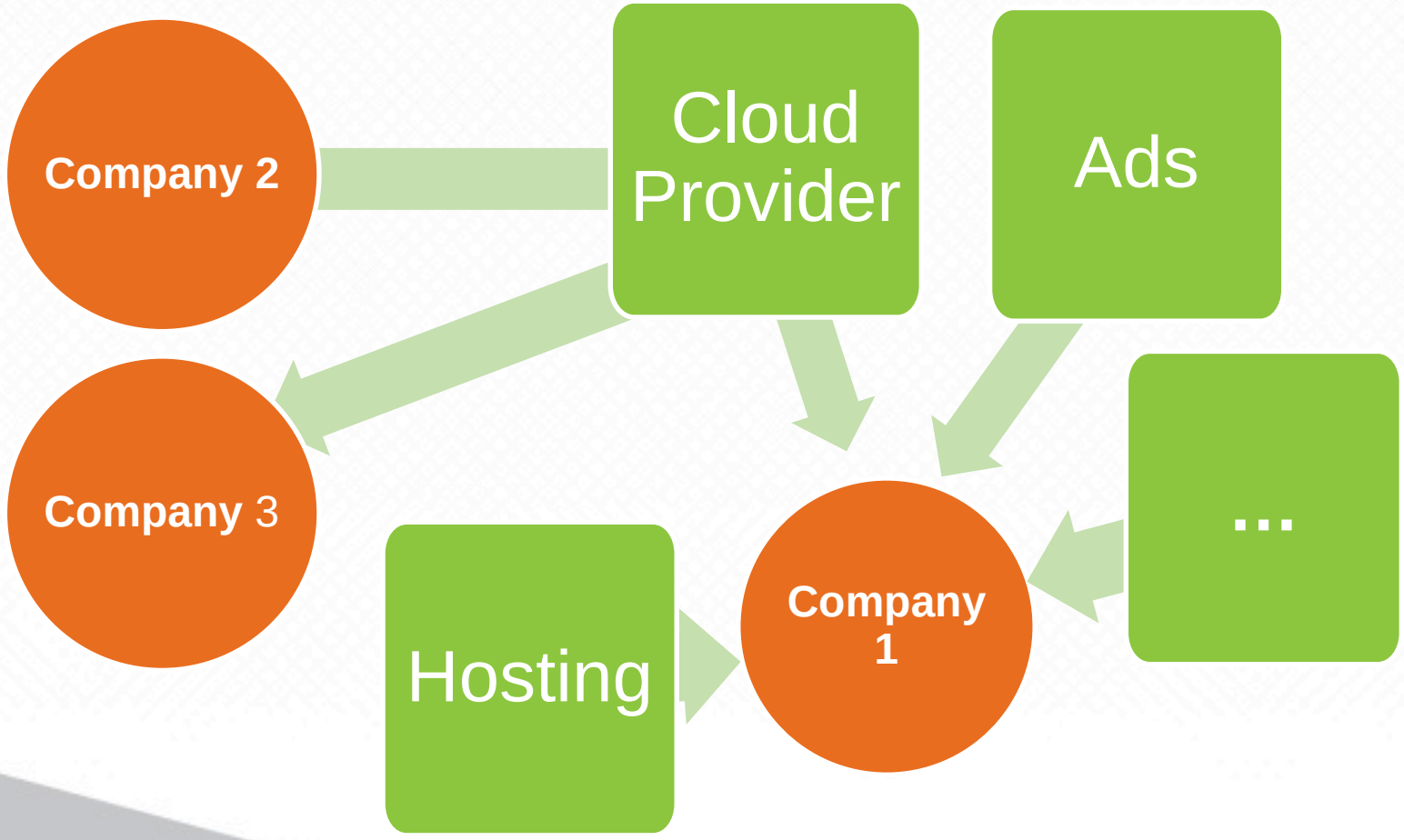
Note: This is the only aspect of the BitSight collaboration that will require clients to also license BitSight's product

BitSight's Scores Will Inform the Model's Relative Vulnerabilities

BitSight's Data Will Inform the Development of the Cyber Industry Exposure Database

AIR's Collaboration with BitSight Provides Business Connectivity Data

- Automatically and seamlessly identify cyber dependencies – and evaluate deterministic cyber aggregation scenarios based on these dependencies



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