UNDERSTANDING LOSS RESULTS FROM THE AIR INLAND FLOOD MODEL FOR THE U.S.

Flood is a significant source of risk that has been challenging to assess—in part because the vast majority of the loss information resides solely with the National Flood Insurance Program (NFIP). Thanks to a major study commissioned by the Federal Emergency Management Agency (FEMA), the AIR Inland Flood Model for the United States has been extensively validated using more than 30 years of NFIP detailed flood claims. For the first time, companies have a robust tool with which they can probabilistically assess and manage their existing flood risk and explore opportunities for profitable growth.

In this brief, we suggest best practices for evaluating and using this new tool and identify the input necessary for producing reliable modeled loss output—location information, key primary and secondary building characteristics, and correct flood policy terms—to help you not only understand your model results but also to integrate the AIR U.S. inland flood model into your overall view of risk.

LOCATION, LOCATION, LOCATION

More so than for other atmospheric perils, losses resulting from floods are highly dependent upon property exposure characteristics. The accuracy of location information is particularly critical. The difference between an exact address and even a "relaxed" address—for example, a street name without the building number—can lead to differences in geocoding by dozens or even hundreds of feet (see Figure 1). Even more importantly, any difference in location can lead to significant differences in the relative elevation, which, in turn, can have a large impact on loss potential. This is critical not just for the most flood-exposed properties located in FEMA flood zones but also for properties located outside them that may lie near the boundaries of on-plain flooding areas or be subject to off-plain flash flooding. Having confidence in the exact location of your exposures is the first step to obtaining an accurate assessment of your overall flood risk.

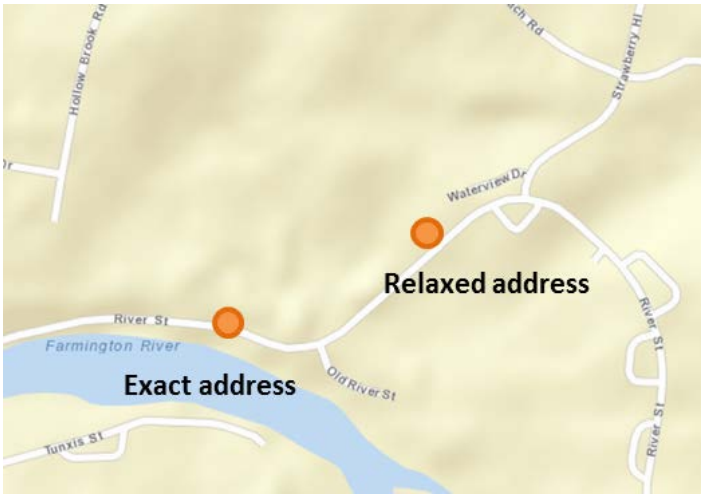

Figure 1. Using a relaxed address locates the property much farther away from the river, causing the model to understate the actual risk.

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CRITICAL PRIMARY AND KEY SECONDARY CHARACTERISTICS

Ensuring that critical primary building characteristics (as well as a few key secondary characteristics) have been properly captured will go a long way toward producing model results that make sense.

- **Construction:** Concrete and masonry structures are much better able to resist the hydraulic forces generated by floodwaters.
- **Year Built:** Newer structures are better able to resist floodwaters and are typically better sealed than older structures. Newer structures are also much more likely to be built in accordance with that location's Base Flood Elevation requirements (see last bullet).
- **Foundation Type:** Basements are the first areas to be affected by floodwaters, so specifying the type of foundation, and hence the number and type of basement levels (if any) for a location, will provide a more realistic representation of the effects of a potential flood.
- **First Floor Height:** A first floor raised above the ground surface greatly reduces vulnerability to flood damage.
- **Base Flood Elevation (BFE):** More commonly used for commercial engineered structures, the BFE is a measure of the water level from a flood with a 1% exceedance probability—essentially, a 1 in 100-year flood level. An engineering study is undertaken to determine the BFE, and the first floor of the building will be elevated above this level. The building is much less likely to incur damage as a result of mild to moderate flood events. So, if the actual BFE for a property is 6 inches above the engineered BFE of 2 feet, you would enter "2.5" feet into the field to capture this elevation.

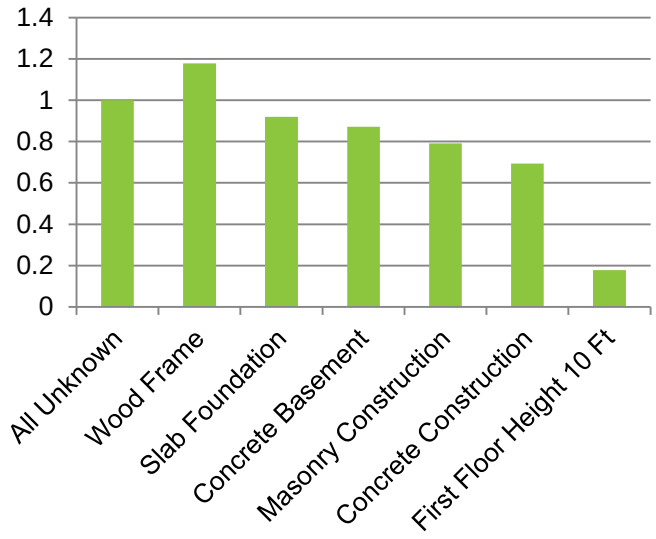

Figure 2. Relative flood AAL based on building characteristics for a sample portfolio. Capturing as much information as possible about flood-exposed locations can dramatically alter the location's risk profile.

ACCOUNTING FOR FLOOD POLICY TERMS CORRECTLY

Ensuring that flood policy terms associated with your exposures are accurately accounted for is also critical to obtaining reliable model results. Running a severe thunderstorm book in the AIR inland flood model, for example, will not produce meaningful results. Losses from severe thunderstorms—hail, tornadoes, and straight-line winds—are fully covered under standard homeowners HO3 policies. This means that not only is the building fully covered up to its replacement value, but the building's contents are also. The insured will also receive coverage for loss of use of the building, in the event that the building can no longer be inhabited following a severe storm. Standard NFIP policies, however, contain some significant differences from standard HO3 policies.

For example, standard NFIP policies:

- Do not provide full protection to a homeowner
- Are typically limited to $250,000 for the building and $100,000 for contents

- Do not cover any portion of the property located below ground level, i.e., basements, even furnished ones
- Do not cover loss of use, or time element (Coverage D)
- Only pay out the Actual Cash Value (ACV) of damaged contents (Coverage C). (Note: ACV accounts for depreciation, which can dramatically reduce the value of home furnishings and accessories over a short amount of time—a typical depreciation schedule may be as short as five years to reduce the value of your new home entertainment center from its retail value to its salvage value.)

Thus, simply applying standard HO3 coverage terms when assessing potential flood losses will represent significantly greater coverage than NFIP policies offer and will, therefore, result in dramatically higher modeled losses than might be expected for the flood peril, as shown in Figure 3.

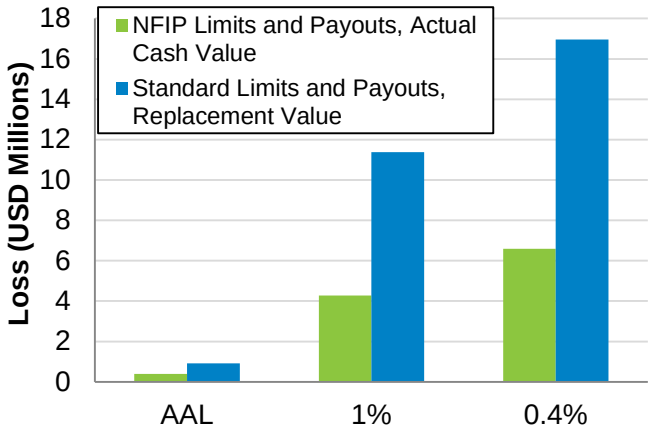

Figure 3. The U.S. inland flood model was run on a portfolio of 1,000 locations in flood-exposed areas using standard terms and limits and typical NFIP terms and limits. The impact of correctly accounting for policy terms and limits is significant.

INTEGRATING THE AIR INLAND FLOOD MODEL FOR THE U.S. INTO YOUR OVERALL VIEW OF RISK

AIR's Inland Flood Model for the United States *can* capture all potential sources of loss from inland flood, including losses to basements, loss of use, and full replacement value for contents. In addition, the model provides loss estimates for flooding both on and off the floodplain, and the ability to monitor aggregations—as opposed to simply doing a binary evaluation of single risks based on FEMA flood maps. We are confident that just as the industry has developed an intuitive sense of potential losses from perils such as hurricanes based on actual post-event claims, so too will the industry develop an intuitive feel for flood losses as the market matures. By capturing critical exposure characteristics and ensuring that policy terms are accurately reflected, the loss estimates produced by AIR's U.S. inland flood model can be better understood and integrated into your overall view of risk.

ABOUT AIR WORLDWIDE

AIR Worldwide (AIR) provides catastrophe risk modeling solutions that make individuals, businesses, and society more resilient. AIR founded the catastrophe modeling industry in 1987 and today models the risk from natural catastrophes and terrorism globally. Insurance, reinsurance, financial, corporate, and government clients rely on AIR's advanced science, software, and consulting services for catastrophe risk management, insurance-linked securities, site-specific engineering analyses, and agricultural risk management. AIR Worldwide, a Verisk Analytics (Nasdaq:VRSK) business, is headquartered in Boston with additional offices in North America, Europe, and Asia. For more information, please visit **www.air-worldwide.com**.