



HAZUS User Group  
Success Story

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# Eagle, Alaska Uses HAZUS

## to Map Safe Rebuilding Zones Following Ice Jam Devastation

### Background

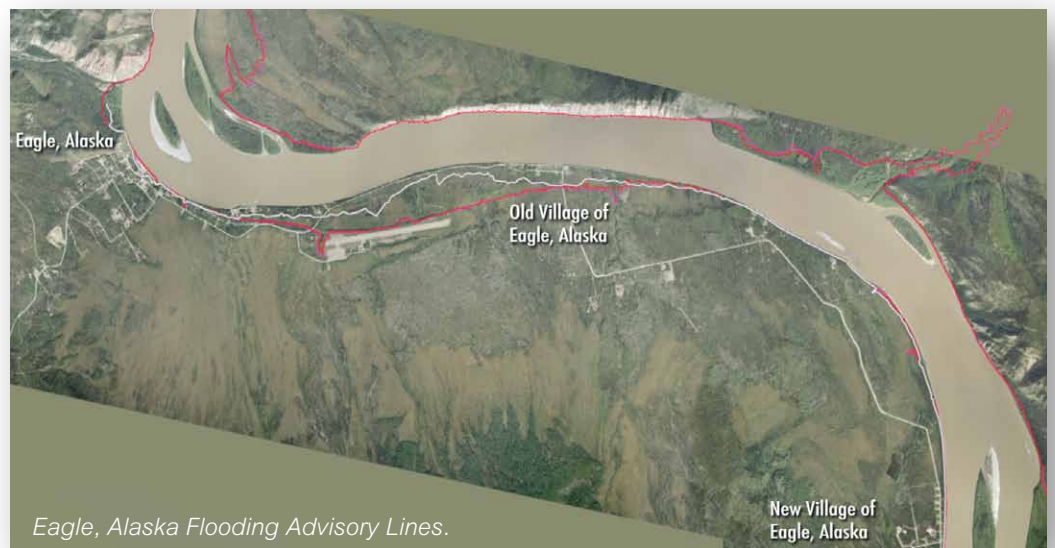
In early May 2009, an ice jam on the Yukon River above Eagle, Alaska broke, flooding the town with icebergs as large as homes. The town was devastated. Houses were pushed off their foundations and the icy flood waters carried away vehicles, homes, and personal belongings. Fishwheels, boats, nets, and other means of livelihood were crushed beneath the weight of moving ice. The ice jam occurred when masses of ice broke apart and got stuck in a narrow part of the river.

### Using HAZUS

The Geospatial Intelligence Unit (GIU) and the Risk Analysis Branch at The Federal Emergency Management Agency (FEMA) Region X watched news reports of the Eagle, Alaska disaster on CNN and YouTube and came to the town's rescue with HAZUS. The town of Eagle had not been previously mapped for flood hazards, including ice jams, and the normal flood mapping process can take several years. Using the US Geological Survey (USGS) stream gauge data and elevation data from across the border in Canada, the team was able to run the HAZUS flood model. The flood model required a large area of digital elevation data which led to the combination of U.S. and Canadian data. The initial HAZUS runs identified areas that were most severely impacted, which helped emergency responders focus their response efforts.



*Ice and debris flowing through Eagle, Alaska.*



*Eagle, Alaska Flooding Advisory Lines.*

## Rebuilding Eagle Alaska

HAZUS became just as useful in the recovery phase as it was in response. The pressure of a short summer season made rebuilding quickly an imperative. FEMA and the state of Alaska were committed to expediting the reconstruction. Using aerial imagery and post event analysis, the GIU traced the boundaries of the ice movement. This line was proof that ice had, at one time, inundated this zone historically, and it could possibly happen again. Then the GIU team ran the HAZUS model again using USGS recommended flow rates for the 100-year and 500-year flood events. The result became a series of recommended building setback lines.

The GIU team created several maps to illustrate to business and home owners the safe zones for rebuilding. The bright white line on the photograph above represents the extent of ice movement on the Yukon River in Eagle, Alaska in early May 2009. The last "great ice jam" recorded occurred in 1937. Actual data on the severity and extent of the flooding were sparse. Anecdotal reports indicated they were comparable to that in 2009. Therefore, it can be concluded that any structures built within the area of ice movement during the 2009 disaster are subject to damage or destruction in future flooding caused by ice jams.

The pink line in the photograph is the extent of a 100-year flood modeled by the GIU using the HAZUS flood model and



*Acceptable levels of risk from ice-jam flooding.*

an assumed river discharge of 575,000 cubic feet-per-second (cfs). The green line is the result of a HAZUS simulation that assumed a discharge twice as large, approximately 1.2 million cfs.

## Final Thoughts

The use of HAZUS made it possible to illustrate that rebuilding in the 100- and 500-year zones put property at risk for flooding. Since HAZUS also generates a base flood elevation (bfe), residents who rebuilt in these zones also knew how high to elevate their structures to avoid flooding. To minimize, or at least to reduce the risk of future losses and damages, rebuilding needed to occur in safe zones, areas above the indicated (or expected) flood level.

Of course, this is no substitute for a full mapping and assessment effort, but when decisions become timely, HAZUS offers an efficient way to provide data that can lead to better outcomes. The State of Alaska was quick to tell residents that these were not regulatory setback lines, but they did represent the best science and effort to help determine the safest places to reconstruct. The risk was communicated and in the end Eagle, Alaska was rebuilt better than before thanks to a dedicated team of HAZUS users.



*Aerial view of devastation in Eagle, Alaska.*