

## ***Interactive comment on “Defining and Analyzing the Frequency and Severity of Flood Events to Improve Risk Management from a Reinsurance Standpoint” by Elliott P. Morrill and Joseph F. Becker***

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Comment Line 167-168: Most papers that we used referenced in this paper specifically deal with European basins and they kept their basin areas smaller and applied size criteria. We wanted to get a better understanding Nationwide in the US and with basins varying drastically in characteristics and sizes we wanted to identify a common basin code to use. I did not come across any other paper that addressed Flood Frequency in the US using HUC's so we took it upon ourselves to choose two codes and work from there to identify which was more applicable. We chose HUC8 as our low end of our

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size range because as you can see in Figure 1, we are able to get approximately 25% coverage of the US, based on the criteria we applied to select sites, had we moved to a HUC10 we would have only be able to cover ~10% of the US which we felt was too low to accurately represent the US. With the HUC6 we were able to examine 85% coverage of the United States however we noticed the spacing of the sites might lead to more site events rather than events being attributed to the entire basin. With our goal being to identify events across a basin we wanted to eliminate the over estimation that you would see with more site events that should be aggregated to a single basin event.

Comment Line: 201-204 and 208 – 209: We recognize the error that we made in by contradicting ourselves in our methodology. We are in the process of removing those sites with < 5 years of data. The outcome of this removal does not affect the overall frequency that drastically as only a few sites within each basin level was removed to account for this error. We will recalculate all of the necessary statistics to account for this change as well.

Comment Line: 246 – 247 We clarified the language during this portion to be more representative of what we wanted to state. Impacted area was changed to affected sites. Affected sites, is more applicable because we wanted to avoid running into errors where it might be interpreted as the flooding extent in terms of area. The affected sites is still an indication of the severity as you noted in the comment because we scale the discharges at those sites and divide by the number of sites in the basin.

Comment Line: 266-267 While this is intuitive where you would think that a larger the basin the higher the frequencies would make sense. Due to the fact that we do not select every single site in the basins, we needed to plot the relationship between events per year and catchment area as well as events per year and site count. From those figures, there is not a significant relationship between catchment area (square km) and frequency in both the HUC6 and HUC8; however we do need to represent a better comparison to further prove our point that the HUC8 provides a better representation

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of our method. The idea we painted with site count vs. frequency does show that there is a relationship between site count and frequency for both HUC6 and HUC8. The plot does show a stronger relationship for the HUC6; however this does not prove our hypothesis that the HUC8 is a better representation. We are currently working on a plot that examines the distribution of the percentage of sites impacted during the events that we record. We are going to show that with our method we are seeing fewer localized events that should be aggregated to basin events when our method is applied to the HUC8 when compared to the HUC6.

Comment Line: 280 – 281 This language has been removed from the paper. It was missed during our earlier revision as it is not referenced in any other capacity during this paper.

Comment Line: 285 – 292 The shape of the CDF will be discussed in the revisions to this paper.

Comment Line: 303 – 304 The language of this statement will be clarified in the revisions to this paper. The sentence was meant to describe that when we see these locations being effected by natural phenomenon's, our definition of event duration as described by the paper does not factor in these events with a drastic event generation caused by an ice jam or prolonged duration from intense ground saturation. We wanted to point out that while it may seem that the duration of these events is longer than what you would expect, they are accurate because of our Q2 threshold that there may be remnants of flooding that are not severe but are still being considered and aggregated to the same basin wide events.

Comment Line: 367 The figure was updated to increase the size of the labels as well as place a blue outline around the selected HUC6 and HUC8 so that it would be easier to identify which basins the figure was referring to.

Figure Comment: Figures were corrected to remove duplicates, increase label size and combined.

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