

DATE: July 3, 2019

TO: Tom Koehler (Moose Lake Improvement Association)

FROM: Jacob Druffner (DNR - Water Management Engineer)

SUBJECT: Moose Lake Dam Failure Analysis and Regional Flood Elevation

DKSN 195, FAD 20326

Background

The Moose Lake Dam was reconstructed in 2015 and at the time the dam failure analysis (DFA) had not been revised to show the updated reconstructed configuration nor the correct high hazard spillway routing. Residents have voiced frustrations about the high regional flood elevation (RFE) from the results of the 2012 analysis when the Department had advised the gates remain shut during the analysis. Meg Galloway and I met with Ellen Faulkner from Ayres Associates on March 21, 2019 to discuss the DFA using Atlas 14 rainfall data. It was concluded that because the spillway design was completed prior to Atlas 14 being enforced, this “to-do” DFA could use the old rainfall and hydrology used to design the reconfigured dam. This hydrology came from the approved 2010 HEC-1 analysis which was accepted as part of the 2011 DFA completed for the old dam.

Ayres submitted DFA and RFE analyses to the Department on April 18, 2019. Members of the Department’s floodplain engineering team agreed that if the 2010 HEC-1 model was to be converted to HEC-HMS to be used for the RFE analyses, because it is being revised with new Atlas 14 rainfall data, less “rudimentary” hydrology should be used. Of the two watersheds in the model, the main basin is 200 sq miles and the other (the lake surface) is 2.8 sq miles.

The water surface elevation (WSEL) upstream of the dam from the RFE analysis was determined to be 1371.9 (NGVD29). The DFA was approved on June 5, 2019 and a WSEL above the dam, using the “Dam in Place with No Failure” profile, was determined to be 1371.5 (NGVD29).

Conclusion

Members of the Department met on June 4, 2019 and June 18, 2019 and discussed the suggestion to use the “Dam in Place with No Failure” elevation from the DFA upstream of the dam for zoning purposes and as best available information for letter of map amendment (LOMA) submittals. It was concluded that this would be acceptable as revising only portions of the model (using Atlas 14 rainfall) and converting the model to HEC-HMS without updated sub-basin delineations would not be considered appropriate revisions for an RFE determination.

The use of DFA “Dam in Place with No Failure” elevation of 1371.5 (NGVD) will be allowed for zoning purposes that include determining whether buildings and properties are considered “in or out” of the floodplain. If lands are in the floodplain, all applicable County Floodplain Ordinance provisions apply. For example, if new development is proposed within the floodplain, a hydrology and hydraulics analysis (H&H) will be required. The H&H shall consist of a HEC-RAS model with updated hydrology including a detailed HEC-HMS model using most up to date rainfall data. Existing structures within the floodplain would need to meet legal, non-conforming floodplain development standards. Again, these are just a few examples, but all applicable County Floodplain Ordinance provisions would apply.

The approved 2019 DFA model shall not be submitted to FEMA for a LOMR until updated hydrologic conditions (described above) are inputted into the model. Future studies on the lake will need to use most up to date rainfall data.