Hazard Creep

How it can affect SWM retrofit projects

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by

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www.damsafety.org/media/Documents/Images-Animations/Dam Animations/Hazard Creep.wmv

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FREESE NICHOLS

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In many cases, typical regulations related to the 100 year floodplain have not been rigorously enforced until more recent times.

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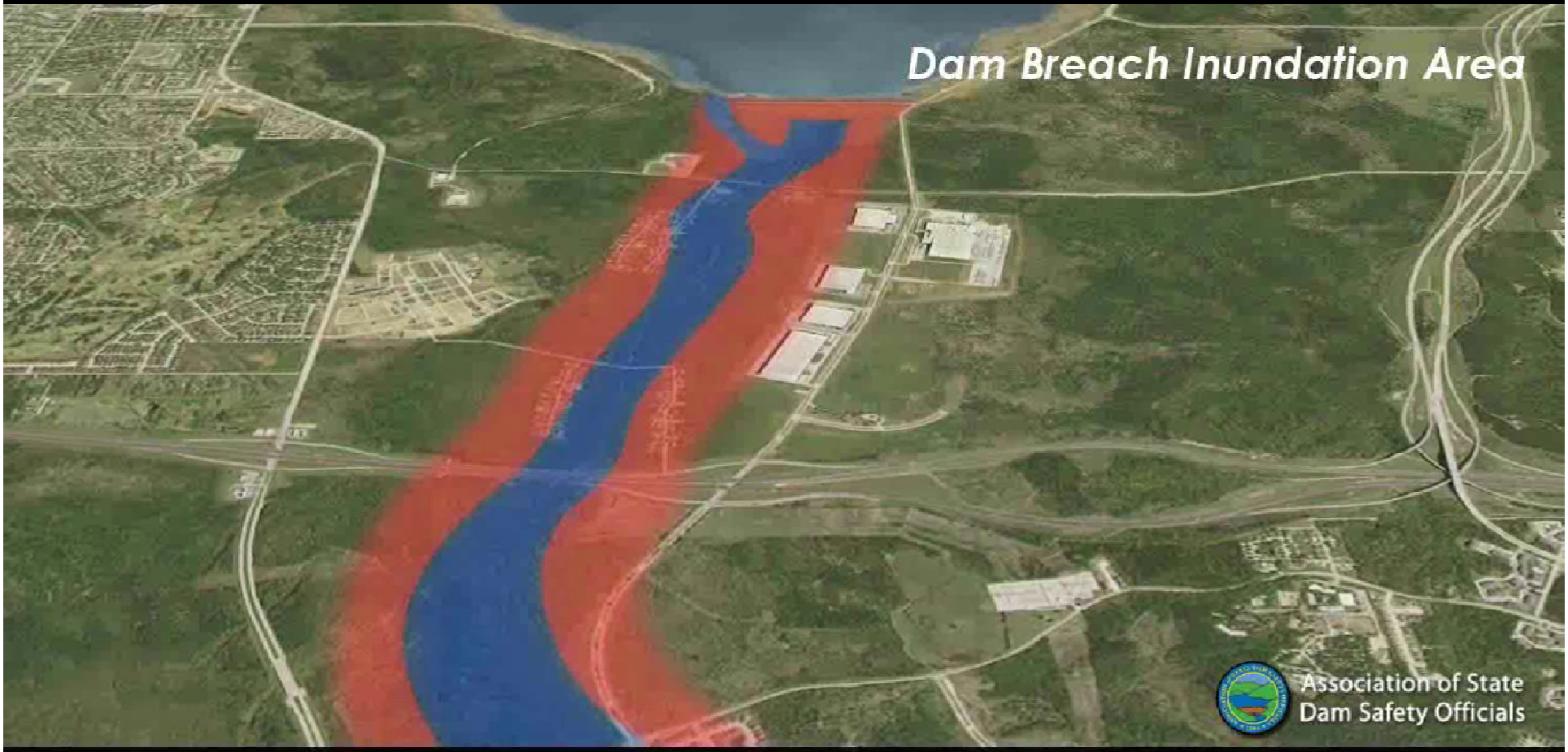

Breach inundation zones are typically much larger than the regulated 100 year floodplain and much development has often occurred in the fringe area.

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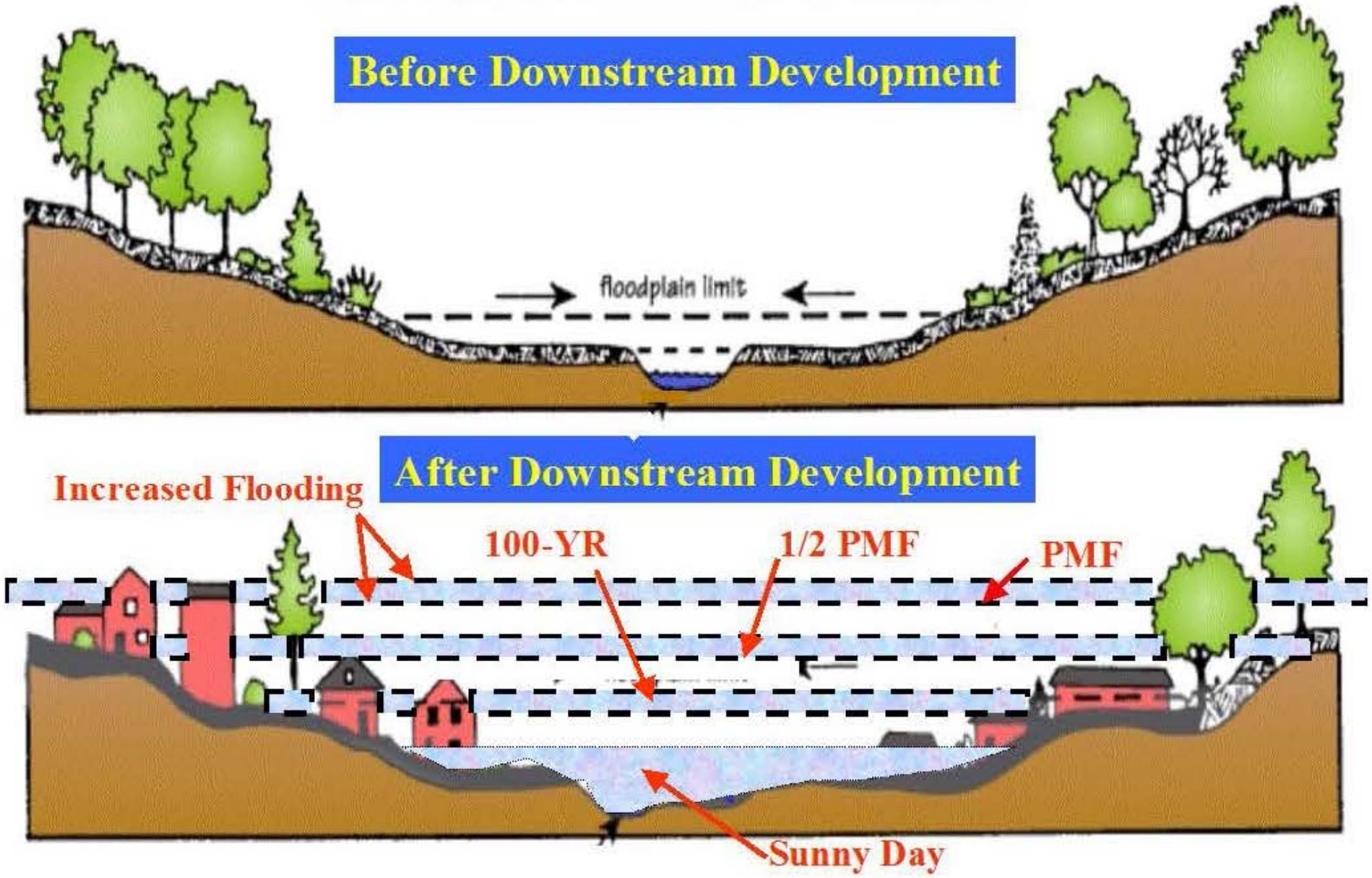
Increased Flood Risks



Embankment Retrofit Design

April 2015

Department of the Environment

1800 Washington Boulevard | Baltimore, MD 21230-1718 | www.mde.maryland.gov
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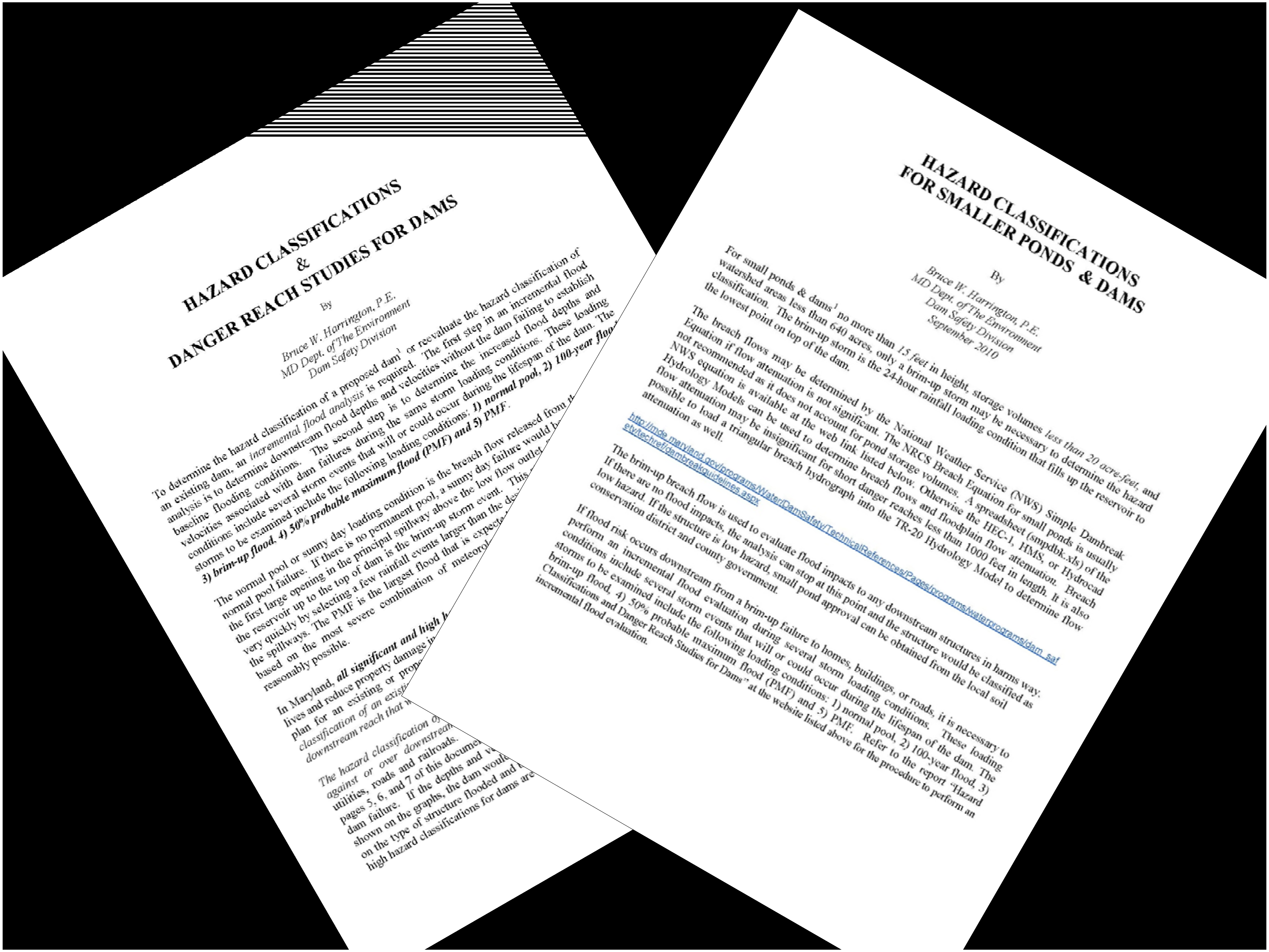


HAZARD CLASSIFICATIONS
&
DANGER REACH STUDIES FOR DAMS

By

Bruce W. Harrington, P.E.
MD Dept. of The Environment
Dam Safety Division

To determine the hazard classification of a proposed dam[1] or reevaluate the hazard classification of an existing dam, an *incremental flood analysis* is required. The first step in an incremental flood analysis is to determine downstream flood depths and velocities without the dam failing to establish baseline flooding conditions. The second step is to determine the increased flood depths and velocities associated with dam failures during the same storm loading conditions. These loading conditions include several storm events that will or could occur during the lifespan of the dam. The storms to be examined include the following loading conditions: ***1) normal pool, 2) 100-year flood, 3) brim-up flood, 4) 50% probable maximum flood (PMF) and 5) PMF.***

HAZARD CLASSIFICATIONS
FOR SMALLER PONDS & DAMS

By

Bruce W. Harrington, P.E.
MD Dept. of The Environment
Dam Safety Division
September 2010

For small ponds & dams[1] no more than *15 feet* in height, storage volumes *less than 20 acre-feet*, and watershed areas less than 640 acres, only a brim-up storm may be necessary to determine the hazard classification. The brim-up storm is the 24-hour rainfall loading condition that fills up the reservoir to the lowest point on top of the dam.

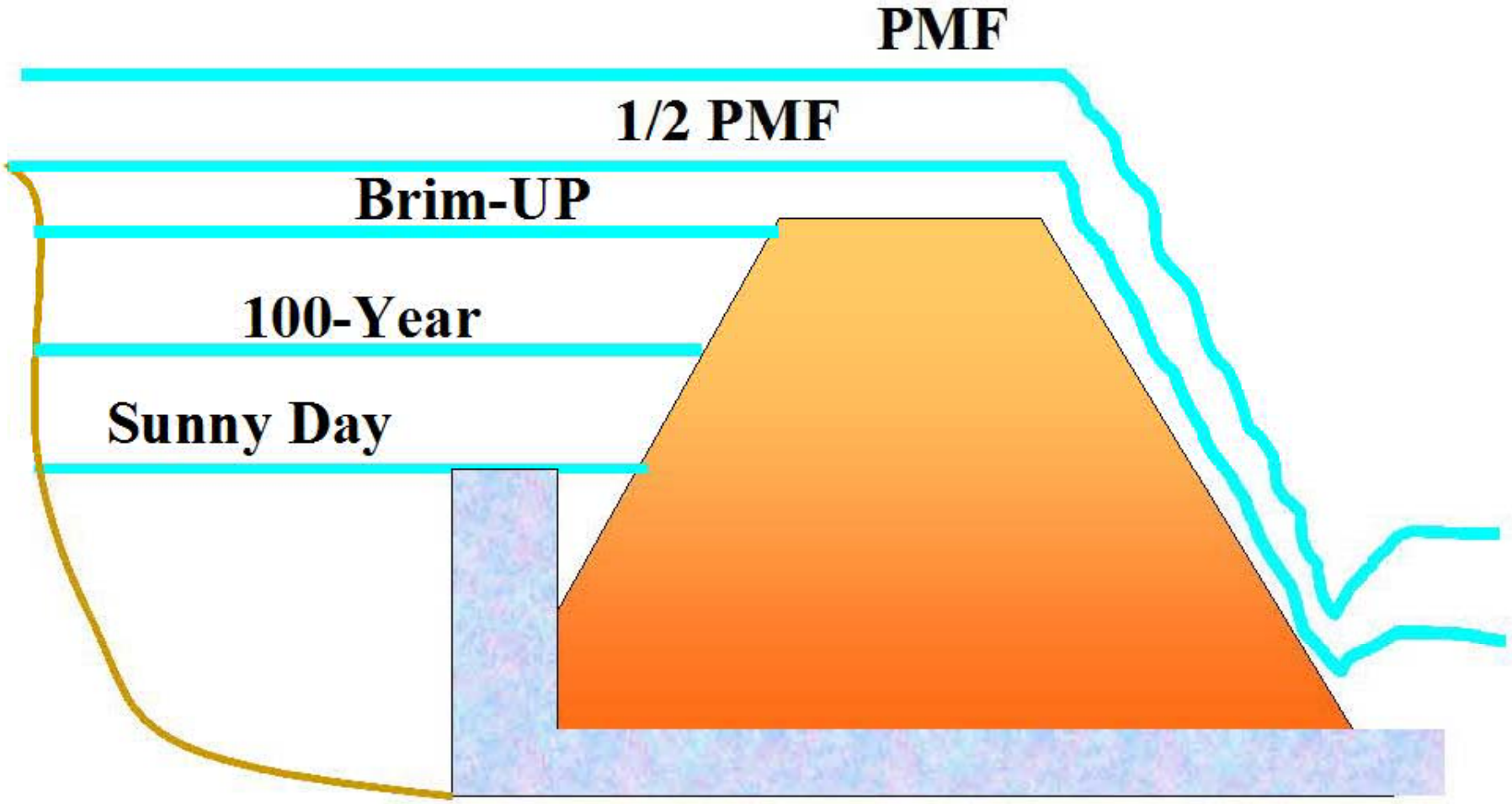
The breach flows may be determined by the National Weather Service (NWS) Simple Dambreak Equation if flow attenuation is not significant. The NRCS Breach Equation for small ponds is usually not recommended as it does not account for pond storage volumes. A spreadsheet (smpdbk.xls) of the NWS equation is available at the web link listed below. Otherwise the HEC-1, HMS, or Hydrocad Hydrology Models can be used to determine breach flows and floodplain flow attenuation. Breach flow attenuation may be insignificant for short danger reaches less than 1000 feet in length. It is also possible to load a triangular breach hydrograph into the TR-20 Hydrology Model to determine flow attenuation as well.

http://mde.maryland.gov/programs/Water/DamSafety/TechnicalReferences/Pages/programs/waterprograms/dam_safety/techref/dambreakguidelines.aspx

The brim-up breach flow is used to evaluate flood impacts to any downstream structures in harms way. If there are no flood impacts, the analysis can stop at this point and the structure would be classified as low hazard. If the structure is low hazard, small pond approval can be obtained from the local soil conservation district and county government.

If flood risk occurs downstream from a brim-up failure to homes, buildings, or roads, it is necessary to perform an incremental flood evaluation during several storm loading conditions. These loading conditions include several storm events that will or could occur during the lifespan of the dam. The storms to be examined include the following loading conditions: 1) normal pool, 2) 100-year flood, 3) brim-up flood, 4) 50% probable maximum flood (PMF) and 5) PMF. Refer to the report "Hazard Classifications and Danger Reach Studies for Dams" at the website listed above for the procedure to perform an incremental flood evaluation.

Failure Storms to Analyze



Questions?

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