



vantage point

The Longer (Wetter) View

Every dam, levee, berm, sea wall, or other structure intended to restrain or divert water from its natural course has an inherent risk of failure, whether due to aging, improper construction, inadequate design, or unexpected volumes of water overcoming even the strongest and newest structures. Therefore, every property situated on dry land due to the presence of such a structure is subject to some level of risk of being inundated.

But there is a generally unacknowledged residual risk of flooding in every such situation even prior to failure, due to inability of any structure to fully protect the land behind it (in the instance of levees and sea walls) or downstream of it (in the instance of dams). Beyond structural failure, overtopping by sea level rise and increasing storm intensities can surpass the ability of structures to withhold water from normally dry areas. All of these examples underscore why we should study the effects of future conditions on current land use, construction practices and standards, and the use of floodplain mapping as a tool to inform and build awareness about residual risk.

For the most part, in the United States we currently do not consider the areas protected by such structures as subject to any risk whatsoever. The only acknowledgement of any residual risk in the NFIP is the imposition of AR and A99 flood zones on non-coastal areas where levees temporarily cease to offer protection during repair and reconstruction, when those areas are re-categorized from minimal hazard areas (unshaded Zone X) to being subject to “Special Flood Hazards”, or 1% annual chance floods, and therefore suddenly subject to mandatory



flood insurance coverage for all buildings serving as collateral on federally-backed mortgages and loans. Zone A99 results from decertification of a previously accredited flood protection system that is in the process of being restored to provide base flood protection.

When enough progress has been made on the dike, dam, or levee to consider it complete for insurance rating purposes, 100% of the project cost of the completed system has been authorized, and at least 60% of that cost has been appropriated, then the area behind the protective structure is categorized as Zone AR; insurance is still required until actual completion and recertification. As a side note, these areas are designated as Zone AR/AH for shallow flooding areas and Zone AR/AE where there is more relief; see 44 *CFR* 65.14. Zone A99 areas are grouped in rating tables with B, C, and X areas,

meaning they are “preferred risk policies”, with Zone AR rates essentially the same but in different tables.

However, when the levee is completed and recertified, then the area landward of it returns to its minimal hazard status, mandatory flood insurance requirements are removed, and awareness of residual flood risk plummets.

Residual risk is very real. We witnessed it vividly in New Orleans after Hurricane Katrina when the levees holding back Lake Ponchartrain failed. After the storm left the area, leaving its own watery reminder, the water level in the city continued to rise as the Lake drained into the city.

Residual risk represents a future condition not currently depicted on floodplain mapping except during limited times of planned levee reconstruction. Therefore buildings in areas of unmapped residual risk currently are

not addressed by building codes to withstand 1% annual chance events, and communities are generally unprepared for future increases in flood risk and flood hazards.

We must also consider that over time, residual risk changes as external conditions change beyond the area protected by structural flood control projects. Additional hardening of the watershed upstream of a dam, for example, can increase runoff to overcome existing structural approaches to floodplain management. This is currently an ignored future condition beyond the narrow scope of “cumulative effects” addressed in 44 CFR 60.3 (c)10.

Should we reconsider the lifespan of dams and other structures, and their planned level of protection? Is today’s freeboard standard enough to offer protection in the future? What are the repercussions if structural protection is not maintained or is removed? We need future conditions floodplain data and mapping to assist in answering such questions, as we plan for safety and advise the public of flooding dangers.

In southern New Jersey, Gibbstown in Gloucester County is attempting to anticipate future flooding conditions to figure out the best way to deal with them. This is an area along the tidal reaches of the Delaware River that is already subject to regular severe flooding with heavy rains. Taking into consideration the effects of sea level rise over 50 years, the Army Corps of Engineers has completed a feasibility study in the Delaware River Basin with three potential approaches for Gibbstown that propose additional armoring through floodwalls, ringwalls, and/or levees, with one alternative including buyouts of repetitively damaged areas that simply can’t be protected. The tentative plans will be the subject of local meetings that are likely to be lively considering the immense cost, although the benefit/cost ratio is about 1.8:1, well beyond to minimum 1:1. To see the plan: http://www.nap.usace.army.mil/Portals/39/docs/Civil/DelComp/DraftDel_Comp%20Draft_Feasibility_ReportEA.pdf ■

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