

## **The Sins of the Past, the Flooding of Today and What About Tomorrow? ( a compilation of articles and insights regarding the Midwest Floods)**

A White Paper

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Record setting flood heights are occurring all along the Mississippi, breaching levees, drowning 2 million or more acres of agricultural crops and submerging towns located near the river. These increased flood heights are breaking well established records in towns like Cedar Falls, Iowa where it bested the previous record by 6 feet and further downstream breaking the record, set in 1929, by 11.3 feet in Cedar Rapids, Iowa. People all along the path of destruction are asking “why”? For some, the torrential rains were a “freak of nature” or, to quote one authority on the situation, “a case of meteorological bad luck”. It is obvious that it rained excessively for a number of consecutive days. However, what is being termed as a “natural disaster” probably isn’t really all that “natural” after all. To quote the late Gilbert White, “Floods are an act of God, but flood losses are an act of man”.

The heavy rains that fell in the Midwest in mid June of 2008 fell on a landscape that had been dramatically altered from the way in which it was originally created to function. The landscape had been re-engineered, re-graded and reformulated by the acts of humans in their quest to develop to suit their own needs. Agricultural pursuits, such as farming and livestock, have replaced what was once miles of open prairies. Drainage pipes have been installed under the surface of these valuable farmlands to lower the water table and keep water from pooling so as to increase the amount of useable land. Areas that were supposed to perform natural water absorbing functions, such as wetlands and floodplains had been filled in and built over. Iowa has lost over ninety percent of their wetlands to date according to state officials. Rivers had been altered and / or dammed up. Formerly meandering creeks and streams had been straightened out; thereby, increasing velocities in those waterbodies. Levees have been built “to hold back the floodwaters”; thereby, reducing floodplain storage . All of this highly profitable “development” over the past century has left the riverine landscape highly susceptible to current and future flooding. In Iowa, for instance, as a direct result of the clamoring for ethanol, in the past year, 106,000 acres were moved from conservation purposes to corn crops. These corn crops will consume more than one third of Iowa’s land surface by the end of the year, making them the #1 U.S. corn growing state in the nation. Studies show that the need for additional corn crops is expected to multiply exponentially in the very near future. Ironically, corn, being an annual crop, does not put down deep roots, thereby causing continual “turn” of the soil leading to unstable soil conditions and increased and often heavy soil erosion.

As farms grow at this alarming rate, farm fields are moving closer and closer to the nearby rivers, creeks and streams. Without open space, natural grasslands, wetlands and floodplains to buffer these agricultural pursuits from the adjoining rivers, creeks and streams, the runoff from these fields moves dramatically quicker to these receiving waterbodies. Additionally, the loss of open space, natural grasslands, wetlands and floodplain buffers allows for increased sediment to flow into the rivers, creeks and streams. Therefore, the water carrying capacity of these waterbodies is decreasing in direct proportion to the sediment they are receiving from upstream

development. At a recent SCAPA meeting in North Augusta, SC, noted speaker John Thomas of WK Dickson, probably summed it up the best: “God made man a steward of the land in Genesis and we have been screwing it up ever since”.

Some point to the “irresponsible development” that has occurred along the Mississippi as a source of the flooding problem. This irresponsible development has resulted in the construction of newer, taller and stronger levees along the river. To further complicate the matter, by building along the riverbanks in recent years, the Mississippi River, now being referred to as the “Big Muddy”, has been forced into a stream bed that is less than half the width of where it originally ran a century ago. This act of narrowing the river and thereby displacing water is causing the river to run higher and faster than it has in the past. This higher and faster water builds up tremendous force and the water it sends downstream is more powerful and potentially more dangerous than before the levees were built. In some areas, developments behind the levees, that once were wetlands, are now filled in and paved over, thereby displacing water and channeling it at a faster rate to the river. Some refer to it as a “self-perpetuating cycle: The rivers rise higher, new levees are built bigger, the rivers rise again”. Each and every levee on its own has a small impact, but combine all of those small impacts together with the construction of a number of levees along the river, and the resulting potential devastation impact is significant.

Not all of the levees are newer, taller and stronger, however. Many are aging, sandy, and offer only unpredictable protection. To further complicate the matter, there is no one source of oversight for levee design, levee construction and levee maintenance nor any kind of overall river comprehensive management plan. “There is a patchwork quilt of levee responsibility.....” one spokesman for FEMA was quoted as saying, “There is no federal agency which oversees levees. That doesn’t exist.” Each levee constructed along the Mississippi, although many of them are constructed by the Army Corps of Engineers, is under local control. There are levees owned by municipalities, agencies, drainage district boards, and even individual farmers and land owners. Many go uncataloged by federal officials and they have admitted that they “don’t even know where some of the levees are”. Although Congress set up a program in 2005 after Hurricane Katrina to inventory and inspect levees, they failed to provide adequate funding to carry out their own program. In 2007, Congress passed the National Levee Safety Act to again establish an inventory and inspection program for the nation’s levees, and in similar fashion to the 2005 legislation, they did not fund their own program so, therefore, no work has begun on the project. You can go back to the days just after the 1993 Flood when a panel of experts commissioned by the Clinton administration issued a 272 page report on the aftermath of the great flood. The report stressed that a “more uniform approach to managing rising waters along the Mississippi” should be undertaken and that the “principal responsibility for many of the levees should be given to the Army Corps of Engineers”. Yet, as the flood waters of ’93 receded, only “a few broad changes were made”. Sadly, many levees in our nation are poorly sited, poorly constructed and poorly maintained. Many levees are woefully undersized for the area that they are supposed to protect. Yet, in many cases, these fallible structures are all that stands between a raging river, as it tries to retake the land that once was open space, natural grasslands, wetlands and floodplain, and financial ruin for population centers, residential subdivisions, and farmland scattered up and down the river. Even in the best of situations, when levees are built to today’s standards and ultimately approved by FEMA, these earthen structures can turn into a soggy mess when they become strained and saturated under the pressure of rising

flood waters. Some describe the Pin Oak levee near Winfield, Missouri, as being so waterlogged that it was like “walking on a waterbed” and there have been reports of “soil sliding down its slopes” on the dry side of the levee. To date, seven of the 35 topped levees along the Mississippi were federally designed and constructed. To quote Ed Thomas, a noted guru on No Adverse Impact, “It’s not a matter of if a levee will fail, but when a levee will fail”.

As the floodwaters move down the river, and the Mississippi peaks, levees will breach and fail and more towns and farmlands will be threatened. There has been loss of life in at least three states, numerous injuries along the floodwaters path, the evacuation of tens of thousands of people from their homes, and billions of dollars in damages. The National Weather Service has recorded record flood heights on four major rivers, including the Mississippi. Many of those affected by the Flood of 2008, were alive and can remember the Great Flood of 1993. The Great Flood was one of the most destructive in the recorded history of the Mississippi Basin, killing nearly 50 people, and causing over 70,000 to be evacuated from their homes. It severely damaged over 50,000 homes and 17 million acres of land, 16,000 square miles of which was working farmland, across its nine state path of destruction. It should be noted here that a White House study done after the 1993 Flood concluded that it was “a significant but not unprecedented rainfall-river event and that such floods would probably occur again”. Many of the areas that were under water in the 1993 Flood, which caused an estimated \$20 billion dollars in damage, are now a canvas of strip malls, office parks, warehouses, industrial sites, and thousands of new residential homes, with little regard to impacts on floodplains and floodplain ecosystems. Yet, property owners feel that it is “unfair” to have two such devastating floods so close in time to one another. It has become a money over safety attitude in these areas.

Meteorologists point to what they refer to as a “wet cycle” that they say the Midwest has been in for approximately the last 30 years. Elsewhere, experts at the Department of Atmospheric and Oceanic Sciences stress that “national-scale circulation patterns” are to blame for the increase in these intense rainfall events. Still others at the National Weather Service point to the aftermath of a “La Nina”, and the associated cooler waters in the Pacific Ocean, with cooler air current patterns and an increase in the moisture carrying capacity in those air currents, which they believe cause an increase in rainfall and tornado events. The Department of Natural Resources chalks the whole phenomenon up to “climate change”. Finally, some blame “global warming” for their fate. The federal government even issued a report predicting more frequent and intense heavy rains because of “increasing concentrations of heat-trapped gases”. Still others grapple with the “why” as to how two 500 year floods happened so close together, when in theory a 500 year flood has a 1 in 500 chance – a 0.2 percent chance – of happening in any given year in a specific location. Outdated maps and discontinued data collection could be a factor, as well, since funding for new maps has been repeatedly delayed over the years and stream gage monitoring across the nation has become a thing of the past according to the U S Geological Survey, who points at a lack of funding since 1999 for the program.

What we do know for sure is that when it rains intensely that there will be an increase in stormwater runoff and a potential for floodwaters. Floodwaters, that have no where to go within the confines of the river, creek or stream they are supposed to flow in, will overtop and reek havoc on the adjoining property at what can be “never before heard of” flood heights. The floods of recent days are evidence all too well of that fact.

What are we going to do about this current situation?

First, we must accept the reality that we are flooding right now in parts of the nation and that we will continue to flood in the future at any time and pretty much anywhere. Flooding can be expected from time to time and the occurrence of the flooding is on the increase. For now, let's set aside the debate on who is right on the issue of what is causing the nation's flooding, for whatever reason rainfall patterns are changing and while rain events may be less frequent, they involve more intense storms on any given day during the course of a year. It is not uncommon to hear reports of "major flooding", "dam failures" or "levees breaching" after one of these intense storms.

Second, development is increasing at alarming rates. More impervious surface, i.e. more rooftops and pavement, equals more stormwater runoff. More stormwater runoff results in an increase in flood heights during even the smallest of storm events. Developers could and should build so that the impacts of their development in floodplains – in the high risk areas - are minimal or not at all. New development trends such as "No Adverse Impact" (NAI) and "Low Impact Development" (LID) should be explored. Not every new development trend has a higher price tag to it. We have to stop doing things "the way that we always did it" or begin to explore the better way to do things.

Last, but certainly not least, regulatory agencies must regulate to these new and recognized storm / flood heights. Communities must recognize that they cannot regulate to old, outdated flood maps and long ago abandoned storm gages. Communities must work to gather new and better data and then regulate to the new storm / flood heights. Communities must also educate their citizenry to their potential for flooding. Flooding does not only occur within the boundaries of the shaded area called the Special Flood Hazard Area (SFHA) on the flood map, but can occur anytime, and anywhere given the right circumstances. Many homeowners have lost their life savings when a home just outside the mapped floodplain has been subjected to severe flooding. In fact, nationwide, over one third of the flood insurance claims in recent years were outside the mapped Special Flood Hazard Area (SFHA) as shown on the Flood Insurance Rate Map (FIRM). In reality, the FIRM should be thought of similar to a Surgeon General's warning - a warning not to live in the Special Flood Hazard Area.

Communities will also have to adapt to more frequent occurrences of "extreme storms" - those that result in flooding. This "adaptation" is going to be anything but inexpensive to accomplish. Communities are going to have to adopt stricter development and floodplain regulations and it would be wise to pattern those regulations after the principles found in No Adverse Impact (NAI). Engineers will have to redesign and communities will have to rebuild structures such as reservoirs, lakes, dams, levees, detention ponds, and stormwater systems, many of which were built in the 1920's and 1930's, to withstand the increase waters sure to be associated with future flooding. More runoff means that design standards will have to change and that aging undersized pipes will have to be replaced. Roads and bridges, especially in areas where they tend to be topped or washed out, will have to be redesigned and rebuilt, as well. In fact, in some areas, entire towns are going to have to look at rebuilding farther away from the scenic yet potential harmful flooding source, much like they did in Valmeyer, Illinois after the 1993 Flood.

Valmeyer, Illinois' motto is aptly, "rising to new heights" and they have not only survived the recent flooding along the Mississippi, but they are actually thriving high atop their 400 foot high bluff where the town was relocated some 2 miles from the Mississippi floodplain. Planners are going to have to look at changes in zoning laws and land use patterns – stressing preservation of sensitive areas such as wetlands and floodplains – and focusing on sustainable development. City and County Commissioners are going to have to pay attentions to the recommendations sent forward by their Planning and Engineering Departments and restrict development, especially residential development, in sensitive areas. These same cities and counties are going to have to look at strategic watershed planning and the impact of existing and proposed detention ponds on increased flood discharges. Reviewing engineers are going to have to require data based on current rainfall statistics and not the outdated statistics of the past, thereby requiring increased capacity in most detention ponds. Traffic Engineers must ensure that evacuation routes are designed to be on high ground, that evacuation routes must be well marked and must be known by the citizenry, as well. It is a known fact that driving through flood waters causes the most deaths nationwide from flooding. Ideas such as rain gardens, porous pavements, grass swales and green roofs are going to have to be written into ordinances and embraced by developers and homeowners. A new ideology will have to come into vogue that it is "hip to go green". Education endeavors will have to be implemented, to put to the forefront, concepts such as sustainable development, conservation, open space, greenspace, wetlands and floodplains and the critical functions that they serve. Efforts will need to be made to educate and inform the public on their up-to-date flood risk and on the role of levees within that flood risk. Also, a concerted effort will need to be made to dispel the historic reliance and false sense of security that many property owners who live behind levees now have. Levees are protection, but only to a certain limit. Property owners need to be informed and educated so that they will turn away from that "it can't happen to us" mentality. Emergency management will bear a burden, as well, and evacuation routes will have to be mapped and clearly marked out, emergency preparedness drills will have to be implemented and emergency warning systems will have to be purchased and installed. Overall, mind sets will have to be switched from the short termed and often short sighted philosophy, to the long term philosophy. Lessons of the past, such as those learned after the Great Flood of 1993, will have to be remembered and put into action for the safety and well being of generations to come. Communities will have to get serious about dealing with problems that they know exist before the next flood comes their way. Communities will have to change their attitude from one of flood recovery to one of flood prevention. Communities will have to lose that "content to wait" attitude that they have been operating under for years and start now to take action to prevent future flooding. In short, communities will have to move into a realm of being proactive instead of reactive regarding flood issues. Across the nation, "plan for the future" will have to become a mantra and not just a bumper sticker in flood-prone communities.

"We must and can work to design and build our communities better and, to the extent possible, out of harms' way. Mitigation must become a priority throughout all levels of our government. We must be proactive on mitigation and not reactive." These are very timely words for today's flooding crisis. Yet, they were spoken by then-director of the Federal Emergency Management Agency, James Lee Witt, to Congress, only a few brief months after the 1993 Flood. You have to wonder whether or not the impacts of the current Midwest flooding would be as devastating as they are had the words of James Lee Witt's only been acted upon in the years to follow the 1993 Flood.

Communities are not the only ones that must stand up and take responsibility. Developers need to stop thinking of flood protection as an additional cost to their development or a “burden” put on them by regulators. Flood protection needs to become an investment that they make in their project and in their community – for the safety and well-being of all. A little money spent by developers in the construction phase can save money, heartache and even lives of the property owners in the event of a flood. For instance, elevating a residential structure by one foot, costs a developer a nationwide average of \$1000 at the construction phase. That \$1000 cost can be passed on to the homeowner in the price of the structure. The homeowner will recoup that \$1000 very quickly in the reduction of flood insurance premiums for the home, because of that one foot increase in elevation. Additionally, that one foot increase in elevation may be the difference, in the future, of that home flooding or not flooding during a flood event.

Property owners, as well, must educate themselves on the risk that can be associated with floodwaters. It is important that a property owner knows where he lives and what risks are around his area. Risks, such as flood risk, should be known and citizens should prepare and act accordingly. If at all possible, homes should not be purchased that are located in the floodplain. It is best to view with a wary eye anyone that says that “the likelihood of flooding is very slim” for a property that is located in the floodplain. Should a property owner find himself near any water or any kind, it is imperative for that property owner to adopt a plan for self-sufficient storm recovery which includes purchasing flood insurance. Even owners of properties protected by a levee should purchase flood insurance. Currently, FEMA does not consider properties behind a levee that has been approved to withstand a 100 year flood – that is a flood that only has a 1 percent chance of happening in any given year - to be in the floodplain. FEMA does not show this area – the area behind a levee - to be in a 100 year floodplain on the Flood Insurance Rate Map (FIRM). Therefore, there is no requirement to purchase federal flood insurance. However, these homes are at a high risk for flooding if a breach of the levee or a failure of the levee should occur, as evidenced by the flooding currently occurring along the Mississippi where at least thirty five levees have been topped in recent weeks. FEMA admits that they have never claimed that levees eliminate the risk of flooding altogether. It is clear from FEMA’s stance on the matter that property owners behind a levee are not out of harm’s way. Therefore, one must conclude that the land behind a levee is still in nature’s floodplain.

It is also important that citizens know that the common everyday homeowners policy does not pay at all in the event of a flood. Government disaster funds for uninsured property owners is sketchy at best – it is unclear what funds, if any, might be available in the event of a disaster. When assistance is provided, it usually comes in the form of a low interest loan that is, for some property owners, a loan in addition to an existing mortgage. That is why it is so important for homeowners and businesses located behind a levee to know their risk and act accordingly, which includes purchasing federal flood insurance. Even homes and businesses located well away from waterbodies may be at risk and it is vital that that risk is known. It can’t be stressed enough – purchase flood insurance if there is a risk imposed by a nearby waterbody. Anyone, anywhere can purchase flood insurance as long as their community participates in the National Flood Insurance Program (NFIP). If the community is not a member of the NFIP, it is up to the citizens to insist that the local politicians take steps to become a member of the program. Flood safety is just as important as fire and police safety – community leaders must give flood safety

the importance it deserves. Citizens must be the driving force in their local communities in promoting the importance of flood safety to their local officials.

Remember, neither the federal government, or our state or local governments, can prevent flooding, nor can they make us whole after a devastating flood. Only by accepting personal and community responsibility now, and effectively planning for the future, will we reduce the adverse impacts of flooding for ourselves and for generations to come.

Resources:

*ASFPM Letter to the Editor (Larry Larson; June 12, 2008)*

*Tempting Fate – Fifteen Years after the Great Flood of 1993, Floodplain Development is Booming (Emily Gertz – Grist; March 19, 2008)*

*Extreme Makeover: Violent Weather Spurs Redesign of Infrastructure (Anita Weier; June 17, 2008)*

*False Security (Opinion / Editorial – The Savannah Morning News / Savannah Now; June 17, 2008)*

*Floods Dredge Up Dispute – Critics Say Building Near Rivers is Cause of Recent Problems (Douglas Belkin; June 19, 2008)*

*Iowa Flooding Could Be An Act of Man, Experts Say (Joel Achenbach; June 19, 2008)*

*Burst Levee Force a Town to Consider Its Future (Malcolm Gay and Monica Davey – The New York Times; June 20, 2008)*

*The Wave of the Future – Developers and Homeowners Need to Plan for More Extreme Floods (Terri L Turner – The Atlanta-Journal Constitution; June 20, 2008)*

*Call for Change Ignored, Levees Remain Patchy (Monica Davey – The New York Times, June 22, 2008)*

*Soaked in '93, Town Now High, Dry – Battered in Previous Flood, Residents of Valmeyer, Ill., Relocated the Entire Town Atop a Bluff (Emma Graves Fitzsimmons – The Chicago Tribune; June 23, 2008)*

*Midwest Flood Victims Feel Misled by Feds (Tammy Webber and Maria Sudekum Fisher – The Associated Press)*

*Corn Crisis to be Felt in Meat, Dairy Aisles (Associated Press as found in the Augusta Chronicle; June 23, 2008)*

*FEMA is Praised for Fast Response (Associated Press as found in the Augusta Chronicle; June 24, 2008)*

*Town Tries to Save Levees (Associated Press as found in the Augusta Chronicle; June 24, 2008)*

*Waterlogged Levee under Pressure from the Mississippi (Cheryl Wittenauer – The Associated press; June 25, 2008)*

*It's Up to Us to Protect Ourselves from Flooding (Terri L Turner – The State newspaper; 06252008)*

*A Flood of Unheeded Warnings (Gerald E Gallaway – The Washington Post; June 25, 2008)*