Developing a Floodplain Management Overlay Ordinance for the City of Ann Arbor, MI

Dow Sustainability Fellowship Program

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III. Abbreviations

ACS: American Community Survey

ASCE: American Society of Civil Engineers

CFR: Code of Federal Regulations

CRS: Community Rating System

EPA: Environmental Protection Agency

FEMA: Federal Emergency Management Agency

FIRM: Flood Insurance Rate Map

MBC: Michigan Building Code

MDEQ: Michigan Department of Environmental Quality

MRC: Michigan Residential Code

MZEA: Michigan Zoning Enabling Act

NFIP: National Flood Insurance Program

NREPA: National Resources and Environmental Protection Act

PDM: Pre-Disaster Mitigation

PDR: Purchase of Development Rights

TDR: Transfer of Development Rights

IV. Executive Summary

As a result of an increase in severe flood events in recent years, the City of Ann Arbor (the City) has been interested in developing an ordinance to manage risk and development within areas affected by flooding. Our interdisciplinary graduate student team of Dow Sustainability Fellows has worked with the City over the past ten months to develop a floodplain management overlay ordinance to regulate development within the floodplain in the City of Ann Arbor.

In combination with the City, we worked to create an ordinance that accomplishes the following goals:

1. To protect open space and limit development in the floodplain;
2. To provide a clear process and set of guidelines for property owners within the floodplain to follow when seeking to develop or improve structures on their property;
3. To lower National Flood Insurance Program mandatory premiums for individuals living within flood hazard area by meeting specific Community Rating System criteria;
4. To expand floodplain regulation beyond the area that is currently regulated by the Michigan Department of Environmental Quality; and
5. To fit within existing Federal and State regulatory frameworks.

We began by examining current Ann Arbor planning documents, including the Ann Arbor 2007 Flood Mitigation Plan, which lays out a strategy for comprehensive management of flood events across the City, to ensure our ordinance would advance the City's overall goals. Additionally, we looked at flood management ordinances from cities comparable to Ann Arbor to understand best practices and explore different types of ordinance structures. We analyzed the federal and state regulatory and legal context in which we would be creating the ordinance to ensure it was consistent and would survive potential legal challenges.

Next, we developed the Floodplain Management Overlay Ordinance in partnership with the City. This ordinance defines a floodplain overlay district for flood hazard areas which are composed of the floodway, the flood fringe, and a 50-foot buffer. This floodplain management overlay ordinance imposes specific restrictions regarding development within the aforementioned overlay district and expands floodplain regulations to all parcels located within the 100-year floodplain. Furthermore, it improves upon existing standards from the Michigan Building Code and requires structures located within flood hazard areas to be elevated so that the lowest floor is at least one foot above the 500-year flood elevation.

The regulations contained within the proposed ordinance are intended to mitigate the impacts of future flood events. This is done by limiting future development and creating a land buffer within the floodplain that can better handle extreme weather events, thereby decreasing damages and injuries in the wake of such events and reducing the communities' recovery costs of these events

After developing the ordinance, we also examined possible next steps for the City. Since the ordinance must go through a process of public review prior to City Council's vote, we addressed potential concerns that residents, developers, and property owners could have regarding the new regulation. These included restrictions on future development; an inability to substantially improve or rebuild residences in the floodplain; and a more burdensome permitting process.

We also looked at ways in which this ordinance fit within a larger flood mitigation plan and suggested other possible actions that could supplement the positive impact of the ordinance, including open space preservation/acquisition and relocation and stormwater management.

V. Project Background

There has been a growing incidence of flooding in Ann Arbor and similar communities as a result of climate change. In response, these communities are identifying proactive ways to mitigate the causes of flooding to reduce the damages to people and property. In early 2014, the University of Michigan - Graham Sustainability Institute approached a team of Dow Sustainability Fellows about the City of Ann Arbor's (the City) request for legal and policy assistance in developing a floodplain management overlay ordinance.

As defined by the American Planning Association, an overlay zone is "a zoning district which is applied over one or more previously established zoning districts, establishing additional or stricter standards and criteria for covered properties in addition to [the standards] of the underlying zoning district."[1] This floodplain management overlay ordinance would have an immediate effect in supporting the community's adaptation to extreme precipitation and flooding events. In addition, it would also allow the City to realize a few major goals of its 2007 Flood Mitigation Plan: first to adapt to recent changes in the National Flood Insurance Program (NFIP) and, second, to take advantage of the Community Rating System (CRS) incentives for adopting more restrictive floodplain management strategies.

At the time of its request, the City had made only marginal headway on the ordinance because it was unable to find appropriate examples of floodplain management overlay ordinances in Michigan. Our team of Dow Sustainability Fellows, representing law, urban planning, public policy, naval architecture, and public health student agreed to partner with the City to develop this floodplain management overlay ordinance. Through this year-long project, we researched floodplain management overlay ordinances and developed a proposed ordinance for the City of Ann Arbor.

We began this project by analyzing the City's existing draft ordinance and reviewing the Ann Arbor 2007 Flood Mitigation Plan, Ann Arbor Allen Creek Greenway Findings and Recommendations Report, and the updated Federal Emergency Management Agency's (FEMA) floodplain maps for Ann Arbor. Next, we looked for floodplain management overlay

ordinances in cities with analogous geographies and populations to inform our approach to Ann Arbor's ordinance. Finally, we analyzed the legal and political feasibility of this new ordinance by gaining a thorough understanding of the existing regulatory framework and key stakeholders that would be impacted by the ordinance. Through this research and analysis, we strove to provide the City with timely and appropriate legal and policy recommendations for floodplain management.

VI. Pillars of Sustainability

We incorporated the three pillars of sustainability into our process and floodplain management overlay ordinance. The pillars of sustainability relate to floodplain management as follows:

1. Economic: Floodplain management overlay ordinances will impact potential development within the regulated area by imposing specific restrictions on the types of development permitted. We strove to understand how this kind of ordinance might impact future development, as well as current property owners within the floodplain.
2. Environmental: This ordinance protects open space and limits development within the floodplain, which will improve floodplain management in the area and help to remove wastewater pollutants from the floodwaters.
3. Equity: According to the American Community Survey (ACS), households affected by the newly proposed ordinance have a lower median income than the City, but these households are still subject to increased flood insurance rates. Thus, lower income residents are disproportionately affected by the increased flood insurance rates. By implementing a floodplain management overlay ordinance with heightened standards, the City can affect a substantial premium reduction for those that live within special flood hazard areas.

VII. Changing Weather Patterns

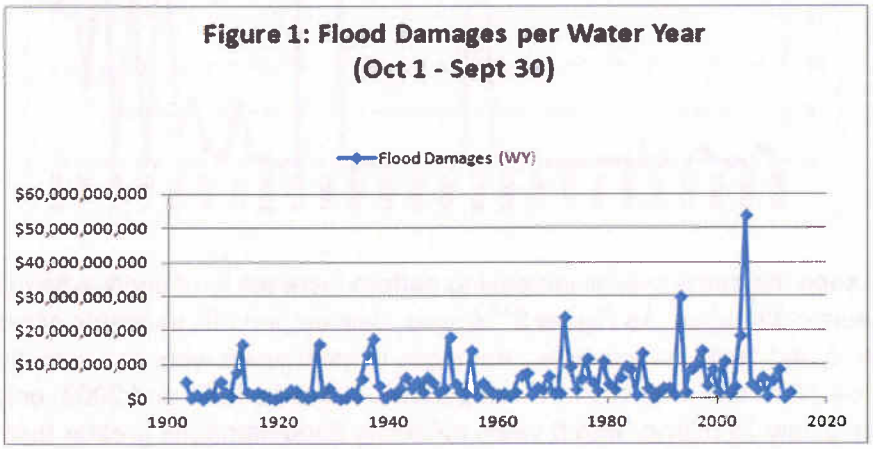
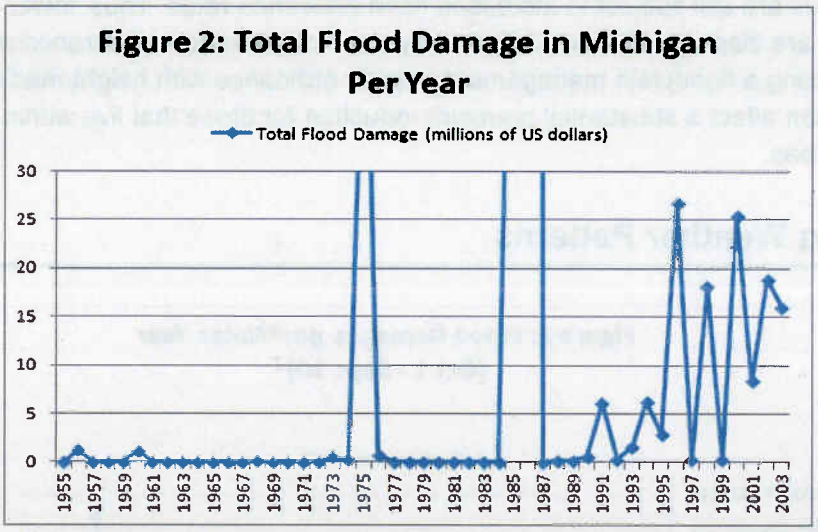


Figure 1: Flood Damages per Water Year (Oct 1 - Sept 30)

According to the Environmental Protection Agency (EPA), as a result of rising temperatures caused by global climate change, the air becomes more saturated with vapor, leading to more severe storms and greater precipitation.[2] Currently, the United States receives, on average, six percent more precipitation than it did 100 years ago,[3] and climate scientists predict that spring and winter precipitation will increase by between 20 and 30 percent by the end of the century[4]. This increase in precipitation has also led to a rise in severe flood incidents around the country in recent decades, as evidenced by Figure 1,[5] which shows a clear rise in the total amount of flood damages per water year since 1900. According to the U.S. Geological Survey, the term water year refers to a 12-month period, starting in October 1 of the relevant year and ending in September 30 of the following year; it is used to measure the supply of surface water supply during that time.[6] Even taking into account periodic abnormal flood incidents throughout the years, an upward trend is apparent.

This trend shows what James Lee Witt, then director of FEMA, argued as early as 1998, that "***there is no disagreement that the frequency and severity of what we call 'weather events' are on the rise***;"[7] even at that time, almost two-thirds of the disasters to which FEMA responded were related to flooding.[8] These disasters are not only occurring with increasing frequency, but are also causing more damage and having a higher negative economic impact than they used to. In fact, the National Weather Service's Hydrologic Information Center estimates that between October 1, 2012 and September 30, 2013 flooding caused approximately $2,152,417,080 in damages throughout the United States.[9]

Figure 2: Total Flood Damage in Michigan Per Year



Michigan has seen the same overall increasing pattern increase in of serious flood incidents and resultant economic damages. As Figure 2[10] shows, despite periodic incidents of extreme flooding (in 1975 and 1986, for example), damages in most years were consistently low, remaining below $2 million until 1991. In comparison, between 1991 and 2003, only 5 years had flood damages below $5 million, with 5 years reflecting flood damages greater than $15 million.