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Floodplain Management Circa 2050: The View from the Land Use Planner's Vantage Point

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Introduction

Tropical Storm Thelma struck the Philippines in November of 1991 killing over 6,000 people on the Island of Leyte. Most of the deaths occurred in and around the City of Ormoc where a massive flood destroyed two thirds of the city. It was the deadliest tropical cyclone in Philippine history. I was working in the country at the time as a community developer for the Christian Reformed World Relief Committee and was given the responsibility to help rebuild one of the villages with funds from the United States Aid for International Development and the Canadian International Development Agency.

How could so many people die from one storm? Most of the dead were living in squatter communities within flood plains and on deforested hillsides. The deaths were not ultimately the result of a natural disaster; they were the result of man-made conditions: poverty, lack of planning, poorly enforced building codes, no land use zoning, careless management of the environment (deforestation), and government indifference and incompetence.

I was pleased that I could help, representing my country, feeling somewhat smug, knowing that something like this could never happen in the United States.

In August of 2005, Hurricane Katrina devastated the Louisiana and Mississippi Gulf Coast, shattering my illusion of American superiority. At least 1,836 people lost their lives in Hurricane Katrina and in the subsequent floods. The man-made causes were essentially little different from those in the Philippines. I find myself morally outraged that this can happen in this country, the wealthiest and most technologically advanced nation on the planet.

This should never happen again. But I fear that it will because the root causes of the disaster aren't a lack of financial resources, knowledge, technological proficiency, or organizational expertise. Instead, as both of these man-made disasters illustrate, the challenge lies in the human social endeavors of planning, cooperation, proactive compassion, and caring for the earth.

It is through this lens that I peer into the future of 2050. From my vantage as a land use planner I consider the facts of continued robust population growth, increasing urbanization, global greenhouse gas induced climate change, stubbornly enduring professional isolation, and governmental fragmentation all combining to create the perfect storm for 2050 floodplain management. As a planner, I see it as my calling to consider the problem comprehensively and to identify the appropriate tools with which to address it.

Population Growth and Urbanization

Having passed the 300 million mark several years ago, the United States of America is expected to grow at a robust rate well into the future, adding an additional 100 million by 2040. By 2050 we could be well on our way to 450 million.

This population increase will not be evenly distributed. Seven out of ten newcomers will be in ten megalopolitan regions, constellations of socially and physically connected urban metropolitan areas with at least ten million population: These include the Northeast (*Richmond, VA, to Washington DC, to Boston),* Midwest (*Pittsburgh to Milwaukee*), Southland (*Los Angeles to Las Vegas*), Piedmont (*Raleigh, NC, to Atlanta, GA*), I-35 Corridor (*Kansas City, MO, to San Antonio, TX*), Peninsula (*Tampa to Miami to Daytona Beach*, *FL*), NorCal (*San Francisco to Reno, NV*), Gulf Coast (*Pensacola, FL, to Brownsville, TX*) Cascadia (*Salem, OR, to Seattle, WA, and beyond to Vancouver, BC*), Valley of the Sun (*Phoenix to Tucson*).[1] Some of these regions are witnessing increasing population density as well, a reversal of historic trends, particularly in the West where physical limitations and federal land ownership patterns hinder sprawl. Others such as the I-35

corridor and Piedmont are expected to sprawl at ever decreasing densities based on current trends and the abundance of land and interstate infrastructure.

Household size in the U.S. has been declining since the 1950s: from an average of 3.5 in 1950 to 2.6 today. At the same time the average size of single-family residences (still the predominant residential type) has more than doubled from 950-square feet in 1950 to 2,350-square feet in 2006.[2] There is an increasing demand for urban living in amenity rich, mixed use, and higher density neighborhoods. The demand for smaller lot sizes is outstripping supply. National market research studies consistently show 25 to 33 percent of housing demand to be for attached and small-lot detached homes.[3] Based on national market research, Arthur C. Nelson concludes that the market demand for new homes through 2025 may be almost exclusively for attached and small-lot units and that the existing supply of large-lot homes is sufficient to meet demand in 2025.[4]

More people, larger homes, greater density, and more impervious surface: much of this growth will occur in areas susceptible to flood and coastal hazards.

Greenhouse Gas Induced Climate Change

The United Nation's Intergovernmental Panel on Climate Change (IPCC) in its fourth assessment report notes that based on growing evidence, there is high confidence that the following effects on hydrological systems are occurring:

- Increased runoff and earlier spring peak discharge in many glacier- and snow-fed rivers; and
- Warming of lakes and rivers in many regions, with effects on thermal structure and water quality.[5]

In the Rocky Mountain West, where I sit comfortably safe from coastal hazards at 5,280 feet, this means lower snow pack, early melting, more flooding, and more wildfire, further compromising the ecological functions of forests to positively affect water flows and quality.

There seems to be little doubt among scientists that the oceans will indeed rise by another meter within the next 50-150 years. The IPCC report notes that coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Population growth and the rising value of infrastructure in coastal areas increase vulnerability to climate variability and future climate change with losses projected to increase if the intensity of tropical storms increases.[6]

Governance and Professional Realities

Governments are internally fragmented by vertical hierarchies and horizontal functional walls, while local, regional, state and federal governing bodies maintain varying external degrees of separation. In almost all cases our governing bodies are not well set up to deal with natural systems such as riparian complexes, coastal zones, and watersheds. Isolation between the professions, such as land use, public health, and transportation, serves to exacerbate the fragmentation by making it difficult or impossible to effectively deal with complex interdisciplinary issues such as flood hazards. Within our professions we have myopic viewpoints on many critical issues.

Below, a brief summary of the critical governance and professional realities we face:

1) *Weak federal and state planning law*—There is virtually no direct federal land use legislation and the vast majority of states merely enable local governments to regulate land use. Hawaii, Vermont, Florida, Oregon, New Jersey, and Maine are among the few states that do require the land use plans of local jurisdictions to conform to a statewide plan or meet specific state goals.[7] Most authority to regulate the use of land is delegated to the local

level, where increasingly the parochial concerns of NIMBYism (not in my backyard) frequently limit the ability to pursue sustainable policies.

2) *Local Government Fragmentation*—Local governments have police power to regulate for public health, safety, and welfare. This is a powerful tool, but it is extraordinarily fragmented geographically and by service type. In Chicago, for example, there are 138 municipalities (cities, villages, and incorporated towns) within Cook County's 956-square miles. In Colorado there are over a 1,000 special districts which provide a range of services including fire protection, flood control, parks and recreation facilities, development of infrastructure, mosquito control, safety protection, sanitation, solid waste disposal or collection and transportation, street improvement, television relay and translation, transportation and water.

3) *Professional Isolation*—Professional "silos of excellence" remain steadfastly separated, although we are seeing evidence of tentative reaching out as it is increasingly apparent that isolation is failing to address many critical environmental and social problems we all share. This isolation is manifest within local government operations where, frequently, civil engineering, land use planning, ecology, and environmental health are separate entities. For example, while the engineers are happily designing state-of-the-art flood control structures, the planners are approving "big-box" retail centers with acres of impervious surface parking lots, wherein they proudly plant a few pretty irrigated landscaping islands. The conservation biologists may have nary a clue about any of this until they notice riparian wildlife disappearing. The environmental health community struggles in the fight to maintain water quality as dramatically increased flows cause sedimentation and scouring of riverbanks.

   A prominent movement within the architecture and planning professions, New Urbanism, while very promising for improving human urban systems, fails to take natural systems and hazards seriously enough. These just don't seem to be nearly as cool and creative as coffee shops and pretty streets. Their myopic approach has led to surprisingly outrageous post-Katrina rebuilding plans within coastal hazard zones along the Gulf Coast, wherein only architectural and town design matters. Massive new urbanist building projects underway on the barrier island—on which sits Galveston, Texas—arrogantly state that man's works will prevail against any natural forces, ignoring the reality of past deadly hurricanes and the many that are sure to come.

An Agenda to Prepare for 2050

As a planner, I believe we must address the issue of floodplain management comprehensively. As a citizen, I believe we must be proactively compassionate, that is, address the issues of social inequity and powerlessness head on in advance of disasters. An agenda to prepare for 2050 should include the following:

1. *A renewed and invigorated land ethic*—Despite improved environmental awareness in our culture, we are still trying to dominate nature instead of working with it: engineered solutions to flood control; the ever expanding industrial agricultural landscapes; a continued excessive reliance on the automobile for transportation; failure to maintain adequately sized habitat patches and corridors for wildlife; and so on, the sorry list of unwise practices continues. A renewed land ethic respects and preserves the natural capital upon which we all depend.

2. *Mandatory interdisciplinary approaches*—A sustainable future requires an interdisciplinary approach to the myriad complex issues we face. We must move away from compartmentalized professionalism toward ongoing interprofessional dialogue and problem solving. This will require a reorganization of local government functions and a more cooperative relationship between governments mandated by states and the federal government where necessary.

3. *Planning leadership*—The professional land use planner is best positioned to take a leadership role because of the unique interdisciplinary and comprehensive nature of the profession. This necessitates that civil engineers, environmental health professionals, conservation biologists, and others must be engaged at all levels of the planning and throughout the implementation process. Too often engineers take the approach of finding a solution without questioning the underlying patterns and drivers, while the planners fail to understand downstream effects beyond political boundaries.

4. *Improved regional political integration*—Natural systems require coordinated efforts that match system boundaries and processes. Regional cooperation—either by mandate or by intergovernmental agreement—is critically necessary. Metropolitan Portland's (OR) regional planning and urban growth boundaries have long been touted as a model for political cooperation and integration. Denver's Regional Council of Governments has made significant progress in regional transportation and land use planning through voluntary pacts with local governments. These types of efforts must be accelerated in areas where local and regional planning are weak such as along the Gulf Coast and rural areas of the Rocky Mountain West.

5. *Stronger state land use planning laws*—The parochial nature of local governments is often a barrier to regulations that are necessary to deal with environmental issues. We may not have the time to wait for change. It may be necessary to resolve issues through state mandates. For example, in California local resistance to distributed energy solutions such as windmills and solar panels has led to state statues preempting local government zoning ordinances that restrict such uses. A similar scenario can be imagined for floodplain management.

6. *Proactive compassion*—As a people we are very compassionate when disaster strikes, quickly filling the coffers of relief agencies. However, we too easily ignore the underlying socioeconomic disparities and the needs of vulnerable populations, and fail to support strong regional and national governmental initiatives that would mitigate the inevitable disasters. A proactive compassionate approach would apply funds and resources to the existing problems in advance such that when natural disasters occur, the human impacts are minimized.

7. *Integrated and comprehensive land use codes at the local government level*—Without integrated and comprehensive land use codes at the local government level, we will not be able to effectively and in a timely manner deal with the complex issues that effect floodplain management and hazards. To address the complex issues of our day in a socially responsible and enduring manner, development codes must take a dramatic evolutionary leap to an entirely new model, if it is to remain relevant in addressing the array of global, regional, and local environmental and social issues we face today.

The Rocky Mountain Land Use Institute is taking up this challenge in its Sustainable Community Development Code initiative which incorporates the following features:

1) Comprehensiveness of topics;
2) Artful and intelligent integratation of natural and man-made systems;
3) Progressive approach, drawing upon useful features of other code types, already proven and in use, in the areas of design, procedures, performance standards, incentives;
4) Based on a sustainable comprehensive policy plan and long-term civic engagement; and
5) Contextually tailored to local and regional climate, ecology, and culture.

Natural hazards regulations are a critical and important component of a sustainable community development code. Their objectives should include increasing safety and the protection of natural ecological functions. Specifically this means minimizing steep slope disturbance, restricting development within flood zones to avoid any adverse impact to floodplains, and requiring the practice of green infrastructure/low-impact development for effective storm-water management. But it doesn't end there: most elements of a development code, from parking requirements to protecting forest ecosystems,have a bearing on flood plain management. Ultimately, regardless of a community's brilliant engineering and best practices in floodplain management, the work can be easily undone by myriad harmful regulations and practices elsewhere beyond its control. Only a multi-disciplinary approach coordinated at all levels of government will ensure a safe future.

References

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[3] "Leadership in a New Era*," Journal of the American Planning Association*, Autumn 2006, p. 397, Arthur C. Nelson, citing Robert Charles Lesser & Company, a national market analysis firm.

[4] Ibid.

[5] "Summary for Policy Makers," *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, item 1.3, Brussels, Belgium, April 20, 2007.

[6] Ibid, items 14.2 and 14.4.

[7]David L. Callies, Robert H. Freilich & Thomas E. Roberts, *Cases and Materials on Land Use, 3rd ed., p. 610,* West, 1999; *see also* Robert H. Freilich*, From Sprawl to Smart Growth: Successful Legal, Planning, and Environmental Systems,* American Bar Association, pp. 209-239 *for a discussion on smart growth in the States* (the first states to implement statewide planning were Hawaii in 1961, Vermont in 1970, Florida in 1972, and Oregon in 1963).

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