

The Need for a Resource Conservation Ethic in Flood Risk Management

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The floodplains of the United States and the rest of the world are finite land areas with specific natural functions and accompanying resources. Floodplains also are vital to human existence and to the ecological balance of the planet. Competing demands between the needs of the ecosystem and the needs of humans threaten this essential resource base. In short, floodplains and the value they provide are an exhaustible commodity. This simplistic and perhaps philosophical description of floodplains and their resources, however, is barely recognized and poorly understood in modern floodplain management policy and practice.

A Little Perspective

In the late 1960s and into the 1970s, national policy advances were made that provided a glimpse of the interconnections among floodplains, wetlands, and environmental objectives. The U.S. Water Resources Council brought attention to the “natural and cultural” resources of floodplains in 1979 (U.S. Water Resources Council, 1979) and their importance was emphasized in each subsequent edition of *A Unified National Program for Floodplain Management* (Interagency Task Force on Floodplain Management, 1986; Federal Interagency Floodplain Management Task Force, 1994) and given prominence in a subsequent national report devoted solely to floodplain functions and services (Task Force on the Natural and Beneficial Functions of the Floodplain, 2002).

However, outside of limited regulation of wetland areas provided by the Clean Water Act, little has been done to further a national policy line that fully appreciates and understands the role that the natural resources within the floodplain play in our nation’s future well-being—as measured in safety, resource economics, quality of life, and the simple knowledge that abundant, healthy floodplains continue to exist in our landscape.

Now, in 2009, our nation and much of the developed world are introducing the concept of “flood risk management” in an attempt to better grapple with the ever-increasing economic losses and social disruption caused by flooding. Flood risk management is a powerful concept that should allow managers at all levels to better understand the risk a given area faces as a result of flooding and, if properly implemented, this approach will allow us to evaluate precisely how management and policy directions influence long-term risk. However, “flood risk” under this framework is most commonly understood to be concerned with impacts to the built environment and/or threats to the safety of people, to the exclusion of the resources and services provided by naturally functioning floodprone areas. This unnecessary boundary on “flood risk” may, unfortunately, lead to even further separation of natural functions from floodplain management in our subsequent policy and practice.

There is a need to bring floodplain management to maturity as an inter-disciplinary profession and as a policy goal in a manner that more effectively balances and considers concerns about life safety and the built environment along with the value and condition of our floodplains’ natural resources. Floodplain management must be broadened from a discipline of engineers and planners to more fully incorporate the skills and experiences of natural resource managers. Now, more than ever, we must include in floodplain management a natural resource conservation and management ethic.

A Rationale for Action

This vision, however, does not answer the essential questions related to the incorporation of a natural resource management ethic, primarily, Why? and Why now?

There are many critical reasons why we should properly protect the natural resources, functions, and services of our floodplains. Perhaps most persuasive is that, looking primarily inward, a nation's natural resources are its economic underpinnings. A nation must have a resource base to clothe, feed, and provide the raw materials for the production of necessary material goods—all essential contributors to a healthy national economy and a healthy population now and in the future.

In their 1980 book, *Economic Theory and Exhaustible Resources*, Dasgupta and Heal called attention to the fact that 20th century economics, in contrast to economic theories of previous centuries, did not fully consider natural resources as constituting a limit on an economy, nor did it, at least, explicitly assume that slight price fluctuations could counteract any negative impacts on the resource base. In essence, the perception of an abundance of natural resources—either due to their sheer volume or to improved methods of extracting, transporting, and efficiently using them—had created the illusion of an unlimited supply. But in many instances today we can see current, and predict future, shortages and the tradeoffs that must take place and will continue to occur with these vital resources. We can no longer afford to think of our floodplain resources as inexhaustible entitlements.

One only need look at our nation's water resources infrastructure and floodplains to recognize that much of our infrastructure and investment has occurred with little consideration having been given to a long-term resource conservation strategy. Water resource economics has been—and still is—focused primarily on the financial benefits of short-term developed uses with little, if any, accounting for the lost opportunity costs to the nation brought about by the demise of critical floodplain resources and functions—such as natural habitat, aquifer recharge, water filtration, flood storage and conveyance, open space and aesthetic pleasure, contribution to biodiversity and watershed health, and others. Flood protection programs of the federal government, by policy mandate, must maximize the National Economic Development (NED) return on any investment. Authorizations for many of these programs come from the Water Resources Development Act.

It is not surprising, then, that our national floodplain management policies and programs reflect a bias towards protecting developed—rather than undeveloped—uses and that project analyses are virtually incapable of demonstrating a flood loss reduction benefit for open space or for natural resource conservation. Again, this policy line evolved during a time when there was a desire to expand the human footprint on the continent by leveraging these resources to establish the nation's economic dominance. But this also occurred during a time when water-based resources were viewed as being without limit (even though we did have to create an infrastructure to capture and transport them) and with little concern for the long-term tradeoffs in opportunity costs or in loss of resource volume and condition. Today, however, we do have the choice—and the responsibility—to manage both finite resources as well as renewable resources in a manner that is sustainable. The other option is to continue in our present manner, which ultimately will lead to the permanent loss of the quality and/or volume of those very resources and the benefits and services they provide.

Forestry and Agriculture as Analogs

Our nation's history has many examples of how we have moved from a management mind set of “resources without limit” to recognizing that specific resources could be exhausted or degraded, to the nation's detriment. About a century ago we came to the conclusion with our forests and agricultural lands that, if we did not modify the way in which we managed these resources, we would

ultimately lose the ability to provide agricultural and forest products essential to our people and our economy. There most certainly were those that viewed these resources purely as mechanisms with which to expand the nation's economy with little appreciation of the long-term damage this exploitation could have on the very goals they aspired to achieve. There also most certainly were managers stuck with using practices little changed for generations. The dust bowl of the 1930s and the rampant deforestation of the late 1800s brought into focus just how fragile our seemingly unlimited resources were, along with a recognition that change was needed.

Today and into the future we face similar challenges with the natural resources of our floodplains. One only need look at the symptoms to more fully appreciate the hurdles we face: fisheries in decline and a nation that can no longer support its population with fresh and saltwater fish; water supplies at the brink of snapping due to oversubscription accompanied by a contradictory need to provide for a rapidly growing population; flora and fauna stressed with untold and unrecognized long-term impacts; and a changing climate that will only further strain these resources. Unfortunately, the rest of the world also faces the same challenges.

To continue to promote a national flood policy that does not fully consider the value of these resources—to practice floodplain management in a manner that does not embrace a conservation ethic—would be akin to our nation's having turned its back on the deforestation of the late 1800s, or to failing to change our agricultural practices during the 1930s.

To Move Forward

There is ample evidence to suggest that floodplain management must embrace a natural resource ethic—as has been done admirably in isolated situations. If we do not do this on a nearly universal basis, we risk responsibility for the collapse of our water-based biotic systems with potentially disastrous impacts on our economy, our well-being, and our future. To establish such an ethic, however, will require a number of modifications in approach. For purposes of discussion these are grouped into the following categories.

- Policy
- Practice
- Education
- Vision.

Policy

We need to evaluate fully our water and associated land management policies to ensure that all our practices are aligned and that they give due consideration to the natural functions and services of floodplains. To date, our primary strategy has been that of environmental regulation, which, as conservationists know all too well, essentially means presiding over the orderly demise of these systems, rather than preserving or managing them. As a starting point, current discussions on flood risk must be broadened to consider both “flooding risk” and “floodplain risk.” These are not the same topics nor is it likely that they can be quantified as a single number. Rather, any indicators of flood risk and floodplain risk that are devised must be managed jointly, furthering our understanding of the tradeoffs among levels of risk, short-term economic gains or losses, and long-term impacts on resources.

Practice

Broad goals such as “protect and restore” the natural resources and services provided by floodplain lands (as declared in numerous official documents) are all well and good but, just as with flood risk management, more carefully targeted direction is needed. Without defined targets we

cannot ensure for future generations any semblance of the natural riparian and coastal resources that have been in place on the continent for millennia.

Quantifying the services provided and the value of the functions and resources of floodplains is essential to crafting management targets and assessing progress, but the technique is only in its infancy (see, for example, Riley, 2009; and Swedeen and Pittman, 2007).

A number of methods are available in the natural resources conservation field to set values on the various services, functions, and resources provided by lands in their natural or nearly natural condition. Setting such values, although not an exact science, is necessary if progress is to be assessed and, perhaps more importantly, if the worth of such lands and resources is to be adequately incorporated when decisions are made about activities within a given watershed. Among these methods are benefit/cost analysis, by which the economic values of floodplain services are “plugged in” to the standard decisionmaking tools (see, for example, Kroeger and Manolo, 2006); ecosystem valuation, which uses various market and non-market techniques to establish the “worth” of natural functions and services (see, for example, King and Mazzota, 2000); economic impact analysis, which establishes the financial benefits of various protection strategies (see, for example, Rivers, Trails and Conservation Assistance Program, 1995); and ecological risk assessment, which evaluates the likely harm to ecosystems in the face of human activities or extreme events in nature (see, for example, Suter, 2006).

These methods, and others, need to be evaluated for their applicability to floodplain resources and services. Appropriate means must be established to ensure that these irreplaceable values are factored into program and policy goals, and into local decisionmaking.

Education

Floodplain management professionals of the future should include engineers, planners, and natural resource managers, among others. Those in the field today should be challenged to obtain additional formal or informal training in natural resource management practice and its theory. There is a need to recognize that optimal outcomes for natural resources do not simply happen, but rather are the result of a systematic management strategy and approach—whether the desired outcome be enhanced resource production, the set-aside of some areas as riparian preserves, or some other balanced set of objectives.

Vision

The nation needs to enunciate a vision of the 21st century and beyond that reflects all of our new realities. As demonstrated in the ASFPM Foundation’s second Gilbert F. White National Flood Policy Forum, “Floodplain Management 2050” (ASFPM Foundation, 2008), the nation faces unprecedented changes in population growth, advancements in technology, an altered climate, and, finally, the combination of all of these, that will have impacts on flooding risk and floodplain resources never seen before. We are no longer a nation of limitless lands and resources, particularly when compared with our large and growing population. However, we are a nation with a wealth of resources that can be sustained, given the necessary attention and management. Failure to craft a modern vision in tune with these new realities will needlessly limit our economic well being, growth, and ultimately our quality of life for generations to come and, perhaps, forever.

To Sum Up

As part of a national flood risk management strategy it is vital that we consider flooding risk (threats to the built environment and life-safety threats) and floodplain risk (threats to the natural resource functions that are dependent on the floodplain). To accomplish this we must both allow

room for these parallel objectives in our thinking, and also work towards establishing a resource conservation ethic within the practice and within our policies. Failure to do so will likely lead to further division between the co-equal objectives of floodplain management (loss reduction and management of natural functions); and further erode the real underpinning of our nation's economy—a healthy and bountiful foundation of water-related natural resources.

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