

Maximized Flood Risk Reduction Benefits of Riparian Buffers

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As part of a broader flood risk reduction strategy, well-designed processes to create riparian buffers have the potential to satisfy both the demand to reduce disaster impacts and encourage positive growth. However, market pressures and scarce resources require that preservation activities be implemented in the most efficient manner available. In addition, maximizing flood risk reduction benefits requires intentional location and methods of creation as well as extensive outreach efforts to both garner public support and influence property owner decisions in and around the preserved riparian corridors. Simply requiring a building setback from a watercourse certainly has direct flood risk reduction benefits. However, the potential for risk reduction can be much greater when the riparian corridor is preserved or rehabilitated to a natural vegetative state and property owners are persuaded to make decisions that allow the riparian corridor to maximize the natural floodplain functions.

Creation of riparian buffer zones can provide a significant economic benefit to property owners and encourage community-wide growth. Quantifying the risk reduction values of preserved vegetated riparian corridors is difficult due to the indirect nature of some of these opportunities. However, evaluation can be considered through both avoided costs as well as increased real estate values surrounding the natural amenity. Benefits of a naturally maintained watercourse include dissipated peak flows and velocities, balanced sedimentation and erosion processes (that help maintain channel location and minimize meandering), and groundwater recharge. These beneficial functions of a natural floodplain can reduce both the number and extent of flood events. The savings associated with avoided flood damages is one of the most straight forward ways to quantify potential value. Reduction in costs are also associated with maintenance of natural flood water storage capacity through reduced stormwater infrastructure costs. Vegetated riparian corridors provide decidedly superior pollutant filtration, and can reduce costs of silt fencing, monitoring, reporting *etc.* that must be borne by both the developer and the community. The cheapest path to improved drinking water quality is preserving the natural function of the vegetated stream corridor.

Community-wide positive growth can be supported by protection of riparian buffers. Many times, the integrity of our natural systems is critical to maintaining the recreation-based tourism sector of the economy. In addition, real estate values are increased simply by proximity to natural amenities such as an unspoiled natural stream corridor. Whether it is a result of the view, access to recreation, the intangible feeling associated with a connection to nature, or some other reason – people will pay more to live near a natural stream corridor. Probably for this reason, many companies consider natural amenities an important part of their criteria for choosing a location. By preserving or rehabilitating a natural stream corridor, the nearby development potential will dramatically increase in value. Of course, simply creating a riparian buffer will not immediately produce these benefits. Maximizing the risk reduction benefits of these buffers requires a number of intentional efforts including prioritized method and location of buffer, public participation in decision-making, implementation of a management plan, and clear connections to a watershed-based risk management strategy.

Prioritized Method and Location of Buffers

Strategically locating riparian buffers for optimal risk reduction will require extensive consideration of the unique local characteristics. While there are a variety of possible methods to create riparian

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buffers, the most efficient method may vary based on development patterns, geography, political constraints, and other factors. Legal adoption of setbacks to establish riparian buffer zones, outright purchase of land, conservation easements deeded to open space, purchase or transfer of development rights and project design that intentionally avoids identified riparian areas are a few options. Buffer zones can be adopted through local zoning, subdivision, NFIP floodplain, or stand-alone ordinances specifically designed to implement buffers. Within these local codes are a variety of forms including overlay or floating zones, specific districts, and qualified easement requirements. Just a few options for establishing regulatory setbacks are single or variable minimums, differing use zones, and watercourse-specific applications. Communities have great flexibility in the application of this type of regulation as long as it can be clearly tied to the health, safety, and general welfare of citizens.

Prioritization of location requires vulnerability analysis to determine which areas most need protection. High development pressure identified by recent growth and anticipated watershed development trends may warrant attention; however, existing or anticipated investments such as infrastructure as well as land characteristics that enable development should also be considered. Of particular importance in identifying priority locations, is protection of environmentally sensitive areas such as headwaters, wetlands, endangered or threatened species habitat, and/or connectivity to these resources. Creating continuous green corridors should be given special consideration for the ability to strategically serve multiple objectives, drastically improved ecological function, as well as their advantage in floodwater absorption and storage capacity. Existing water quality measures can help to identify other highly functioning ecological systems that deserve special consideration including NDPES attainments, high scores on qualitative habitat evaluation index (QHEI) and index of biotic integrity (IBI), or other established measures of quality such as Scenic River or Cold/Warm Water Habitat designations. Especially in the event that a vulnerability analysis shows a particular need for flood risk reduction in an area that does not have an existing high quality watercourse, rehabilitation opportunities should be considered for currently degraded watercourses. Further, uncovering culverted streams through the process of “daylighting” has significant potential for urban areas that are in need of flood risk reduction and are willing to explore creative alternatives.

Public Involvement in Decision-Making Process

Putting forth the effort for involving the public as critical stakeholders in the decision-making process of developing and implementing a flood risk reduction strategy is crucial to success. Public participation benefits the process by improving outcomes, enabling politicians to securely make decisions based on the long-term community vision, and garnering public support for bringing riparian buffers into the future. Collaboration with stakeholders allows for the collection of a wide breadth of expertise, historical perspective, and personal experiences that local officials may not otherwise have accessed. In an effort to efficiently and effectively use our scarce resources it is important to tap into this important knowledge base. Also, full consideration of alternatives in a public forum assists in tailoring solutions to local needs. Without an earnest effort to solicit public input it is difficult for sometimes-controversial land use control efforts to gain credibility. Perhaps most important, long-term support of riparian buffer programs is necessary to maintain the flood risk reduction benefits. If public support is lost the regulatory setback can easily be repealed or maintenance and administrative funding for enforcement can be withdrawn. Emerging from public participation is a sense of shared responsibility for the success of the program.

Half-hearted efforts to involve the public can be counter-productive to these endeavors. Strong facilitation of group discussion as well as providing a valid opportunity to offer input into assessing a range

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of alternatives, is crucial. Citizens must be educated on the actual risk – which is frequently very different than perceived risk – and then provided the opportunity to participate in determining how to best implement a solution. Public skepticism of the actual risk stems from vague information that hasn't been well disseminated. To combat these problems, present a well communicated risk assessment or vulnerability analysis. Public understanding of exactly who and what is vulnerable helps build support for solutions, such as riparian buffer creation. Enabling personal connection to both the resource and process can grant local officials the political backing necessary to bring about change. Participation strengthens citizen satisfaction and empowers stewardship, which carries maintenance of riparian buffers into the future.

Implementation of a Maintenance Plan

A clearly articulated maintenance plan with continued public outreach is critical to capitalize on the full risk reduction benefits of riparian buffers. Local efforts will be maximized by proper management of the protected lands and surrounding areas. With most riparian buffers this requires that property owners make choices in land use that are compatible with maintaining the natural vegetated state. While enforcement may be an option, it requires administrative authority and physical access to maintain the desired vegetative state once it has been achieved. Funding should be built into the maintenance plan to allow for some upkeep of riparian species, invasive species control, marking boundaries of protected land, and general enforcement of maintenance.

Aggressive public education and outreach efforts on maintenance, allowable and prohibited uses, as well as best management practices can be built directly into the funding mechanism. Successful public education can be accomplished through local governmental efforts; however, they can be dramatically enhanced by partnering with other entities with similar goals. County Soil and Water Conservation Districts are a particularly powerful partner due to their existing administrative infrastructure, relationships with property owners, and a tremendous wealth of local knowledge. There are many other partnerships that could enhance outreach efforts including local watershed groups, non-profit environmental conservation and land trusts, as well as local schools and universities.

Strong disincentives for returning the land to production or development should be clearly laid out. To maintain political support for such enforcement efforts, it is crucial to clearly communicate permitted/prohibited activities and their appropriate locations. In addition, a great deal of effort must be expended to educate the public and dispel commonly held myths that the structural methods of erosion control, bank stabilization, and dredging are beneficial to long-term flood control.

Conclusion

Support for local efforts in creating vegetated riparian buffers as part of a comprehensive risk reduction strategy can be found through watershed-level management. Finding holistic solutions to mitigating adverse development impacts is most successful when conducted as a multijurisdictional effort where both Priority Conservation Areas and Priority Development Areas are identified and incentivized. In this way, watershed-level management can also help to reduce the strains of regional competition through alignment of policies. By combining resources and reducing political fragmentation, many challenges to implementing risk reduction solutions can be overcome. Cohesion amongst jurisdictions in adopting riparian buffers enhances recreational value, which can boost citizen satisfaction and support; improve ecological function, thus improving flood reduction capabilities; and overall maximize the monetary investment of the program. Clearly, a flexible approach, driven by public demand for efficient sustainable solutions to flood risk is needed. As part of watershed-based planning efforts to reduce flood risk, the benefits of vegetated riparian buffers can be maximized.