

A PRIMER ON FLOODPLAINS AND FLOODPLAIN MANAGEMENT



Part 2

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In the first part of this article, published in the July/August 2008 issue of Right of Way magazine, we introduced the basic terminology of floodplains and floodplain management. Now we can investigate the land use aspects of floodplains.

Floodplains are an environmental land use restriction that may be regulated by law, or may simply dictate land use through Mother Nature's own laws. Land that may be periodically covered by water is possibly the most desirable location for a proposed right of way, but what difficulties are we likely to encounter in terms of construction, facility maintenance, or disaster planning in the face of possible or probable flooding?

WHY SHOULD WE CARE ABOUT FLOODPLAIN MANAGEMENT?

If we don't live or work in a floodplain, why should we care about floodplain management? There are a number of reasons to be concerned. Flooding that occurs in one area absolutely affects other nearby areas. Flood-damaged businesses close for repairs and their employees lose income, sometimes even losing their jobs when a business is affected too severely to recover. Transportation routes through flood-prone areas isolate area residents and

workers when rising waters make these roads and rails impassable. Utilities damaged by flooding can no longer service area citizens dependent upon those facilities.

While not all floodplains are wetlands and not all wetlands are floodplains, they serve similar beneficial purposes beyond the generally acknowledged open space benefits of wildlife habitat and human recreation. In their natural state, floodplains and wetlands protect other areas from flooding by absorbing floodwaters and delaying them from their path of destruction, holding water in the soil and vegetation.

Water quality is also affected by the action of water in a floodplain. Soil particles scoured from the earth's surface by water erosion travel into fish habitats and human drinking sources. Protecting an area from more serious flooding can mean less sedimentation in our streams and rivers, keeping water clear and clean.

When acquiring land for rights of way, we have legal and logistical concerns about use and protection of lands subject to flooding. Use of one property affects adjoining sites, and we may find ourselves liable for increasing hazards elsewhere in the watershed. The Association of State Flood Plain Managers (ASFPM) has developed

an extensive public awareness program called No Adverse Impact, in which it states, "The action of one property owner does not adversely impact the rights of other property owners, as measured by increased flood peaks, flood stage, flood velocity and erosion and sedimentation." In other words, we must be good neighbors if we expect others to respect our property rights in return. More information on No Adverse Impact is available on the ASFPM website at www.floods.org.

WHAT ARE THE MOST BENEFICIAL AND LEAST RISKY USES OF FLOODPLAINS?

As water moves, it tends to scour particles from the bed and sides of the channel conveying it. This natural action of erosion can mean that the water channel can shift, as softer soils are ripped away and floating particles are dropped as sediment in new areas. Migrating stream beds and either gradual or dramatic failure of riverbanks can be the result. When we build in a floodplain, obstructions erected in the path of stormwater can change flow patterns and erosional patterns, not only during the 1%-annual chance flood but in every rain event. Even the placement of fill to raise a site serves as such an obstruction. While floodwaters will no longer inundate the raised area, the water won't magically disappear and needs somewhere to go. That "somewhere" can be into areas not previously considered flood prone. We experience similar results every time we add impervious area in a watershed, not just pavement, but rooftops that do not allow precipitation to percolate into and be absorbed by the soil.

But there are uses of floodplains that cause less harm to the environment and can add value to the neighborhood. In considering these options, the common theme is assuring that water will not be impeded in its flow or diverted toward other areas in the floodplain or onto adjacent lands, that water velocity or depth will not be increased by activities either in or adjacent to the floodplain, and that water penetration into the ground will not be diminished.

Leaving a floodplain undeveloped has its advantages. It preserves wildlife habitat, allows passive recreation, such as hunting, bird watching and hiking, and does not add to further deterioration of the floodplain's natural functions. Leaving open ground allows water to soak into the soil, recharging the aquifers that service our drinking water needs, as well as the lakes and streams whose existence depends on a constant water flow.

Environmentally aware planners incorporate these concepts into regional plans, looking at the entire area rather than a single isolated site to assess the cumulative effects of development and infrastructure. Passive recreation is most often recommended for floodplains. But other water-dependent uses, such as marinas and boat launching are reasonable activities that generally have less impact on a floodplain than covering the ground with structures or paving.

While we may consider the placement of poles and towers to be minimally invasive, remember that storms can rip wires from support structures, creating a hazardous mix of electricity and water. Similarly,



(Photo Courtesy Marvin Nauman/FEMA)

As the bank continues to erode away from flooding damage only three months earlier, this home is slowly falling into the Skyomish River in Washington.

a small diameter gas conduit may not seem like much impediment to percolation, but severe flooding can cause subsidence and sinkholes that rupture pipelines. Consider alternative locations, or plan additional protection for facilities when the floodplain cannot be avoided.

WHAT ARE THE EFFECTS OF FLOODPLAINS ON RIGHT OF WAY ACQUISITION AND MAINTENANCE COSTS?

Land managers should check for environmental restrictions and regulations while planning and siting the right of way, particularly if they intend to install structures, such as towers, transformers or impervious surfaces. Several levels of governmental regulations must be navigated before permits for clearing, construction or grading may be allowed.

Awareness of these additional restrictions and the additional costs of maintaining a site that is subject to flooding may allow the land manager to negotiate the acquisition cost, whether purchased or leased. Know what one-time and annual expenses you are likely to face in obtaining the right to use the proposed right of way in the desired way and for the desired purpose. One of these expenses may be flood insurance, especially if a structure within the floodplain is to be financed through a government-regulated lender. In such instances, federal regulations in the U.S. mandate flood insurance coverage before financing can be released. If the borrower refuses to purchase insurance, the lender has the right to force-place it and include that cost in escrow funds.

Once a right of way is acquired, the manager should monitor relevant regulatory changes that could impede proposed alterations to the right of way. If a community has re-studied and re-mapped its floodplains and identified floodways, for example, it may require special permits for excavation to maintain facilities or even prohibit the addition of a second pipeline within an existing easement. Monitoring local regulatory activity makes coping with newly placed environmental restrictions (after acquisition) less of a surprise and less antagonistic, particularly if the right of way manager provided views during the public hearing stage of the map change. Such increased local presence should be accounted for in determining the cost of right of way maintenance.

Similarly, when floodplain mapping is updated to include a site not previously identified as within the Special Flood Hazard Area, while financing is still through a government-regulated lender, mandatory flood insurance coverage will be enforced even after closing has taken place. However, regardless of whether or not acquisition has been financed, map changes can trigger imposition of more stringent construction and land use oversight by the community and the State.



(Photo Courtesy Leif Skoogfors/FEMA News Photo)

FEMA's Rapid Response team, the U.S. Public Health Service, and the U.S. Army Corps of Engineers examine torn gas lines after storms ripped away the road surface that formerly covered the lines in Sycamore, WV, 2001.

WHAT ARE THE EFFECTS OF FLOODPLAINS ON ACCESS TO THE RIGHT OF WAY?

There are two main effects of floodplains on the use of a right of way. The first is directly related to the topography and environment of the floodplain itself. Rights of way located in a periodically wet location are difficult to access because they are under water. Inspection and maintenance become problematic, even hazardous. Further, depending upon what other land uses are within the same watershed, the water covering the right of way may be contaminated by agricultural, chemical, or sewage effluents, including drowned animals and overflow of sanitary sewer systems. Even after the water recedes, the site may be dangerous and require a controlled clean-up effort.

The second is the effect of the floodplain on regional utilities and roads. This is a disaster planning issue. Flooding can damage infrastructure within rights of way, affecting regional services far beyond the immediate vicinity. It becomes critical to plan emergency evacuation routes and

“...severe flooding can cause subsidence and sinkholes that rupture pipelines.”

alternative access routes during the siting and design phases of any project. Nearby roads that are normally accessible may be congested during an emergency due to the extra burden of handling traffic from flooded routes.

On some stream reaches, high flows will cause stream bank erosion, channel bottom erosion, deposition, or migration. These processes occur either in addition to overbank flooding or in place of overbank flooding along rivers and streams. In some places prone to these processes, more property damage is caused by erosion or channel instability than by overbank flooding. Land that appeared superficially to be safe from flood hazards may literally fall into the stream channel or become part of a new, relocated channel. Severe deposition can raise the channel bottom sufficiently to cause substantial localized increases in flood elevations, thereby subjecting land to the Special Flood Hazard Area that was formerly out of that 1%-annual chance floodplain. Buildings already constructed on such land, originally safe from flooding, are suddenly placed at risk.

Flood hazard mapping in the U.S. does not provide any information regarding erosion or channel instability for either coastal or riverine areas. In fact, maps are developed based on a “snapshot” showing the actual conditions at the immediate time of the flood study, without considering possible future changes. For more information, the Code of Federal Regulations (CFR) offers some guidance. See 44 CFR 60.5, “Floodplain management criteria for flood-related erosion-prone areas” and 44 CFR 60.24, “Planning considerations for flood-related erosion-prone areas.”

WHAT ARE THE REGULATORY RESTRICTIONS ON FLOODPLAIN DEVELOPMENT, AND WHO ENFORCES THEM?

In both Canada and the U.S., federal agencies establish minimum criteria for safe use of floodplains. The 1% annual chance floodplain has been legislatively established in the U.S. as the trigger for floodplain management controls. Regulatory restrictions can prevent construction of any new structures or additions to existing structures within the floodplain, require floodproofing or elevation of structures and accessories, and prevent certain uses for new or existing structures (such as prohibiting hospitals, prisons or schools in floodplains due to the problem of evacuation).

Floodplain management and regulation occurs at the community, state, provincial and federal level. There are two purposes of protective measures in floodplains – one is to protect human life and property, and the second addresses water quality. For this reason, there are a number of regulations affecting floodplain activities, with state regulations emulating the federal programs and local

ordinances refining the state/provincial and federal regulations to fit local conditions. State/provincial and local regulations may be more stringent than the federal rules, but never less stringent. This means that the land manager must check rules and regulations at several agencies to understand the full impact on use of the floodplain.

In the U.S., the Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to reduce risks due to flooding. Land use and floodplain management requirements established at the federal level must be adopted as the minimum criteria for state and local regulations. More stringent regulations may be adopted and enforced, such as establishing a greater restriction on type of land use, type of construction, and floodproofing or elevation structural requirements. Similarly, in Canada, the provincial Ministries of Natural Resources must adopt equal or superior floodplain management regulations to the minimum established by the federal government. In both countries, there may be additional regional watershed and river commissions with jurisdiction.

CONCLUSION

Understanding that floodplains are not evil impediments to our development plans is an important step in protecting these valuable natural resources. As we learn to respect floodplains for the safeguards they offer to other sites and acknowledge that natural forces will ultimately prevail, we can determine how best to utilize them. If we maintain structures within floodplains and flooding repeatedly damages them, regulations may require us to remove or substantially alter them to better withstand future flood events.

For more information on floodplain identification and mapping or the National Flood Insurance Program in the U.S., a wide range of technical and plain language material is available on FEMA’s website at www.fema.gov. Federal regulations are published at Title 44 of the Code of Federal Regulations (44 CFR), Sections 59 through 79. Remember to check state and local community governments for other guidance and restrictions regarding floodplain use. ☺