

SECTION 13: ADDITIONAL REGULATORY MEASURES

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13.1. INTRODUCTION

The NFIP regulatory standards are minimums. They may not be appropriate for every local situation or unique circumstances. Therefore, communities are encouraged to enact more restrictive requirements where needed to better protect people and properties from the local flood hazard.

This section reviews the more common regulatory approaches that exceed the NFIP's minimum standards which result in a better and more appropriate local floodplain management program.

Many of these more restrictive requirements are eligible for credit under the Community Rating System (CRS), a program which provides insurance premium discounts to policyholders in communities with more restrictive floodplain management programs (see Section 18).

44 CFR 60.1(d) *The criteria set forth in this subpart are minimum standards for the adoption of flood plain management regulations by flood-prone... communities. Any community may exceed the minimum criteria under this Part by adopting more comprehensive flood plain management regulations utilizing the standards such as contained in Subpart C of this part. In some instances, community officials may have access to information or knowledge of conditions that require, particularly for human safety, higher standards than the minimum criteria set forth in Subpart A of this part. Therefore, any flood plain management regulations adopted by a State or a community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence.*

13.2. LOCATION RESTRICTIONS

Where the hazard is so severe that certain types of development should be prohibited, a location restriction provision may be appropriate. Some communities prohibit some or all development in all or parts of their floodplains. A common approach is to prohibit particular structures in the floodway or areas exceeding certain flood depths or velocities.

Because this is the most restrictive higher regulatory provision, location restriction language has to be drafted carefully to avoid a taking challenge. Sometimes, a community can tie transfers of development rights or other benefits to a development that avoids the flood hazard area. These types of “win – win” situations benefit everyone and reduce the potential for challenging the ordinance.

13.2.1. Highly hazardous areas

Prohibiting development makes sense in high hazard areas, where people are exposed to a life-threatening situation even though buildings could be protected from flood damage. For example, it would be appropriate to prohibit development at the base of a bluff or along a narrow floodplain in a stream valley that is susceptible to flash flooding.

13.2.2. Subdivision design

Undeveloped land, still in large tracts, offers the best opportunity to limit where certain types of development will be located. When a developer wants to subdivide the land, communities have many tools to arrange the development so that buildings are kept out of the floodplain. This has two advantages over simply requiring the buildings to be protected from flooding:

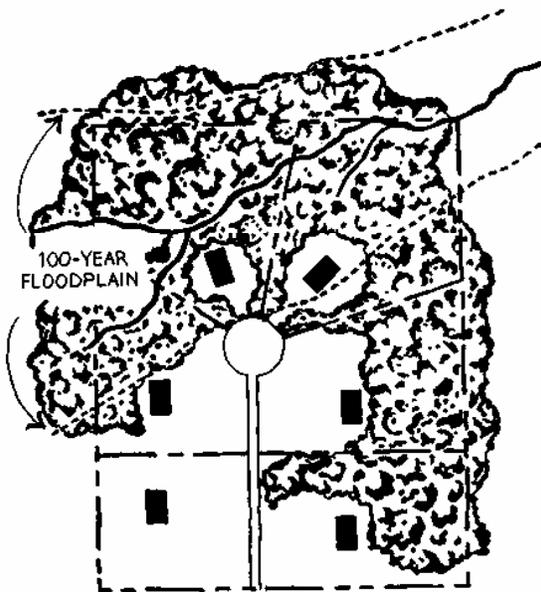
1. Buildings aren't isolated by floodwaters, putting a strain on local emergency services to guard them or evacuate or rescue their occupants, and
2. The neighborhood will have waterfront open space and recreation areas – a valuable amenity in most communities.

A housing development can be clustered, as shown in Figure 13-1, so the developer can sell the same number of homesites as a conventional subdivision. State laws must be checked on whether cluster development can be mandated or just encouraged during the subdivision review process.

As explained in the American Planning Association's *Subdivision Design in Flood Hazard Areas*, the planner's toolbox contains other tools for encouraging developers to avoid floodplains. A density transfer can be used to, say, trade development rights with a flood-free site. Credits or bonuses can be given to increase the allowable density if the developer puts building sites on high ground or does not disturb a wetland.

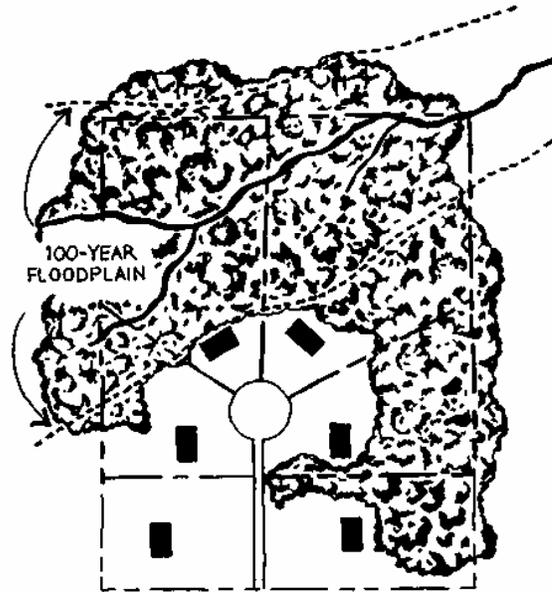
The planned unit development (PUD) approach offers developers flexibility in planning the entire area. For example, a PUD may have a cluster development with houses closer together than allowed under normal zoning lot line setbacks.

Subdivision and planning regulations also can mandate that a certain portion of a development be set aside as open space for recreation or stormwater management purposes. Developers find that it is cheaper to put the open space in the floodplain than to put buildings there that have to incorporate the more expensive floodplain requirements. Linear parks and greenways that connect the open space areas through a community are becoming more and more popular and help sell new developments.



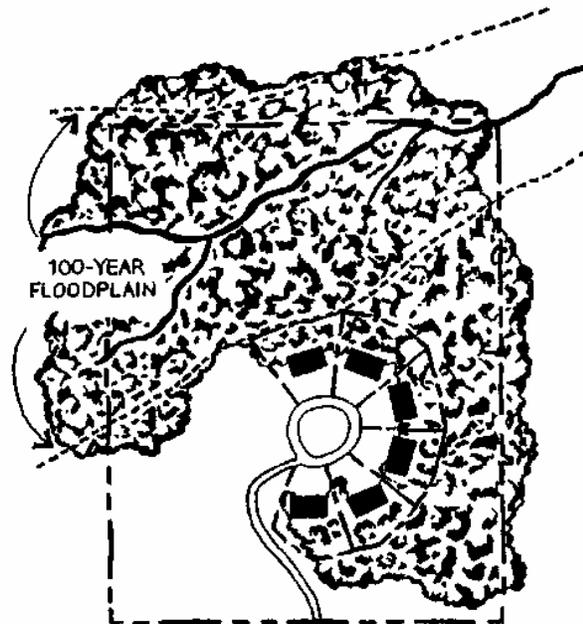
CONVENTIONAL PLAN A

Conventional Plan A: All land on site is subdivided into lots; some lots partially or entirely in floodplain; some homesites in floodplain.



CONVENTIONAL PLAN B

Conventional Plan B: All land on site is subdivided into lots; some lots partially in floodplain; homesites restricted to natural high ground; setbacks and sideyard restrictions modified to accommodate structures out of floodplain.



CLUSTER PLAN

Cluster Plan: All floodplain lands and other sensitive lands kept as open space; net density remains equal to conventional plans; lot sizes reduced to protect natural features; all homesites are on natural high ground.

Figure 13-1: Clustering can keep buildings out of smaller floodplains

Source: Subdivision Design in Flood Hazard Areas

13.2.3. Setbacks

Setbacks may be used to keep development out of harm's way. Setback standards establish minimum distances that structures must be positioned — set back — from river channels and lake shorelines. Setbacks can be defined by vertical heights or horizontal distances.

In riverine situations, setbacks prevent disruption to the channel banks and protect riparian habitat. Such setbacks are frequently created to serve as isolation distances to protect water quality, and stream and wetland resources.

Setbacks from watercourses have been used to minimize the effect of non-point sources of pollution caused by land development activities, timber harvesting, and agricultural activities. Solid waste landfills and on-site sewage disposal systems often are restricted within certain distances of a body of water. See also the discussion on buffer strips and protecting water quality in Section 13.5.1. on stormwater management.



The Community Rating System credits setbacks that prevent disruption to shorelines, stream channels and their banks under Activity 430, Section 431.g.2 in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.

13.2.4. Manufactured homes

Many communities have adopted provisions prohibiting the placement of manufactured (mobile) homes in the floodway. Local ordinances should be checked. This used to be a minimum requirement of the NFIP and may still be on those books.

13.2.5. Natural areas

The natural functions and values of floodplains coupled with their hazardous nature have led communities to promote and guide the less intensive use and development of floodplains. More and more municipalities are requiring that important natural attributes such as wetlands, drainage ways, and floodplain areas be set aside as open space as a condition to approving subdivision proposals.



The Community Rating System provides substantial credit for preserving floodplain areas as open space. If buildings and filling are prohibited, credit is found under Activity 420 Open Space Preservation, Section 421.a in the *CRS Coordinator's Manual* and the *CRS Application*. If the area has been kept in or restored to its natural state, more credit is provided under Section 421.c.

13.2.6. Low-density zoning

When a community prepares its land use plan and zoning ordinance, it should consider what uses and densities are appropriate for floodplains. If buildings are not prohibited entirely, the community should zone its floodplains for agricultural or other low-density use to reduce the number of new structures.

For example, it's better to have a floodplain zoned for agricultural or conservation use with a minimum lot size of 20 or 40 acres than to allow four single-family homes to every acre. In some areas, "residential estate" zones with minimum lot sizes of two to five acres provide lots large enough that homes can be built out of the floodplain.

The Community Rating System provides substantial credit for zoning floodplains with low-density uses under Activity 430LZ Low Density Zoning in the *CRS Coordinator's Manual* and the *CRS Application*.



13.3. ADDITIONAL BUILDING PROTECTION

13.3.1. Foundation standards

Without a safe and sound foundation, an elevated building can suffer damage from a flood due to erosion, scour, or settling. The NFIP regulations provide performance standards for anchoring new buildings.

However, the NFIP performance standards do not specify how a buildings' foundation is to be constructed. Especially where an engineer's certificate is not required, more specific foundation construction standards would help protect buildings from flood damage.

One option is to require that a licensed professional engineer or architect certify the adequacy of elevated building foundations and the proper placement, compaction, and protection of fill when it is used in building elevation.

The national model building codes address building foundations and the proper placement, compaction, and protection of fill. The floodplain administrator and local building department should review how these standards are enforced.

The Community Rating System credits foundation protection under Activity 430, Section 431.b in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Higher Regulatory Standards* for example regulatory language.



13.3.2. Freeboard

Freeboard is an additional height requirement above the base flood elevation (BFE) that provides a margin of safety against extraordinary or unknown risks. The elevation of the BFE plus the freeboard is called the flood protection elevation (FPE). This reduces the risk of flooding and makes the structure eligible for a lower flood insurance rate.

While not required by the State or the NFIP, communities are encouraged to adopt at least a 1-foot freeboard to account for the 1-foot rise built into the concept of designating a regulatory floodway and the encroachment requirements where floodways are not identified.

There are other reasons for considering a freeboard:

- Accounts for future increases in flood stages if additional development occurs in the floodplain.
- Accounts for future flood increases due to upstream watershed development.
- Acts as a hedge against backwater conditions caused by debris dams.
- Reflects uncertainties inherent in flood hazard modeling, topography, mapping limitations, and floodplain encroachments.
- Provides an added measure of safety against flooding.
- Results in significantly lower flood insurance rates due to lower flood risk, well below the rates for properties outside the floodplain.
- Protection against waves that can occur during a flood event.

Freeboard safety factors are common in the design of flood control projects and floodplain development. Many communities have incorporated freeboard requirements into the elevation and floodproofing requirements stipulated by the NFIP. Some communities have adopted freeboard requirements of up to 4 feet.

When constructing a new elevated building, the additional cost of going up another foot or two is usually negligible. Elevating buildings above the flood level also reduces flood insurance costs for current and future owners.



The Community Rating System (CRS) credits freeboard under Activity 430, Section 431.a in the *CRS Coordinator's Manual* and the *CRS Application*. Under Activity 450, Section 451.c, the CRS credits requiring all buildings to be elevated above the street level to prevent flood problems caused by local drainage.

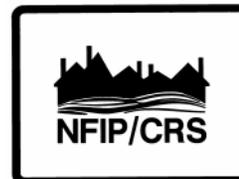
13.4. SAFETY REQUIREMENTS

13.4.1. Hazardous materials

Many communities prohibit storage of hazardous materials in floodplains or, at least, require them to be elevated above the BFE.

The U.S. Army Corps of Engineers' *Flood Proofing Regulations* provides a list of items that are extremely hazardous or vulnerable to flood conditions some of which should be prohibited from the SFHA or even the 500-year floodplain (see Section 10.2.3.).

The Community Rating System credits regulations on hazardous materials under Activity 430, Section 431.g in the *CRS Coordinator's Manual* and the *CRS Application*.



13.4.2. Critical facilities

For some activities and facilities, even a slight chance of flooding poses too great a threat. These should be given special consideration when formulating regulatory alternatives and floodplain management plans.

FEMA defines four kinds of critical facilities:

- ◆ Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic and/or water-reactive materials.
- ◆ Hospitals, nursing homes, and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood.
- ◆ Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during, and after a flood.
- ◆ Public and private utility facilities that are vital to maintaining or restoring normal services to flooded areas before, during and after a flood.

A critical facility should not be located in a floodplain. Communities often prohibit critical or hazardous facilities or uses from the floodway or the entire floodplain. While a building may be considered protected from the base flood, a higher flood or an error on the builder's or operator's part could result in a greater risk than the community is willing to accept.

If a critical facility must be located in a floodplain, then it should be designed to higher protection standards and have flood evacuation plans. The more common standards — freeboard, elevation above the 500-year floodplain and elevated access ramps — should be required.

According to Executive Order 11988, Federal agencies must meet rigorous alternative site evaluations and design standards before funding, leasing, or building critical facilities in the 500-year floodplain.

The Community Rating System credits prohibiting critical facilities or requiring them to be protected from damage by the 500-year flood in Activity 430, Section 431.e in the *CRS Coordinator's Manual* and the *CRS Application*. See *CRS Credit for Higher Regulatory Standards* for example regulatory language.



13.4.3. Dry land access

Fire prevention, evacuation, and rescue operations are common emergency response activities associated with flooding. The effectiveness and success of these efforts greatly depend on readily available access. However, streets and roads are usually the first things to be inundated in the event of a flood.

To ensure access, some communities have enacted ordinance provisions requiring that all roads and other access facilities be elevated to or above the BFE. Some require elevation to within one foot of the BFE so at least fire and rescue equipment can travel on them during a flood.

While some local officials may feel that this approach is too restrictive, it is important to note that emergency response personnel die every year attempting to rescue flood-stranded citizens. Also, others may die or be seriously injured because they cannot be rescued in time.



Figure 13-2: Four people died in a 1978 flood in this critical facility.

This nursing home in Rochester, Minnesota, was isolated by high velocity floodwaters. Because there was no dry land access, firefighters could not rescue the occupants.

Naturally, there are some areas with floodplains so extensive that a developer cannot be expected to connect his development to high ground. In such cases, community leaders should determine whether it is wise to allow development without special precautions, such as prohibiting critical facilities if dry land access cannot be provided.

As with all regulatory standards, carefully weigh the local hazard, the regulation's objectives, and the costs and benefits of meeting the standard before drafting new ordinance language.

The Community Rating System has credited dry land access provisions under Activity 430, Section 431.i in the *CRS Coordinator's Manual* and the *CRS Application*.



13.5. FLOOD CONVEYANCE AND STORAGE

13.5.1. Stormwater management

A floodplain management program in an urbanizing area must confront the increase in flood flows caused by development within the watershed. As forests, fields, and farms are covered by impermeable surfaces like streets, rooftops, and parking lots, more rain runs off at a faster rate. In an urbanized area, the rate of runoff can increase fivefold or more.

Changes in the surface drainage system compound this problem. Stormwater runoff travels faster on streets and in storm drains than it did under pre-development conditions. As a result, flooding is more frequent and more severe. Efforts to reduce the impact of increased runoff that results from new development in a watershed are known as stormwater management.

One way to reduce the impact of stormwater from new development is to require the developer to restrict the rate at which the increased runoff leaves the property. The developer must build a facility to store stormwater runoff on site.

Under stormwater detention, the stored water is held for release at a restricted rate after the storm subsides. Under stormwater retention, stormwater runoff is held for later use in irrigation or groundwater recharge, or to reduce pollution.

As an alternative to using a uniform standard for all areas, many communities regulate development according to a master plan that analyzes the combined effects of existing and expected development on stormwater and flood flows in the watershed. Such watershed-specific regulations may allow different amounts of runoff for different areas in order to control the timing of increased flows into the receiving streams.

Instead of requiring developers to build stormwater facilities on-site, a plan may require them to contribute funds for a regional facility. By planning the runoff from entire watersheds, this approach can be more effective in reducing increases in downstream flooding.

Stormwater management also has water quality aspect. Most stormwater runoff is not collected and sent to a wastewater treatment plant, it flows directly into a body of water. On its way, it collects sediments from soil erosion as well as road oil, pesticides, lawn treatment chemicals, and other pollutants (see Figure 13-3). Where there is no treatment facility to clean this runoff water, the result is called nonpoint source pollution.

Regulatory approaches for non-point sources include buffer zones or stream setbacks where there are on-site disposal systems, timber harvesting, tilling of soil, mining, or development in general.

Many communities are now required by Federal law to develop programs to address nonpoint source pollution under the National Pollution Discharge Elimination System (NPDES). Each community develops its own program, which should have public information, inspection, and regulatory aspects. It is recommended that these communities coordinate or combine the flood protection aspects with the water quality aspects of their local stormwater management program.

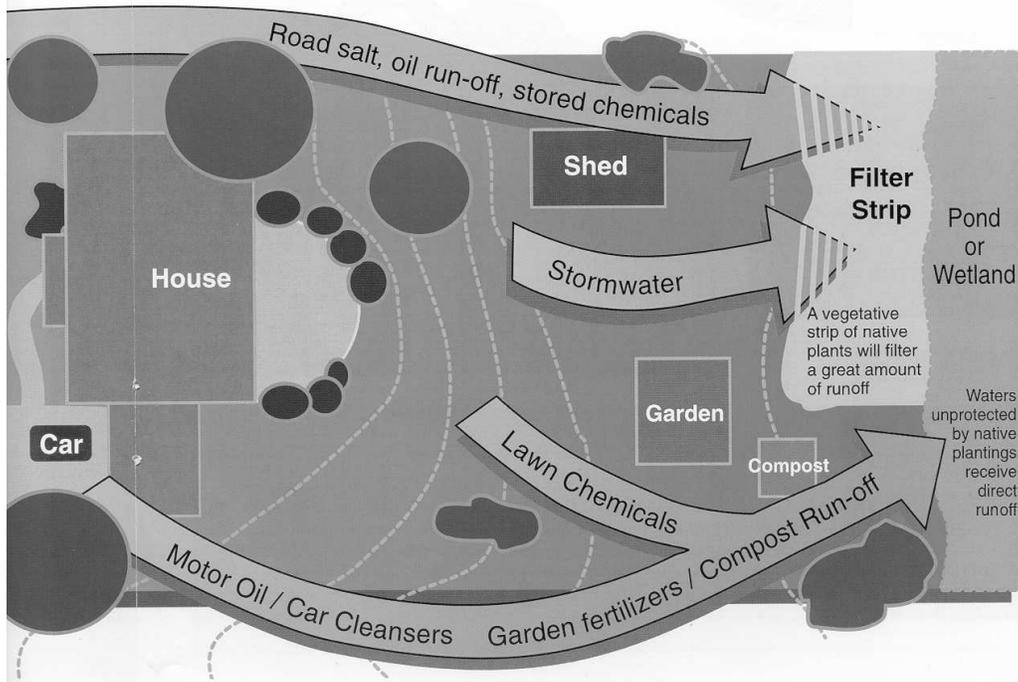


Figure 13-3: Vegetative filter strips can clean stormwater runoff

Source: *Living With Wetlands, A Handbook for Homeowners in Northeastern Illinois*, The Wetlands Initiative, 1998



The Community Rating System credits both water quantity and water quality stormwater management regulations and plans under Activity 450 in the *CRS Coordinator's Manual* and the *CRS Application*. See also *CRS Credit for Stormwater Management*.

13.5.2. Compensatory storage

As discussed in Section 11.3.3., the floodplain provides a valuable function by storing floodwaters, especially in flat areas. When fill or buildings are placed in the fringe, the flood storage areas are lost and flood heights increase because there is less room for the floodwaters.

Some communities adopt more restrictive standards that regulate the amount of fill or buildings that can displace floodwater in the fringe. One simple approach is to prohibit filling and buildings on fill—all new buildings must be elevated on columns or flow-through crawlspaces.

On the other hand, some communities prefer buildings on fill because it provides a safe spot above flood levels outside the building walls. In this situation, a compensatory storage provision can offset any loss of flood storage capacity.

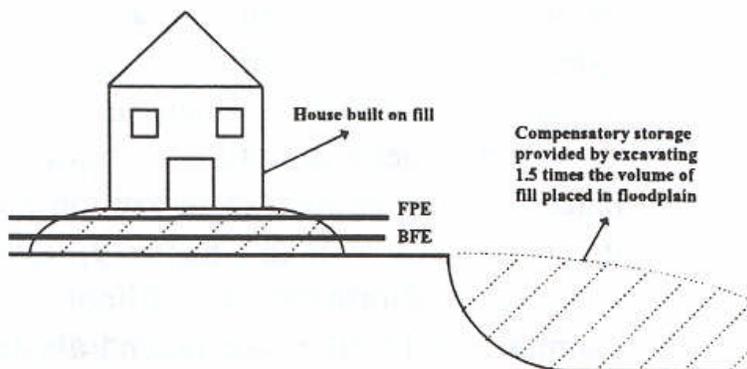


Figure 13-4: Recommended compensatory storage requirement

Compensatory storage in the flood fringe is not mandatory. However, IDNR/OWR and the Northeastern Illinois Planning Commission highly recommend compensatory storage with a safety factor equal to at least 1.5 times the volume of storage lost to compensate for uncertainties in the estimate of the BFE and in the determination of project impacts. If a community does not include compensatory storage within the flood fringe, IDNR/OWR requires that all future mapping will have storage floodways rather than floodways based on conveyance only.

The Community Rating System credits prohibition of fill and compensatory storage under Activity 430, Section 431.f in the *CRS Coordinator's Manual* and the *CRS Application*.



13.6. OTHER REGULATIONS

13.6.1. Dam breaks

Should a dam give way, the area covered by the resulting flood downstream is called the dam breach inundation area. Dam breach analyses may have been done for some of the dams upstream of a local community, in which case the map of the area subject to inundation can be obtained. Check with IDNR/OWR's Dam Safety office.

Close to the dam, the dam breach inundation area is likely to be larger than the base floodplain. A regulatory program should encompass such areas outside the base floodplain. It should also take into account the lack of warning time a dam break would pose.

Typical regulatory measures include:

- ◆ Prohibiting construction of buildings in the dam breach inundation area.
- ◆ Prohibiting critical facilities in the dam breach inundation area.
- ◆ Requiring new buildings to be elevated above the BFE or the dam breach elevation, whichever is higher.
- ◆ Requiring dam owners to maintain their facilities.
- ◆ Requiring dam owners to establish warning systems if their dams are in danger of failing.

CRS credit for dam failure regulations is provided in Activity 630 Dam Safety, Section 631.b of the *CRS Coordinator's Manual* and the *CRS Application*.



13.6.2. Ice jams

Ice jams form in several ways and at different times in winter and early spring. Damage from ice jam flooding often exceeds that of clear water flooding because of higher surface elevations, rapid increases in flood elevations, and physical damage caused by moving ice floes.

FEMA and the Corps of Engineers have developed an ice jam flood study methodology (see Appendix 3 of *Flood Insurance Study Guidelines and Specifications for Study Contractors*). If a local community has a study done following this methodology, then they should adopt the results as regulatory flood elevation.

In the absence of such a detailed study, the historic ice jam flood of record plus a foot or two of freeboard should be used as the building protection level or flood protection elevation. Other standards should include requiring new buildings to be elevated on engineered fill or pilings, and prohibiting new buildings (or at least requiring them to be on fill) in the floodway or other defined area subject to ice floes.

For more information, contact the Corps of Engineers (see Figure 10-2 for local districts and contact information). The Corps has ice jam expertise in its district offices and its Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire.

See also *Special Hazards Supplement* and *CRS Credit for Management of Areas Subject to Ice Jam Floods*.



13.6.3. Temporary moratorium

Following a flood, a number of communities have imposed moratoriums on rebuilding in the damaged area, effectively prohibiting floodplain development. Often, temporary measures are put in place after a flood to allow time to plan for acquisition, relocation, or redevelopment of the area, or to install flood control projects.

A temporary moratorium should specify when it is started and when it will be lifted, such as “within three months or when the plan is completed, whichever is sooner.” An open ended moratorium may be viewed by a court as a taking, since the owner has no idea when he or she will be allowed to build or rebuild.

13.7. ENVIRONMENTAL PROTECTION MEASURES

Flooding may not occur often enough in local areas to be viewed as a problem in need of a solution, making it difficult to obtain the public and political support needed to carry out local floodplain management measures designed solely to reduce future flood losses.

Support often can be gained by associating flood loss reduction with broader community concerns and goals. A larger constituency for managing the community’s floodplains can be built if other interests realize that their needs can be met through their involvement and support in flood protection. This, in turn, brings more resources and expertise into play.

Then, too, designing and packaging funding proposals to meet a number of community goals can boost chances of obtaining outside resources. One approach is to tie the need to manage the floodplain to protect local community’s economic well-being with the need to protect and maintain the natural resources and functions of the floodplain. These resources and functions can be of considerable benefit to the community, a benefit often unrealized or underestimated.

13.7.1. Strategies

Preservation and restoration are the two basic approaches to protecting a floodplain’s natural resources. Preservation strategies focus on strict control or prohibition of development in sensitive or highly hazardous areas. Restoration strategies focus on actions to improve the quality or functioning of degraded floodplains.

It is not always possible — or necessary — to make a distinction between the two strategies.

This section focuses on the development controls and regulatory standards that can be used to protect natural resources or minimize harm to them. These measures, used by all levels of government, are among the most effective means available for protecting natural resources of floodplains and reducing flood damage.

For model ordinance language for several of these measures, see *Model Stream and Wetland Protection Ordinance of the Creation of a Lowland Conservancy Overlay District*, Northeastern Illinois Planning Commission.

13.7.2. Federal regulations

Federal regulations and those in many states protect resources by limiting the ways, location, and extent to which these resources may be modified. Two federal regulations, NEPA and EO 11988, can have far-reaching impact.

NEPA: When a Federal agency proposes to fund a project located in a flood hazard area, the National Environmental Policy Act (NEPA) requires an evaluation of the project’s environmental impact as part of the decision-making process. The evaluation should include the impact on flooding as well as water and air quality.

EO 11988: Executive Order 11988 sets minimum requirements for Federal agencies to follow when they build in the floodplain, fund projects in the floodplain, or are otherwise responsible for floodplain development. The Order does not prohibit floodplain development. It requires agencies to “consider alternatives to avoid adverse effects and incompatible development in the floodplains.” Additional information on EO 11988 can be found in Section 10.3.

In short, Federal agencies must meet the same or more restrictive development standards as do private property owners under the community’s NFIP regulations.

13.7.3. Wetland protection

The Federal regulation that local permit officials see most often is the program established by Section 404 of the Clean Water Act. Jointly administered by the Corps of Engineers and the U.S. Environmental Protection Agency, the Section 404 program regulates the discharge of dredged or fill material into U.S. waters, including adjacent wetlands.

The Section 404(b)(1) guidelines provide extensive environmental criteria for judging permit applications while emphasizing the need to prevent avoidable losses of aquatic resources, as well as the need to minimize adverse environmental impacts.

The desire to reduce the cumulative impacts of wetland losses has led many jurisdictions to adopt a “no net loss of wetlands” policy. No net loss is addressed either in terms of acreage or the functional value of the wetlands. Despite these programs and other such efforts, as recent as 1989 it was estimated that the country was losing 300,000 – 450,000 acres of wetlands each year. Therefore, many counties and/or communities establish regulations that are more restrictive than the Federal or state programs.

13.7.4. Rare and endangered species

Undeveloped floodplains may contain habitat for rare and endangered species of plants and animals. On the Federal level, the Endangered Species Act of 1973 (Act) directs Federal agencies not to undertake or assist projects that would adversely affect any endangered species.

The Act also requires an “incidental take permit” when it appears that the habitat of a rare or endangered species will be “taken” or impacted by a non-federal activity. Communities with natural areas should coordinate their permit review with this program which is administered by the U.S. Fish and Wildlife Service.

13.7.5. On-site sewage disposal

Most states and municipalities regulate the design, location, and placement of on-site sewage systems. Because the objective of such programs is to prevent surface and subsurface contamination, there are many requirements to selecting a proper site and designing a system that will work

in a flood. In Illinois, the Department of Health and several county health departments do not allow the placement of septic systems in the floodplain.

Less than desirable locations for on-site systems include areas with high groundwater tables, impervious soils, certain types of porous soils, and the potential for flooding. These characteristics often coincide with floodplains.

Regulations that restrict where septic systems can go often mean that a property owner cannot build in or near the floodplain.



The Community Rating System credits preserving areas for their natural functions under Activity 420 Open Space Preservation, Section 421.c. Credit for prohibiting on-site sewage treatment, landfills and other hazardous use or threats to public health, is provided in Activity 430 Higher Regulatory Standards, Sections 431.e and 431.g, respectively. Water quality regulations are credited in Activity 450 Stormwater management, Sections 451e. and f.

13.8. NO ADVERSE IMPACT LEGAL REVIEW

No Adverse Impact (NAI) is a concept developed and encouraged by the Association of State Floodplain Managers. NAI is an explanation and rationale for higher regulatory standards and other local actions to ensure that flood problems are not increased. The following pages are taken from materials published by the Association following a review of recent court cases. More information, including a legal review, can be found at the Association's website, www.floods.org.

13.8.1. Community liability

When individuals are damaged by flooding or erosion, they often file law suits against governments, claiming that the government has caused the damages, knowingly allowed actions which contributed to the damages, or failed to provide adequate warnings of natural hazards. Courts and legislative bodies have expanded the basic rules of liability to make governments responsible for actions which result in, or increase, damages to others.

Lawsuits are most commonly predicated upon one of four causes of action:

Negligence: All individuals have a duty to other members of society to act reasonably in a manner not to cause damage to other members of society. The standard of conduct is that of a reasonable person in the circumstances. Negligence is the primary legal basis for public liability for improper design of hazard reduction measures such as flood control structures, improperly prepared or issued warnings, and inadequate processing of permits.

Nuisance: No landowner, public or private, has a right to use his or her land in a manner that substantially interferes, in a physical sense, with the use of adjacent lands. "Reasonable conduct" is usually no defense against a nuisance suit.

Trespass: Landowners can file trespass suits for certain types of public and private actions which result in physical invasion of private property, such as increased flooding or drainage.

Law of Surface Water: In most states, landowners cannot substantially damage other landowners by blocking the flow of surface waters, increasing that flow, or channeling that flow to a point other than the point of natural discharge. Landowners are liable for damages caused by their interference with the natural flow of surface water when their actions are “unreasonable.”

The overall issue, in most instances, is the reasonableness of an action by the community or property owner. Due to advances in technology and products, there is an increasingly high standard of care for “reasonable conduct.” The “act of God” defense is seldom successful because even rare flood events are now predictable. As technology advances, techniques and approaches also advance for “reasonable conduct” by engineers and other professionals. Governments are negligent if they fail to exercise the same “reasonable conduct” expected of technical professionals.

13.8.2. The minimum NFIP standards

The National Flood Insurance Program requires the adoption of a minimum set of floodplain management criteria in order for communities to be eligible for flood insurance, certain types of disaster assistance, and other Federal support. The minimum standards reduce overall flood damages for new construction and may be appropriate for the purposes of managing the flood insurance fund, but FEMA has long supported the adoption of higher standards through its regulations and programs such as the Community Rating System.

Current NFIP standards for floodplain management allow the following. These impacts may result in successful common law or “takings” suits despite community compliance with minimum Federal standards:

- Floodwaters to be diverted onto other properties.
- Channel and overbank conveyance areas to be reduced.
- Essential valley storage to be filled.
- Velocities changed with little or no regard as to how these changes affect others in the floodplain and watershed.

In general, if a community permits development that results in an adverse impact, that community may be liable, even if it meets the minimum Federal standards.

In the legal research paper "No Adverse Impact Floodplain Management and the Courts," Jon Kusler, Esq. concludes that under common law, no landowner, public or private, has the right to use his or her land in a way that substantially increases flood or erosion damages on adjacent lands.

Communities that cause or permit an increase in flood or erosion hazards may be liable for monetary damages to injured individuals. Increased flood and erosion hazards can be caused by

construction projects undertaken, or permitted, by a local government. Landowners damaged by flooding are also suing governmental entities that fail to adequately administer or enforce floodplain regulations, particularly where an issued permit resulted in damage to other lands.

Communities can protect themselves from liability by incorporating the “No Adverse Impact” approach and making sure that the actions taken in the floodplain, and throughout the watershed, do not lead to adverse effects on neighbors and neighboring communities. Adverse impacts must be mitigated to prevent transferring the problems to another property or community.

Courts have broadly and consistently upheld performance-oriented floodplain regulations, including those that exceed minimum FEMA standards. The courts have consistently upheld regulations that require additional freeboard, establish setbacks, impose tighter floodway restrictions, or very tightly regulate high risk areas.

The Association of State Floodplain Managers recommends a “No Adverse Impact” approach as a general guideline for landowner and community actions throughout the watershed, not just in the floodplain regulated by the Federal standards.

In essence, “No Adverse Impact” floodplain management is an approach that assures that the action of one property owner or a community does not adversely affect the properties and rights of other property owners. The true strength of the “No Adverse Impact” approach is that it encourages local decision-making to ensure that future development impacts will be considered and mitigated—a comprehensive strategy for reducing flood losses and costs.