



Preparing for the Next Flood:

VERMONT FLOODPLAIN MANAGEMENT

L A N D U S E I N S T I T U T E

VERMONT LAW SCHOOL

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2009

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Preparing for the Next Flood: Vermont Floodplain Management¹

“Floods are ‘acts of God,’ but flood losses are largely acts of man.”

—Gilbert F. White, University of Chicago Department of Geography, 1942

Background and Introduction

Floods have shaped the natural landscape since the beginning of time and will continue to do so. The most frequent cause of flooding is heavy rains, but flooding can also result from melting snow, coastal storms, ice jams, or dam failures. Floods and flash floods can occur at any time of year. For more than 40 years, the National Flood Insurance Program (NFIP) has provided federal guidance to local jurisdictions working to manage floodplain development to minimize losses and increase protection against damage from floods. As a result, land use and other development review standards adopted by state governments and more than 20,000 communities across the country are saving the nation more than \$1.1 billion a year in prevented flood damage. Even so, in the last century, flood damage in the United States has increased fourfold, approaching \$6 billion annually. Flooding has become the most widespread and destructive hazard in the United States. In Vermont, precipitation analyses indicate that more intense, localized storms are occurring with greater frequency. This pamphlet provides basic information on the legal framework of floodplain protection and management for government officials, landowners, and others with an interest in enabling Vermont—and Vermonters—to meet these challenges.



Ripton 2008

What Is a Floodplain?

NFIP and regulatory protection against flood damage focuses on mapped floodplains—comparatively low-lying lands adjacent to waterways and subject to inundation from surface water. Floodplains are generally defined according to their probable frequency of flooding. For example, the “100-year floodplain” is that area subject to inundation in the “100-year flood,” or, more accurately stated, a flood that has a 1 percent-chance of occurring or being exceeded in any given year. Some Vermont towns have had two 100-year floods in the same decade.

¹ Portions of this pamphlet incorporate research, ideas, and text contained in Edward A. Thomas and Sam Riley Medlock, “Mitigating Misery: Land Use and Protection of Property Rights before the Next Big Flood,” 9 *Vt. J. Envtl. L.* 155 (2008), an article prepared simultaneously with the preparation of the pamphlet.

Floods rarely follow precise boundaries on a map, especially flash floods associated with sudden, heavy downpours. Flood damage can, and often does, occur outside regulatory floodplain boundaries. Nationally, approximately one-third of all flood damage occurs outside the mapped floodplain. In Vermont, two-thirds of flood damages occur outside of mapped flood areas. Vermont's steep slopes and frequent flash flood events may render structures near upland streams more susceptible to flooding. Contributing factors often include failure of beaver or human-made dams and debris jams in the upland streams, which can cause a stream to jump course under a storm surge.

Statistically, a homeowner in the 100-year floodplain has a 26 percent chance of being flooded during the life of a 30-year mortgage, and many owners are unaware that standard homeowner's insurance does NOT cover damages from a flood. This is why lenders generally require property owners in floodplain areas to have flood insurance. Property owners with structures located close to flood-prone areas not in the mapped floodplain, such as on a steep slope adjacent to a high elevation stream, will not be required by their lender to purchase flood insurance but may wish they had.

Roles and Responsibilities in Preventing Flood Damage and Harm

Floodplain management and protection from flood damage are a shared federal, state, and local responsibility in which each level of government has its own role. Thus, the federal government provides minimal standards, but the authority to enact floodplain zoning and building codes is contained in the states' "general grant of power to zone for the public health, safety, and welfare." *Turnpike Realty Co. v. Town of Dedham*, 284 N.E.2d 891, 901 (Mass. 1972). Although the Federal government administers certain national programs, grants, and projects of federal interest, land use and development decisions are made at the state and local levels of government.

Federal Activities in Flood Damage Reduction and Floodplain Management

The importance of managing the Nation's waterways and coastal areas, along with their associated wetlands and floodplains, has been long recognized. Generally, two federal agencies play the most prominent roles in assisting community efforts to identify and manage flood risk: The U.S. Army Corps of Engineers (Corps) and the Federal Emergency Management Agency (FEMA).

The Corps and the EPA

Historically, the U.S. Army Corps of Engineers has interpreted and applied federal water law to carry out Congress's intent to prevent pollution and flood damages. The Corps was first given authority to regulate dredging, filling, or obstructing "navigable waters" under the Rivers and Harbors Appropriation Act of 1899, 33 U.S.C. § 401 *et seq.* (RHA). Section 13 of the RHA, commonly known as the Refuse Act, prohibits the unpermitted discharge of any refuse of any kind "into any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable water, . . . either by ordinary or high tides, or by storms or floods" *Id.* at § 407.

The principal federal law regulating filling and other development of wetlands and floodplains is the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act. Federal Water Pollution Control Act. 33 U.S.C. §§ 1251-1387. Section 404 of the Act provides the primary federal authority for protecting the Nation's waters from discharges that would have "an unacceptable adverse effect on municipal water supplies,

shellfish beds and fishery areas . . . wildlife, or recreational areas.” *Id.* at § 1344 (c). The Corps’ regulatory program is charged with administering section 404 with oversight from the Environmental Protection Agency.

“Any floodplain management regulations adopted by a State or community which are more restrictive than the criteria set forth in this part are encouraged and shall take precedence.”

—Code of Federal Regulations, Title 44, Part 6

FEMA and the NFIP

FEMA administers the NFIP, which manages the mapping of the nation's floodplains and makes federally backed flood insurance available in participating communities. The NFIP was established by the National Flood Insurance Act of 1968, enacted by Title XIII of the Housing and Urban Development Act of 1968 to provide previously unavailable flood insurance protection to property owners in flood-prone areas. The NFIP requires that participating communities “review all permit applications to determine whether proposed building sites will be reasonably safe from flooding.” 44 C.F.R. § 60.3(a)(3). In addition, the regulations of the flood program specifically provide for states and communities to adopt and enforce standards that “exceed the minimum criteria . . . by adopting more comprehensive floodplain management regulations.” Criteria for Land Management and Use, 44 C.F.R. § 60.1(d). Moreover, “any floodplain 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.” *Id.*

The NFIP has proven to be one of the most cost-effective hazard mitigation programs in history, saving the nation more than \$1 billion in flood losses annually, preventing untold misery to disaster victims, and damage to the environment. However, the minimum NFIP standards do not prohibit diversion of floodwaters onto other properties nor do they prevent the loss of channel conveyance and storage, or increases in erosive velocities. As a result, though communities that manage floodplain development based solely on the minimum standards of the NFIP provide some valuable regulation, the minimum standards allow development to encroach and constrict the floodplains. Thus, property owners and downstream or upstream neighbors are subjected to greater flood frequency and severity than would result had the entire floodplain been preserved to convey flood waters.

State and Local Roles in Floodplain Management

The federal flood insurance program was intended to provide homeowners with affordable insurance protection against floods while alleviating taxpayers' responsibility for flood losses. It was not intended to federalize the nation's floodplains. Although the federal government administers the NFIP and assists communities with large-scale mitigation projects, federal programs anticipate that the floodplain management mission will be carried out through decisions at the state and local levels. National Flood Insurance Program, 44 C.F.R. § 60.2. Within minimum guidelines, these decisions include whether and how to permit development, plan for local infrastructure, and administer permit programs. Participating communities can take charge of their floodplains by steering development out of harm's way.

State Leadership in Floodplain Management

In Vermont, flood hazard management is a coordinated effort among many different actors: federal, state, and local governments, regional planning commissions, private landowners, nonprofit organizations, academic institutions, and other interested groups. The state government, in particular, plays a major role in implementing flood hazard programs and providing technical support and coordination among the various groups.

The general police power to protect the health, safety, and welfare of the people is among the powers reserved to the State of Vermont and other states by the Tenth Amendment of the U.S. Constitution. The Vermont legislature has expressly recognized the importance of preventing and minimizing flood hazard areas to protect these interests. 10 V.S.A. § 751. It has also delegated police power to municipalities, authorizing them to accomplish the state's goals through the planning and regulation of land. The relevant statute that enables municipal planning and land use regulation is the Vermont Planning and Development Act, 24 V.S.A. Chapter 117 ("Chapter 117"). One of the general purposes of Chapter 117 is to encourage the appropriate development of land in a manner that "will promote the public health, safety against fire, floods, explosions and other dangers." 24 V.S.A. § 4302(a). Chapter 117 also specifically authorizes municipalities to adopt freestanding bylaws to regulate development and use along shorelines and in flood or other hazard areas. 24 V.S.A. §§ 4303(8), 4424.

Vermont law establishes that the state will provide assistance to local governments to help manage flood hazard areas; coordinate federal, state, and local management activities; and encourage local governments to manage flood-prone lands. 10 V.S.A § 751. This provision also states that Vermont will "maintain the wise agricultural use of flood-prone lands" and "carry out a comprehensive statewide flood hazard area management program for the state in order to make the state and units of local government eligible for flood insurance."

In practice, Vermont has created an interagency network of specialized agencies coordinated by Vermont Emergency Management (VEM) in the Department of Public Safety. VEM oversees federal requirements for the state and towns, which have been addressed via Vermont's regional planning commissions, to create and maintain hazard mitigation plans. During and following a natural disaster, VEM coordinates emergency response by multiple state agencies and is responsible for the distribution of grants to repair damage to public infrastructure. Engineers within the Vermont Transportation Agency (VTrans) carry the major role in the repair work. Staff within the Vermont Agency of Natural Resources (ANR) work most closely with other governmental agencies to ensure that flood hazard risks are being addressed proactively, before a disaster hits.



Preparing for the 2007 Flood in Montpelier

The Vermont River Management Section (RMS) of the Department of Environmental Conservation (DEC) manages flood hazard programs throughout the state. It coordinates directly with FEMA to oversee the NFIP for participating communities in Vermont, and accordingly provides technical assistance for communities to comply with NFIP requirements. Consistent with FEMA's floodplain map modernization program, RMS also collaborates with municipalities and regional planning commissions to inform them of updated floodplain maps and to provide guidance for adopting new maps in a town's flood hazard regulations. The Department of Environmental Conservation, for example, has issued "Model Flood Hazard Regulations" to assist municipalities to amend their ordinances.

The Vermont Agency of Natural Resources River Management Program has also created the Fluvial Erosion Hazards Program (FEH) to prevent and



Montpelier 1927, Lower Main Street

mitigate against “fluvial erosion,” erosion caused by shifting rivers and streams, as opposed to inundation. This type of flooding accounts for much of the flood damage in Vermont because of the state’s unique geography and human-induced land alterations. Additionally, because NFIP maps do not capture fluvial erosion hazards, Vermont’s FEH program is a critical component of the state’s flood management plan.

A major element of the Fluvial Erosion Hazard Program is its risk assessment and mapping process. The River Management program, which partners with various regional planning commissions, provides technical and financial assistance to municipalities by supporting the mapping and implementation of fluvial erosion hazards.

The River Management team uses a computer modeling program, the Stream Geomorphic Assessment Tool (SGAT), which produces an automated drawing of fluvial erosion hazard zones based on geometric stream assessment data. From this data, towns can better understand the location and nature of fluvial erosion hazards in their areas, and adopt avoidance measures or choose from various mitigation techniques. Working with the Vermont River Management Program to map fluvial erosion hazards, therefore, is an important part of a town’s flood hazard mitigation plan.

State law also regulates land use permitting decisions for development applications of a certain size. The Vermont Land Use and Development Act (Act 250) provides criteria for determining whether a permit for development or subdivision should be issued within a “floodway” or “floodway fringe.” 10 V.S.A. § 6086(a)(1)(D). The Agency of Natural Resources reviews permit applications for development or subdivision and makes case-by-case determinations of what constitutes a floodway or floodway fringe that govern appeal under the criteria of § 6086(a)(1)(D).

A permit will be granted if an applicant, in addition to meeting other criteria, shows that “the development or subdivision within a floodway will not restrict or divert the flow of flood waters, and endanger the health, safety, and welfare of the public or of riparian owners during flooding.” 10 V.S.A. § 6086(a)(1)(D). In the case of development or subdivision in a floodway fringe, the applicant must show that its proposal “will not significantly increase the peak discharge of the river or stream within or downstream from the area of development and endanger the health, safety, or welfare of the public or riparian owners during flooding.” *Id.* The ANR’s technical staff utilizes the delineation of floodway limits based on NFIP maps, which account for inundation risks, and principles of fluvial geomorphology, which account for the more common fluvial erosion hazards. The state’s control over floodway determinations under Act 250 helps ensure that proposed development will not cause flood or erosion hazards that will endanger the health, safety, and welfare of the public.

In 2003, the Vermont Supreme Court reviewed a challenge to a state regulation that established a methodology based on fluvial erosion for the designation of floodways much broader than the FEMA minimum standard. In the case, *In re Woodford Packers, Inc.*, 175 Vt. 579, 830 A.2d 100 (2003), the Secretary of the Agency of Natural Resources used a fluvial geomorphology analysis instead of FEMA’s NFIP maps to determine floodways for a proposed retirement village. In affirming the permit denial, the court found that the evidence supported the State’s decision that the applicant’s proposed project did not comply with land use permit requirements concerning soil erosion, and that “the flood controls implemented by [the applicant], while intended to prevent the river from inundating heavily eroded areas, may actually increase the damage done by the river.” This case demonstrated judicial support for regulation based on local conditions and applied to all property owners equally.

Local Control Means Local Responsibility

Community participation in the NFIP is the best first step to prepare for the next flood—before it strikes. Failure to participate in the NFIP can have serious consequences for a community. Communities that are identified as

flood-prone areas and choose not to participate in the NFIP are disqualified from receiving federal flood insurance and financial assistance to mitigate flood damages. Additionally, if a presidential disaster declaration occurs in a non-participating community, no federal financial assistance can be provided to assist with flood recovery in flood hazard areas.

“ Poor enforcement of existing flood hazard regulations may be increasing properties at risk. ”

the local partner must develop plans to “reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding and to preserve and enhance natural floodplain values.” *Id.* at § 701b-12(c)(2)(A). Thus, any community wishing to cost-share or participate in a major federal flood control project must participate in the NFIP and undertake land use planning to preserve the floodplains in their jurisdiction.

As noted above, the framework for management of the nation’s floodplains demonstrates the intent of Congress that the federal government provide certain minimum standards and maps for flood insurance purposes, and that land use and development decisions be made at the state and local levels. Vermont statutes, described in the previous section, provide authority and guidance for local action. Since local governing bodies bear the responsibility to review all development to ensure that it is safe from flooding, local bylaws, permitting, and other administrative processes may be all that determine whether a new home, school, or business is high and dry, or is directly in the path of the next big flood. Many cash- and personnel-strapped towns throughout the nation have leveraged their collective resources and creativity to achieve reductions in the risk of harm through initiatives tailored to their unique needs and priorities. The key is to acknowledge the responsibilities associated with local control, identify areas for improvement, educate stakeholders, and duplicate the successes of similarly situated communities.

Local officials may have to deal with the consequences of past decisions. Even if a town is small, and little growth is heading its way, existing homes and businesses may have been placed at risk. Local regulations may be outdated and not truly protective of property. Moreover, poor enforcement of existing flood hazard regulations may be increasing the number of properties at risk.

It is important that communities review FEMA’s flood maps as well as any history of flooding in town to fully comprehend the risks they face. Communities should also review their own regulations and their administration to ensure they are protecting their citizens. Many communities allow the filling in of floodplains without understanding the increased threat of flooding this can cause. Planning for flood protection should also include mitigation plans to lessen the exposure to flood damages, and emergency plans to deal with evacuation and warning in higher risk communities.

The remainder of this pamphlet provides specific guidance to craft and implement a successful local program to steer development out of harm’s way, while preserving every landowner’s right to be free from harm resulting from others’ decisions. The next section outlines every local official’s basic floodplain management tools and strategies, from floodplain maps to specific development standards that are proven to prevent loss of life and property in floods. The following section discusses the “No Adverse Impact” philosophy developed and promoted by the Association of State Floodplain Managers to help ensure that possible negative impacts from development are identified and mitigated before development ever begins. The final section provides reassurance to local officials

The federal Water Resources Development Act of 1996, which authorized the Corps to oversee structural flood control works, requires that the state or local partner in a federal flood control project “participate in and comply with applicable federal floodplain management and flood insurance programs.” 33 U.S.C. § 701b-12(a). Moreover,

regarding constitutional challenges under the Takings Clause of the Fifth Amendment in the hazard mitigation context, debunking the myth that land use regulations designed to prevent harm always result in takings that must be compensated. The theme underlying each of these sections is that local control of land use decisions brings important responsibilities and opportunities to keep Vermonters safe from flooding.

Floodplain Management Strategies and Tools



Floodplain Maps—What They Are... and What They Are Not

The basic tool of floodplain protection is mapping. As noted above, in administering the NFIP, FEMA manages the mapping of the nation's floodplains as a basis for making federally supported flood insurance available in participating communities. Flood Insurance Rate Maps (FIRMs) are used by the insurance industry to rate flood policies according to the flood risk of the property to be insured. Lenders generally require that flood insurance be obtained for property located in a mapped “special flood hazard area.” Local planners also rely on FIRMs in the development planning and permitting processes to support safer development and help property owners to make informed decisions regarding flood risks.

FEMA is currently updating its FIRMs using state of the art technology through the Map Modernization initiative. Digital Flood Insurance Rate Maps (DFIRMs) are the result of this effort. DFIRMs can be distributed electronically, added to existing base maps, or printed in traditional hard copy format. They have aerial photography

as a background so that designated flood hazard areas can be easily seen against recognizable landmarks. As is the case with the old Flood Insurance Rate Maps, these new DFIRMs may be used to regulate development, and to establish flood risk zones and base flood elevations to mitigate against potential future flood damages to property.

“Sparsely populated areas (like most of Vermont) are mapped with less detail.”

DFIRMs are precise, but their accuracy may be an illusion. Conventional wisdom suggests that modern maps are accurate—clearly and flawlessly depicting features, distances, and issues for development planning. The fact that maps are now digital and look high-tech can belie underlying errors. However, maps, even computer-generated maps, are only as accurate as the data that created them. In the case of floodplain maps, representations of risk may be products of highly-detailed hydrologic and hydraulic modeling laid onto excellent topographic surveys, or instead may be best estimates based on historical flood records placed as well as possible on 20-foot contour data. The level of detail and cost that goes into a study determines the level of detailed information available on the maps. FEMA's Map Modernization

initiative invests resources based on the density of property at risk of flooding. Higher population areas are mapped to the greatest level of detail, whereas rural, sparsely populated areas (like most of Vermont) are mapped with less detail.

Uses and Limitations of FEMA Floodplain Maps

Floodplain maps are administrative tools that depict riverine and coastal floodplain and floodway areas expected to be inundated in a 100-year flood, and the minimum elevations for development and floodproofing to avoid flood damage. In the least studied areas, there may not even be designated floodways or flood heights. This presents challenges for local floodplain managers, who may seek to require developers and property owners to conduct engineering studies that will accurately assess flood risk on a given piece of property to ensure that development will be safe from flooding.

Local development standards in ordinances or regulations refer to the FIRM, or new DFIRM, for regulating types of development appropriate to a given area based on its risk of flooding. Yet, floodplain maps do not provide information on site-specific flood hazards, such as land erosion or sudden shifts in the channel of the watercourse. Other sources of water, roads, or other barriers can restrict water flow and affect local flood levels. Additionally, obstructions such as ice, debris, flooding in surrounding areas, groundwater, or other phenomena can cause flood levels to exceed those depicted on the map. Land adjacent to a floodplain may be subject to flooding from nearby tributary watercourses, many of which were not studied for flood risks because they were small. Floodplain maps do not locate legal survey boundaries. A site survey is required to reconcile the property location, ground elevations, and designated flood level information.



Improving Flood Maps

Communities must regulate at least the mapped areas on FIRM, but they can go beyond these areas. Some towns in Vermont, in concert with their regional planning commissions and the Vermont River Management Program are mapping river corridors to show those areas particularly sensitive to erosion. This is known as fluvial erosion hazard (FEH) mapping, discussed in greater detail in the section on state leadership above. FEH maps can then be used in addition to FIRM to recognize more fully and plan for flood dangers more common in Vermont. Since this can be a time-consuming process, towns can request FEH mapping on their larger stream and river segments and use the Vermont Agency of Natural Resources buffer guidelines and restrict development within fifty or one hundred feet of the top of stream banks on their many smaller streams. The River Management Program, in cooperation with the regional planning commissions, will assist towns in creating a plan for the appropriate and timely use of these hazard avoidance tools and strategies.

Communities can slowly acquire better contour data for their valley floors, and then provide this to FEMA for use in map updates. Landowners can improve FEMA's maps piecemeal by filing what are known as Letters of Map Change. In particular, Letters of Map Revision (LOMRs) may change flood insurance risk zones, floodplain and/or floodway boundary delineations, surface features, and/or Base Flood Elevations. This process uses site surveys to correct instances of errors that are usually due to inaccurate topographical data. Eventually, these corrections are all recorded on revised maps.

Protecting Lives and Property Through the NFIP Community Rating System

Another important tool is the development of standards that exceed the NFIP's minimum standards for floodplain management. The Community Rating System (CRS) is a part of the NFIP. The CRS reduces flood insurance premiums to reflect what a community does above and beyond the NFIP minimums. The objectives of the CRS are to reward communities for what they are doing and to provide an incentive for new flood protection activities. The reduction in flood insurance premium rates is provided according to a community's CRS classification.



What's Wrong with FEMA/NFIP Minimum Standards?

FEMA has long encouraged state and local governments to adopt higher regulatory standards through the Community Rating System and to offer incentives for safer development practices. Indeed, this is a good practice for state and municipal agencies to adopt because communities that rely on the minimum federal NFIP standards may allow diversion of floodwaters onto other properties, loss of channel conveyance and storage, and an increase in erosive velocities, all of which may make the community liable for resulting harm.

Relying exclusively on NFIP minimum standards may lead to:

- Adverse cumulative impacts of allowing small rises in flood elevation here and there that accumulate into significant and hazardous changes, subjecting families and businesses to greater flood risks
- Increased storm water velocities that worsen erosion, sedimentation, streambank failure, and new stream channel formation
- Increased destructive potential as what were once manageable storms become major producers of flood damage and associated disruption and misery

...all of which subject the community to severe costs and the possible liability of having allowed poorly sited or designed development to occur.

It is important to remember that the NFIP was designed with insurance in mind, and was never intended to be the nation's land use program for floodplain management. Communities, accordingly, should carefully evaluate their specific needs and consider whether the minimum NFIP standards are enough to ensure the safety of their citizens.

What Are the Community Benefits of CRS Participation?

When a community participates in the CRS, everyone benefits, including those who do not occupy property in a floodplain. Even when there is no flooding, the community's public information and floodplain management efforts can improve the quality of life, protect the environment, make people safer, and save everyone money. And when there is a flood, CRS activities can help save lives, prevent property damage, and minimize the economic disruption caused by flooding of offices, factories, farms, stores, and other businesses.

Reduced flood insurance rates are only one of the rewards a community receives from participating in the CRS. There are many other benefits. First, the CRS floodplain management activities improve public safety, reduce damage to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment. Second, a town can evaluate the effectiveness of its flood program against a nationally recognized benchmark. Third, technical assistance in designing and implementing many activities is available at

no charge. Fourth, a CRS community's flood program benefits from having an added incentive to maintain its flood programs over the years. The fact that the community's CRS status could be affected by the elimination of a flood-related activity or a weakening of the regulatory requirements for new development, should be taken into account by the governing board when considering such actions. A similar system used in fire insurance rating has had a strong impact on the level of support local governments give to their fire protection programs. Finally, implementing some CRS activities, such as hazard mitigation planning, can help a community qualify for certain federal assistance programs.

Additional CRS Benefits: Natural and Beneficial Floodplain Function

The CRS provides special credit for activities that protect natural and beneficial floodplain functions, even though some of the activities may not directly reduce flood losses to insurable buildings.

The CRS encourages state, local, and private programs and projects that preserve or restore the natural state of floodplains and protect these functions. The CRS also encourages communities to coordinate their flood loss reduction programs with Habitat Conservation Plans and other public and private activities that preserve and protect natural and beneficial floodplain functions. Preserving and protecting natural floodplains above and beyond the NFIP minimum standards provides the following environmental benefits:

- Flood waters can spread over a large area in floodplains that have not been encroached upon. This reduces flood velocities and provides flood storage to reduce peak flows downstream.
- Water quality is improved in areas where natural cover acts as a filter for runoff and overbank flows; sediment loads and impurities are also minimized. Natural floodplains moderate water temperature, reducing the possibility of adverse impacts on aquatic plants and animals.
- Floodplains can act as recharge areas for groundwater and reduce the frequency and duration of low flows of surface water.
- Floodplains provide habitat for diverse species of flora and fauna, some of which cannot live anywhere else. They are particularly important as breeding and feeding areas.

Getting Credit for CRS Activities

To earn CRS credit, a community can do things like preserve open space in the floodplain, enforce higher standards for safer new development, maintain drainage systems, and inform people about flood hazards, flood insurance, and how to reduce flood damage. Many Vermont towns are probably already doing many of these things. To get credit, towns simply prepare an application showing what's being done. Once the information is verified, FEMA provides the flood insurance premium discounts, putting money back into the pockets of local residents.

At a minimum, a town must participate in the NFIP and be in full compliance with the minimum requirements of the NFIP. Further, the town must require and maintain FEMA's elevation certificates for all new and substantially improved construction in the floodplain. Lastly, if the town has properties that have received repeated flood insurance claim payments, it must map the areas affected. Communities with 10 or more such properties must prepare, adopt, and implement a plan to reduce damage in repetitive loss areas.

Additional activities that generate points are grouped into four main categories: Public Information, Mapping and Regulatory Activities, Flood Damage Reduction, and Flood Preparedness. Examples of these activities include:

Public Information Activities

- Maintain FEMA elevation certificates for all new construction.
- Respond to inquiries to identify a property's FIRM zone and publicize this service.
- Send information about the flood hazard, flood insurance, and flood protection measures to residents of flood-prone areas or to all residents of the community.
- Maintain references on flood insurance and flood protection in the town's public library.



Honey Brook, East Barre 2007

Mapping and Regulatory Activities

- Require that developers provide new flood elevations, floodway delineations, or other regulatory flood hazard data for an area that was not mapped in detail by the flood insurance study.
- Guarantee that a portion of currently vacant floodplain will be kept free from development.
- Implement higher standards, such as:
 - Requiring freeboard, an additional margin of safety above base flood elevation
 - Requiring soil tests or engineered foundations
 - Requiring compensatory storage for any filling in of floodplains
 - Tailoring regulations to protect critical facilities, such as hospitals, water treatment works, and emergency equipment and personnel
 - Identifying and managing areas subject to special flood hazards, such as alluvial fans, ice jams, landslides, and subsidence
 - Keeping flood and property data on computer records, obtain improved base maps through partnerships with neighboring communities, and maintain elevation reference marks
 - Regulating new development throughout the watershed to ensure that post-development runoff is no worse than predevelopment runoff.

Flood Damage Reduction Activities

- Prepare, adopt, implement, and update a comprehensive hazard mitigation plan using an inclusive planning process.
- Acquire or relocate flood-prone buildings so that they are out of the floodplain.
- Document floodproofed or elevated pre-FIRM buildings.
- Conduct periodic inspections of all channels and retention basins and perform maintenance as needed.

Flood Preparedness Activities

- Provide early flood warnings to the public and have a detailed flood response plan keyed to flood crest predictions.
- Maintain dams and levees to ensure that they will be credited with providing base flood protection.

Using Freeboard and Setbacks to Reduce Damage

Other tools include establishing “freeboard” and setback requirements in town subdivision and zoning regulations.

What Is Freeboard?

“Freeboard” is a nautical term for the amount of a vessel above the water line. For purposes of floodplain management the term means extra elevation of a structure (usually expressed in feet) above the estimated base flood elevation. Freeboard requirements compensate for the many unknown factors that could contribute to flood heights greater than the height calculated on flood maps, such as ice and debris jams, restrictive bridge openings, and urbanized watersheds effected by hydrological processes. Any fill that has been placed in the floodplain after the maps were produced may also raise flood heights to some degree beyond what the maps show. Using freeboard for purposes of floodplain management is critical because it provides a factor of added safety when actual flood levels rise higher than levels calculated for the 100-year flood. An example of a freeboard requirement is a local floodplain management ordinance that requires a structure's lowest floor to be placed a minimum of one foot above base flood elevation. Many communities across the nation have set two feet, and even three feet, as minimum freeboard requirements.

“ Freeboard provides a margin of safety for new development in poorly mapped areas. ”

As noted in the section on floodplain maps above, conventional wisdom suggests that modern maps are accurate, but maps are only as accurate as the data that created them. Many communities are now receiving new flood maps, but these are often just digital versions of existing maps, not maps created from new flood data. When flood hazard areas are actually recalculated using the latest topography and other information, recalculated flood heights in parts of Vermont have been raised by a few feet. Freeboard provides a margin of safety for new development in poorly mapped areas, helping landowners and developers to avoid unpleasant surprises until an area is restudied for new flood maps.

Use of Setbacks

Setbacks are the horizontal version of freeboard, limiting development in areas that may be at risk of flooding, even though they may not be designated as such on FIRMs. This can take place in two ways—staying back from eroding banks, and restricting construction of basements near the flood zone. Areas with eroding stream banks may be at higher elevation with comparatively less flood risk, but then the river moves laterally, the bank fails, and what was high and dry falls into the river. In Vermont, significant flood damage occurs in exactly this way. Keeping structures 50 or 100 feet back from the top of stream banks on smaller streams is the recommended state minimum. It is important to note that on larger streams and rivers, these setbacks are often inadequate at protecting against catastrophic erosion, and a defined Fluvial Erosion Hazard corridor should be used to assess the risk. As noted in the section above on State and Local Roles, the Vermont River Management Program provides assistance in identifying and mapping erosion hazard zones.

Flood regulations must restrict basements within the flood zone, since water above the ground also means water below the ground. However, most regulations stop restricting basements beyond the flood zone boundary. Even though the surface may not be inundated beyond that point, water can be in the soil and under considerable pressure well past the area of surface inundation. Therefore, continuing to restrict basements near mapped flood zones can be a prudent public safety measure.

No Adverse Impact Floodplain Management

“NAI is a PRINCIPLE that leads to a PROCESS that is legally acceptable, nonadversarial, understandable, and palatable to the community as a whole.”

—Edward A. Thomas, Esq.

“No Adverse Impact” (NAI) floodplain management is a management principle developed by the Association of State Floodplain Managers (ASFPM) to provide communities with tools to address deficiencies of the typical local floodplain management program. Town leaders may believe that adopting the minimum regulatory standards under the NFIP will protect them from liability to developers threatening takings litigation and to landowners at possible risk of damage in the next flood. See the section on Protecting Property Rights to Reduce Local Liability on page 19. Unfortunately, they may be wrong on both counts. NAI helps communities to ensure a higher level of protection for their citizens and to prevent increased flood damage now and in the future.

NAI floodplain management is an approach that ensures that the action of any community or property owner, public or private, does not adversely impact the property and rights of others. An adverse impact can be measured by an increase in flood stages, flood velocity, flows, the potential for erosion and sedimentation, degradation of water quality, or increased cost of public services. No Adverse Impact floodplain management extends beyond the floodplain

““ The Association of State Floodplain Managers provides numerous helpful resources on NAI and sustainable floodplain management on their website at www.floods.org. ””

to include managing development in the watersheds where increased runoff of storm water and floodwaters originate. NAI is not anti-development. It means that any adverse impact caused by a project must be mitigated, preferably as provided for in the community or watershed plan.

For local governments, No Adverse Impact floodplain management represents a more effective way to tackle their flood problems. The concept offers communities a framework to design programs and standards that meet their true needs, not just the requirements of a federal or state governmental agency. The NAI floodplain management initiative empowers communities and their citizens to work with stakeholders and build a program that is effective in reducing and preventing flood problems. NAI floodplain management is about communities being proactive—identifying potential impacts and implementing strategies to prevent and mitigate those impacts before they occur.

No Adverse Impact watershed management relies on a combination of development planning, standards, and review to ensure that proposed and anticipated development will not adversely impact other property interests through increased runoff, velocities, or degradation. Since each community is unique, NAI provides the flexibility for each community to adopt strategies to fit unique community interests, watershed dynamics, political will, vision, and goals. The town can select from among a diverse menu of options to tailor its program to its unique management needs. Under the NAI approach, the developer and community work together to identify the impacts of proposed development and explore design alternatives to avoid adverse impacts. Ultimately, the NAI approach allows for the development of appropriate mitigation measures that are acceptable to locals, neighbors, and the community as a whole.



Montpelier 1927, CVRR Bridge

The NAI Legal Framework

NAI does not take away property rights—it protects them by preventing one landowner’s activities from harming others. NAI is not an arbitrary or inflexible denial of development rights, or blanket no-growth strategy. It is a performance-based standard consistently favored by courts when challenged. While no strategy can completely eliminate all possible legal challenges, following the NAI approach to floodplain and watershed management can help to:

- Reduce the number of lawsuits filed against local governments
- Greatly increase the chances that local governments will prevail against legal challenges arising from their floodplain management programs
- Reduce or eliminate the chances of surprising or alienating developers who want to do business, but find little or no guidance until project design is well underway
- Ensure that critical facilities, such as hospitals, schools, police, fire and EMS facilities, are well above flood elevations and fully accessible during flood events
- Educate community leaders, families, and businesses regarding the community’s flood risks and how to stay safe in a flood.

The legal system has long recognized and supported the local community’s duty to identify hazards and prevent harm. Courts throughout the nation, including the U.S. Supreme Court, have consistently shown great deference to governments acting to prevent loss of life or property, even when protective measures restrict some uses of private property. Recent decisions confirm that communities have the legal authority to manage floodplains and development. Moreover, communities have the legal responsibility to do so, and may be liable for any harm resulting from failure to exercise that responsibility. Property owners who increase flooding or erosion, or violate reasonable watershed or floodplain standards, are intruding on the property rights of others. The community is seen as the first line of defense against this intrusion.

Protecting Property Rights to Reduce Local Liability

The efforts of a town to apply the floodplain management measures described in the preceding sections are sometimes challenged as a “taking” of private property in violation of the owner’s constitutional rights. If proper procedures are followed in adopting floodplain management measures, such challenges will fail. The greater risk of local liability comes from using inadequate methods to prevent flood damage.

What Is a Taking?

The Fifth Amendment to the U.S. Constitution guarantees that private property shall not be taken for public use without just compensation. Regulations that some citizens believe “take” their property rights are often incorrectly characterized as unconstitutional “takings.” Many attempts at even mild land use regulation run aground against angry landowners or developers arguing that they have an absolute constitutional right to build on property. However, while claims like this may intimidate local officials and volunteer review boards, there is no such absolute constitutional right. Indeed, a properly documented and enacted measure designed to protect property values and public safety will in all likelihood withstand a takings challenge.

A 2005 U.S. Supreme Court case, *Lingle v. Chevron*, 544 US 528 (2005), involved a challenge to a state statute that limited the rents that oil companies could charge to dealers leasing company-owned stations. In a significant reworking of takings jurisprudence, the Court rejected the challenge and eliminated the requirement that, to avoid a takings claim, a regulatory measure must “substantially advance” a legitimate state interest.

After *Lingle*, there are four ways to show that government has taken property, all of which recognize the general validity of public safety measures:

1. Government has engaged in a permanent physical occupation of the property, a “Loretto” taking, *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982);
2. Government regulation or action has denied all economically viable use of the property, a “Lucas” taking, *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992);
3. Government action reduces the value of property under what is known as the “Penn Central” test, which examines the magnitude of the impact on the landowner and the character of the government’s action, *Penn Central Transportation Co. v. New York City*, 438 U.S. 104 (1978); and finally
4. Government has imposed an “exaction”—for example, conditioning grant of a development permit on dedication of a public easement where the exaction fails to substantially advance the same interests that the government could assert to deny the permit altogether, a “Nollan-Dolan” taking, *Nollan v. California Coastal Comm’n.*, 483 U.S. 825 (1987); *Dolan v. City of Tigard*, 512 U.S. 374 (1994).

“Vermont courts have long ruled that regulations preventing land uses that are threats to public health and safety are not takings, even if property values are substantially reduced.”

Though a landowner may argue that regulation to reduce the risk of harm from floods has rendered the property undevelopable or valueless, the Supreme Court in *Lucas* emphasized that even where regulation deprives land of all economically beneficial use, no compensation may be due if the purpose is to prevent a dangerous use. 505 U.S.1003

at 1022. Moreover, a court would likely require that the owner meet the burden of showing deprivation of all economically beneficial use. Courts frequently find at least some economic value in land preserved as open space or for stormwater detention, viewshed amenity to adjacent property owners, or similar uses other than brick and mortar development.

“ Notwithstanding the rhetoric of the property rights debate, local officials are the true defenders of property rights. ”

Courts recognize that developing flood-prone areas may create a public hazard to the occupants, emergency workers, upstream and downstream owners, and to the public generally because of increased costs. Where threats to life are involved, the legislature may take the "most conservative course which science and engineering offer." *Queenside Hills Realty Co. v. Saxl*, 328 U.S. 80, 83 (1946).

Courts in Vermont and other states have long ruled that regulations preventing land uses that are threats to public health and safety are not takings, even if property values are substantially reduced. *Alger v. Department of Labor & Industry*, 917 A.2d 508 (Vt. 2006); *Pope v. Town of Windsor*, 438 A.2d 388 (Vt. 1981); *Eno v. City of Burlington*, 209 A.2d 499 (Vt. 1965). In the Massachusetts case of *Turner v. Walpole*, 409 N.E.2d 807 (Mass.App. 1980), the court held that a floodplain zoning district did not result in a taking of property since the evidence established that the land was flood-prone and the plaintiff had not been deprived of all beneficial uses of the land. In 2006, the New Jersey Supreme Court reversed a lower court decision and found that denial of permits for residential construction in a mapped floodway did not constitute a taking. *Mansoldo v. New Jersey*, 187 N.J. 50, 898 A.2d 1018 (2006). Thus, the law supports a preventive approach as part of local "police powers" to protect the health, safety, and welfare of all members of the community.

Should Towns Worry? Not for the Reasons You May Think.

Developers and landowners may attempt to use takings litigation or the mere threat of litigation to persuade government officials to relax or abandon land use controls designed to regulate development in a flood hazard area. However, in reality, state and local governments are more likely to be held liable for undertaking activity or permitting development that causes or exacerbates future flood damage than for enacting and enforcing regulations that restrict development to prevent harm.

In 1865, the Supreme Court of Vermont found "that the town [of Burlington] ... was liable for the damages to the plaintiff, not on the ground that the town was liable for the acts of the ... agents of the town, but on the ground that it was as much the duty of the town to keep and maintain a sufficient passage for the water, as to provide for it originally." *Haynes v. Town of Burlington*, 38 Vt. 350 (1865). The Vermont courts have also found that local governments are liable on takings clause grounds for the wrongful flooding of private properties. For example, the court in *Bragg v. City of Rutland*, 70 Vt. 606 (1898), found that the city was liable for damages resulting from drain obstruction where city was responsible for inspecting the work and materials. In 1914, the court found the Village of Enosburg Falls liable for injury to adjoining property from obstruction of a natural water course. *Sanborn v. Village of Enosburg Falls*, 87 Vt. 479 (1914). Notwithstanding the rhetoric of the property rights debate, local officials are the true defenders of property rights. The overwhelming majority of property owners in the United States are homeowners whose interests are protected and property values enhanced by local zoning and other land use controls. Communities are at least as likely to be held liable for permitting poorly planned development that harms others than for preventing that harm in the first place.

If town officials build a proper record, work closely with the municipal attorney, the state NFIP coordinator, and other land use experts to address real hazards, avoid unduly severe economic hardships, and proceed in a fair and equitable manner, the town should prevail in court or avoid costly litigation altogether.

Conclusion: Meeting Minimums Is Not Enough

Community leaders may believe that adopting the minimum regulatory standards under the National Flood Insurance Program will protect them from liability from both fronts of concern: developers threatening takings litigation and landowners at possible risk of damage in the next flood.

FEMA encourages the adoption of higher regulatory standards than it promulgates. Communities that fall back on the minimum federal standards may still allow diversion of floodwaters onto other properties, loss of channel conveyance and storage, and an increase in erosive velocities, all of which may make the community liable under the Takings Clause or for negligence. Ultimately, any new development that is allowed to adversely impact other properties may make the community liable, even if minimum standards are in place. Therefore, it is incumbent upon local officials to adopt, implement, and enforce flood regulations that provide meaningful standards to ensure the safety of our local communities.

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