

# CHAPTER IV – PREVENTING INCREASED DAMAGES

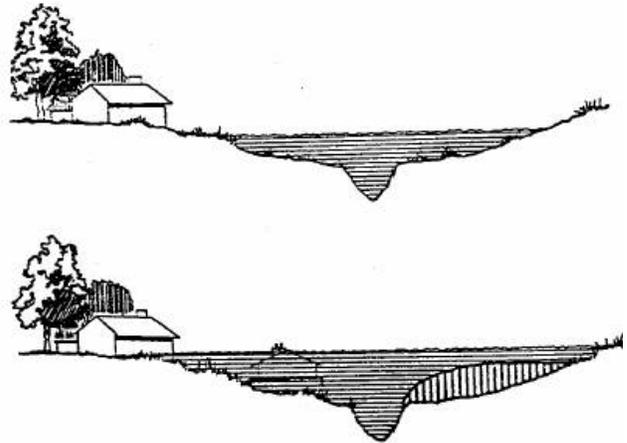
## Chapter Summary

Preventing increased flood damage is one of the major objectives of floodplain regulations. Primarily, this means local governments must prohibit any development that obstructs flood flows and increases the risk of damage to the property of others. The area through which most of the flood waters flow is called the floodway.

### A. The Problem

The previous chapter addressed the reason why development must be regulated in floodplains: many projects could block flood waters, cause water to rise, or be diverted onto properties that would not otherwise be at risk for flooding.

An example of a cross-sectional view of a floodplain to the right shows how much area is available for carrying the base flood discharge. When part of the area is taken up or obstructed, the discharge still needs roughly the same amount of area. The result is that the flood must go higher. Another way to think of it, is when you get into a bathtub with water in it, your body displaces the volume of water and causes the water level to rise. It is the same thing with a river basin. It is just like a big bathtub.



One of the key purposes of floodplain regulation is to prevent construction projects similar to those that have created problems in the past. This is done by withholding the development permit until the project plans are reviewed to ensure that there is no obstruction to flood flow, increases to flood heights, or increased flood damages being created.



*(Augusta, ME) Commercial areas in older towns are often located on rivers. Floodproofing is an option for commercial buildings. Photo by Maine Floodplain Management Program.*

Recall from Chapter III the pebble that could theoretically affect the flow and storage of flood water. Preventing such pebbles would be unfair and absurd. There must be a definition of obstructions to flood flow that would exempt pebbles. Our objective is not to prohibit the use of floodplains. Rather, the use of floodplains that cause "injury" or "damage" to others is prohibited. This concept is the first objective of the regulations and it guides the flood damage protection standards of Article VI of the Model Ordinance.

The legal system requires that regulations be fair and reasonable, and that all property owners be treated equitably. If one property owner is allowed to raise flood heights by a small amount, other owners in a similar situation must be given the same permission. While such action on the part of the first owner would not cause damage, the cumulative effect of similar actions would cause damage. As such, none may be allowed.

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A zero increase may not be a desirable standard because a strict legal reading of it would prohibit even the pebble. However, some states have adopted the zero rise standard. The NFIP requires that encroachments within the floodway be permitted only when it is demonstrated, by means of an engineering analysis, that the proposed development, when combined with all other existing development and anticipated development, will not increase the water surface elevation of the base flood by more than one foot.

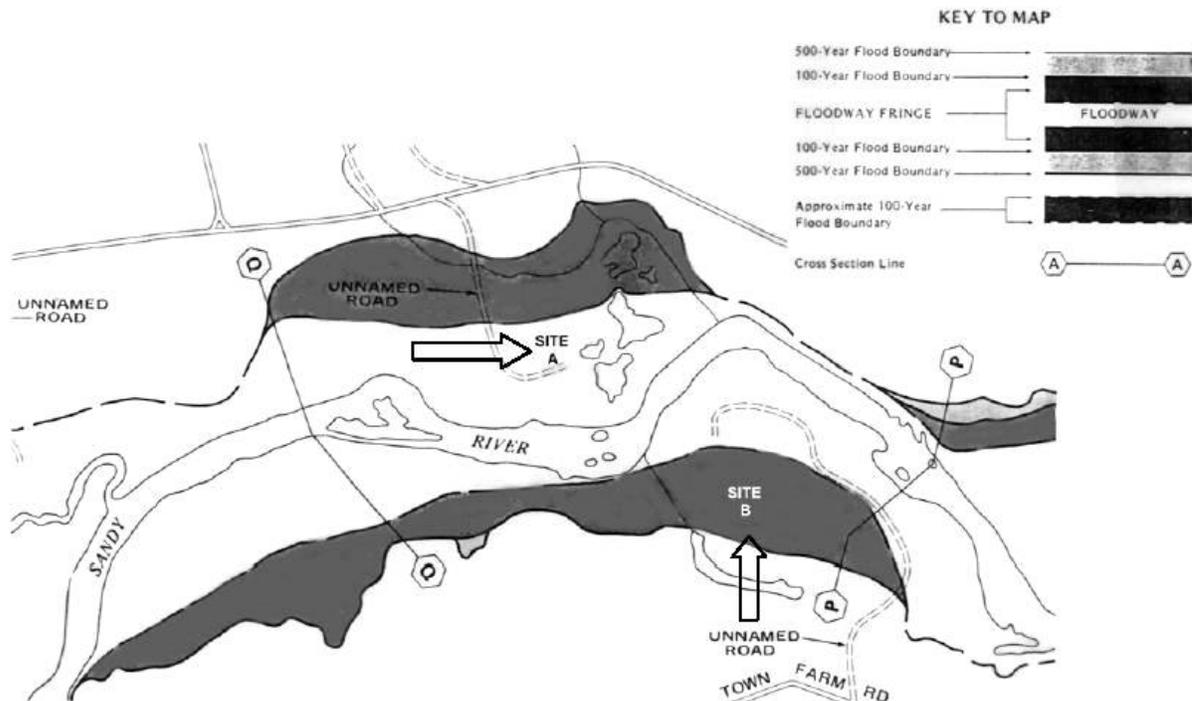
### ***B. The Floodway Concept***

As has been discussed, it is challenging to assess the impact that any given project will have on development during the permit application process. It can be difficult and expensive to determine the project's impact on flood heights, particularly when future developments must be considered. In an effort to reduce the regulatory burden on a community or property owner and as part of the Quid Pro Quo, the federal government has financed such calculations in those areas where development is most likely to occur. These calculations are part of the floodway analysis in the Flood Insurance Study and they result in the development of a Flood Boundary and Floodway Map in older studies and are part of the floodway determination on the FIRMs in the studies typically done after 1985 and '86 (as described in Chapter II). In the State of Maine when a floodway study has not been done, the floodway is assumed to be one half of the width of the SFHA, adjacent to the stream or river.

### **Development Outside of the Floodway**

Once a floodway is delineated, the job of the floodplain regulator is greatly simplified. When a permit application is submitted, the community permitting official checks the site location in relation to the floodway boundaries. If the site is in an identified fringe (in other words, outside of the floodway), the official knows the development will not cause flood damage to others: the floodway study already calculated that fringe obstructions will not cause a significant increase in flood heights. (NOTE: this does not mean that the development will not create a localized drainage problem, only that it will not block the flow of waters from flooding of the stream or river that was studied).

### **Project Site A: In Floodway Project Site B: In Flood Fringe**



### **Development in the Floodway**

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Development is not completely prohibited in a floodway, however, development that restricts the discharge of the base flood is prohibited. The regulations assume that fringe owners can and will completely fill or otherwise develop the flood fringe areas. Therefore, any obstruction in the floodway could cause the base flood to rise above that previously determined permissible amount (e.g. more than one foot). The result would be the creation of damages to others - a violation of one of the purposes of the regulations and contrary to Maine law.

Because the community's flood map has already taken into account the maximum rise of one foot, to minimize the potential for unlawful obstruction, community guidelines must require that the developer of a project located in a floodway obtain an engineering assessment indicating that the project will not cause any rise in the flood elevation. The assessment must take into consideration existing and planned development. This requirement is specified in Article VI, Section K.1. of the Model Ordinance as shown in chapter one of this handbook. In SFHAs for which no regulatory floodway has been designated on a FHBM or FIRM, Article VI, Sections K.2. and K.3. apply – see discussion in the next paragraph.

### Development Where No Floodway is Mapped

In a riverine community wherein the SFHA has not been mapped, the floodway must be assumed to be the area adjacent to the stream or river, which is one half of the width of the SFHA. If a community has a significant potential for development in these types of riverine SFHAs, they may consider asking FEMA to prepare a detailed study to identify that portion of the riverine SFHA considered as the floodway. There is always the option that a community can fund its own study provided it meets the technical mapping standards established by FEMA. These studies are expensive and with the limited funds both at the state and federal level, there must be a strong justification for such a request. The State Floodplain Management Coordinator is available to assist communities in preparing such a request.

### C. Hazardous Materials



*Canton, ME Flood December 18, 2003  
Caution should be exercised when working near a damaged tank.  
Such a structure may be particularly hazardous when it has been  
loosened from its anchor during a disaster. Photo by Lou Sidell,  
Maine Floodplain Management Program.*

Increased flood height is not the only potential flood-related hazard that can result from floodplain development. Although Article VI of the Model Ordinance does not prohibit the placement of chemicals, explosives, buoyant materials, or other hazardous materials below the flood protection elevation, a community should take steps to assure that places that store or use hazardous material are properly mitigating flood damages either by using floodproofed storage facilities like tanks or in places otherwise protected. It may be wise to completely prohibit such materials in the SFHA. From the U.S. Corps of Engineers book, *Floodproofing Regulations*, two lists of examples have been developed:

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1. Items that are extremely hazardous or vulnerable to flood conditions that should be prohibited from the SFHA:

Acetone	Hydrocyanic (Prussic) Acid
Ammonia	Magnesium
Benzene	Nitric Acid
Calcium Carbide	Oxides of Nitrogen
Carbon Disulfide	Phosphorus
Celluloid	Potassium
Chlorine	Sodium
Hydrochloric Acid	Sulfur

2. Items that are sufficiently hazardous or vulnerable to require their prohibition in all spaces below the base flood elevation or the elevation of flood protection:

Acetylene gas containers	Petroleum products
Drugs (in quantity)	Soaps and detergents (in quantity)
Food products (potential health problems)	Tires (open storage)
Gasoline	Wood products (in quantity)
Charcoal, coal dust (subject to spontaneous combustion when wet)	
Matches and sulfur products (in quantity)	

Other hazards to be cautious of are storage tanks, lumber, and similar buoyant materials. If not properly anchored, these items can become floating debris that will abut buildings or bridge openings downstream causing blockage of flood flows and increased flood heights.



*Hallowell April 2005, LP tanks not anchored and susceptible to flow.  
Photo by Bonnie Cowle, Maine Floodplain Management Program*

FEMA has produced a CD that addresses the proper installation of LP and home heating oil tanks titled *Anchoring Home Fuel Tanks*, A Presentation of FEMA's Mitigation Division, FEMA 481. Contact the state coordination office or FEMA for a copy.

*Wells, Maine: A home heating oil tank in an AO Zone that is adequately anchored to prevent floatation and lateral movement. Photo by Lou Sidell, Maine Floodplain Management Program*



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### Pollution

Article VI, Section C of the Model Ordinance is designed to prevent both pollution from and flooding of sewer lines (which usually results in flooded basements) and subsurface wastewater disposal systems. Manholes can be watertight or elevated above the flood protection elevation. Although there is no way to make a septic system leach field watertight, septic tanks can be made substantially watertight with backflow prevention techniques and they must be adequately anchored. In Maine, the Department of Health and Human Services, Division of Environmental Health is responsible for the regulation of onsite disposal systems.

### Manufactured Housing

A manufactured home is susceptible to being washed off its foundation, carried downstream and causing significant damage to other properties. Article VI, Section H of the Model Ordinance requires that manufactured housing units be elevated on a permanent foundation at least one foot above the BFE. **Whereas permanent foundations cannot be placed within a floodway without causing an increase in the flood elevation, the NFIP does not allow manufactured housing in floodways.** The NFIP does not apply this regulation to the placement of mobile homes in **existing** mobile home parks (those that were there before a community joined the NFIP). However, the Model Ordinance does regulate against the placement of homes in floodways in existing parks.



To summarize, manufactured homes must be elevated above the BFE and anchored on a permanent foundation to resist wind and water forces. Such structures must also be attached to a permanent



*(Canton, ME) Manufactured homes such as this one are particularly susceptible to the ravages of extreme weather. The ice jam flooding December 18, 2003, on the Androscoggin River set the stage for widespread community flooding. The oil tank on page 4-3 of this chapter belonged to this home. Note that the steps were also washed away. The flood depth was up to the second board above the skirting or just above the door sill. Photo by Lou Sidell, Maine Floodplain Management Program.*

foundation that is secured in one of the following ways: poured masonry slab or foundation walls; with hydraulic opening; or reinforced piers or block support. The foundation must support the home so that its wheels and axles are not weight-bearing. For additional information see— *Manufactured Home Installation in*

*Flood Hazard Areas/FEMA 85 9/85*