

Chapter 15

Commonly Applied Floodplain Management Measures

Chapter Overview

There are a number of floodplain management measures that should be more closely examined because they are commonly applied by localities. They include land use regulations, flood warning and preparedness systems, and acquisition of flood-prone lands. Land use regulations can be implemented in a relatively short period of time, whereas flood warning and preparedness systems and acquisition programs typically require further planning before implementation (discussed in a latter chapter).

Land Use Regulations for Floodplains, Wetlands, and Urban Drainage

Around 18,000-19,000 localities have adopted some form of regulation over future development and construction in identified flood-prone areas, required for participation in the National Flood Insurance Program (see Chapter Ten). Considerably less have enacted regulations to protect the natural resources and functions contained in our nation's wetlands. But similar to the floodplain management situation, thousands of localities have implemented urban stormwater management measures. Typical regulatory provisions are presented in the following treatment of these three regulatory controls.

Zoning Ordinances – A Primer

The United States Constitution allows states “to enact legislation to protect the public health, safety and welfare of its citizens.” Virtually every state has adopted legislation that passes all, or some, of the authority to adopt zoning ordinances to their counties, cities, towns, and other local general-purpose governments. Because zoning ordinances are locally devised regulations, they differ dramatically across the country. They also vary greatly in their degree of regulation.

The basic intent of “zoning” is to separate incompatible uses of land. Zoning ordinances adopted by local units of government characteristically provide for the following:

- a) A system of dividing the jurisdiction into zones with different regulations applying to different zones;
- b) A system for permitting certain land uses to be established within those districts;
- c) A system for permitting other land uses or developments to be established only upon the issuance of a special or conditional use permit; and
- d) A system for treating existing development through the concept of non-conforming uses.

In form they include at least the following seven basic elements:

Land use districts

Local units of government divide themselves into residential, commercial, industrial, and sometimes agricultural areas, and establish **land use districts** to separate these different kinds of land use so that property values can be maintained. After zoning is adopted, a new gas station is not permitted in an area zoned for single-family homes.

Once a locality is divided into districts, there are some uses that just do not fit into any district. Such uses as churches, schools, and libraries need to be examined on an individual basis in relation to their impact on their surroundings and then located and designed specifically to minimize those impacts. These uses are “special” and require a permit to be built or operated, hence the “**special use permit**.” Because conditions are placed on these uses – such as hours of operation or site development—they are also known sometimes as “**conditional uses**.”

Development standards

Once uses are separated, even if a permitted structure is built in a certain area, that structure can cause big problems for other existing structures. If there exists a modest structure and there is built next to it an immense structure up to the property line, the occupant of the modest structure might lose view, sunlight, and much of what was enjoyed about the structure. In addition to the separation of uses, then, **development standards** are incorporated into zoning ordinances. Development standards are the *measurable* rules contained in zoning ordinances that tell citizens how high, side, and deep everything can be built. They relate to building setbacks, height limitations, percentage of property that can be covered by buildings, occupancy, and parking spaces required.

After development standards are included in an ordinance, there needs to be some provisions for adjusting the standards to accommodate properties with unusual shape or topography. For instance, although a zoning ordinance may require a 25-foot setback from the front property line, it might be appropriate to reduce the setback to 20 feet on a parcel of land that would otherwise be unbuildable because of a large steep bank. In this and some other cases it might be reasonable to allow the development standards to be varied in a particular instance, hence, the **variance**.

Nonconforming uses

Most zoning ordinances are adopted after localities have already partially developed. When such ordinances are adopted, inevitably certain existing uses are either in the wrong use district or do not meet the development standards of the new ordinance. Provisions have to be made for things that have been built, or done, that does not conform to the new zoning—the **nonconforming uses**. An example might be an old grocery store and service station in the middle of a residential neighborhood. Rules are written to determine how and when to allow modifications to these uses and structures, i.e., issuance of permits for modifications to nonconforming uses.

Permit evaluation criteria

Zoning ordinances establish use districts and development standards, and allow the granting of permits for special uses, variances, and modifications to nonconforming uses. To be consistent and fair in the granting or denying of such permits, criteria for evaluating applications for these permits

are included in zoning ordinances, thus **permit evaluation criteria**. These criteria are subjective matters of judgment and are not measurable. They relate to such things as whether granting the permit “will have a significant negative impact on the existing neighborhood,” and so forth. They are the judgmental factors upon which decisions to grant or deny permits are based. They are intended to ensure that such decisions are not “arbitrary and capricious,” which would be unconstitutional.

Procedures

Most local governing bodies – city councils, county commissions, and the like – do not have time to review all the zoning permit applications, particularly in rapidly developing areas. Elected or appointed bodies such as planning commissions or boards of adjustment, and staffs are created to take some of the work load off of the governing bodies, and administrative **procedures** are established or integrated into zoning ordinances to standardize the processing of zoning ordinance permit applications.

Definitions

Normal dictionary definitions for many words used in zoning ordinances are not adequate for administering those ordinances. Certain words or usage need to be defined for each community, thus **definitions** are added to zoning ordinances. Most ordinances have these definitions in a separate section.

Zoning map

Finally, to make it easier to visualize where different uses are permitted, and where different development standards apply, maps are prepared, and/or other maps are incorporated by reference in the ordinance, to show the different zoning districts, thus the **zoning map**.

Floodplain Zoning Ordinances

With this general introduction and guide to zoning ordinances, attention can now be devoted to a study of the application of this tool in regulating development in identified flood-prone areas. It is the process most frequently used by local units of government in addressing appropriate uses of such areas.

There are a number of “model” floodplain zoning ordinances, tailored after the minimum floodplain management measures required to participate in the National Flood Insurance Program (NFIP). They are typically prepared by state agencies or regional entities to serve as templates for use by local governments in developing their own ordinances. Nearly all models lack the commentary regarding ordinance language and purposes of the various sections, needed for an academic treatment and understanding of how the ordinance operates. However, there are a few comprehensive ordinances and accompanying detailed commentaries available for viewing and downloading at Internet sites. The best sole source to locate these ordinances is <http://www.google.com>. Type in the search box “annotated floodplain management ordinances.” Under the selection “Maine Floodplain Management Handbook” is a well-constructed “Model Floodplain Management Ordinance.” **Download the ordinance for study and classroom**

discussion. Note its language and pay particular attention to the commentary regarding ordinance provisions. Most of the language is tied to floodplain management measures required to participate in the NFIP.

Subdivision Regulations

Subdivision regulations typically require that floodplain boundaries and elevation information are to be included on all preliminary and final plats submitted for approval, involving land to be subdivided. They also provide that no lot is to be approved that does not include a building site that can be used in conformance with floodplain zoning regulations. Further, they include a requirement that where a watercourse or drainageway transverses any subdivision, suitable easements must be dedicated in behalf of the public. These easements are designed to provide access to those who have the responsibility to maintain these watercourses or drainageways. Soil erosion and sediment control regulations are also tied into the subdivision plat approval procedure. In addition, subdivision ordinances generally include requirements for the installation of public drainage improvements. Developers may be required to provide storm sewer systems, open channel and culvert systems, and other stormwater facilities and appurtenances as appropriate.

A “Model Conservation Subdivision/Open Space Development Ordinance,” that follows the theme of this course, is located on the Internet and may be accessed at <http://google.com>. Type the ordinance name in the search box. **Select and download for study and classroom discussion the model conservation ordinance.**

Wetland Regulations

Land use regulation is the most commonly used wetland protection technique among local governments throughout the country. Wetland regulations have been adopted in at least 2,000 communities. Regulations are inexpensive relative to acquisition and can provide substantial protection for wetlands if adequately enforced. Local governments can tailor a regulatory program to fit their needs.

While existing local wetland regulations vary greatly in their details, they have some common elements: 1) a statement of wetland protection goals; 2) a definition of a wetland; 3) a list of permitted and prohibited uses or performance standards; and 4) a section on penalties.

Wetland protection goals may be stated in one of several sections of an ordinance – preamble statements, goals, legislative purposes/intent, findings of fact, or objectives. Goal statements should justify wetland regulations as a means of executing specifically mandated state statutes, where they exist, or the general mandate of protecting the public health, safety and welfare. Citing specific functions and resources of wetlands and addressing the natural hazards of building in wetland environments can make the necessary linkage to public health, safety, and welfare issues. Where information specific to the wetlands within the local jurisdiction exists, local ordinances may be strengthened through a specific reference to that information.

Most wetland ordinances include **criteria for identifying regulated wetlands**. Since the U.S. Fish and Wildlife Service's wetland classification system (refer to Chapter Eight) has become a widely known and used standard, most local ordinances use all three wetland identification criteria (the presence of wetland plants or hydrophytes; hydric soils; and flooding, ponding, or saturation) as a means of defining a wetland. Definitional criteria that make use of all three wetland criteria provide an improved basis for resolving wetland boundary disputes. In addition to criteria identifying regulated wetlands, ordinances often adopt maps to help define wetlands subject to the ordinance. Including at least some minimal procedures for undertaking wetland field delineations is also advisable to supplement and update maps.

Wetland ordinances also provide standards for wetland protection and use. Regulations generally list **uses permitted** as a matter of right, those **prohibited**, and those requiring a case-by-case review before an individual permit (often called special permit, special exception, or conditional use – as discussed in above zoning “primer”) is issued, i.e., **performance standards**. Specifying what activities will and will not be allowed, and under what conditions, constitutes the essence of a wetland protection ordinance. Certain objectives should be considered requisite to a successful protection program. Protection and use standards should include provisions for: 1) at the onset, eliminating or avoiding impacts to wetlands; 2) ensuring that approving a wetland use will not cause, or make worse, natural hazards; 3) protecting the natural resources and functions of wetlands; 4) achieving consistency with other broader plans and regulations; and 5) minimizing impacts and restoring or replacing wetlands (mitigation) as necessary.

Regulations generally take the form of **zoning** or **subdivision controls** or a combination of both. They may be adopted as separate ordinances designed solely for the purpose of protecting wetland resources or as part of a more comprehensive program regulating a number of activities and areas in addition to wetlands and adjacent buffer zones.

Zoning Ordinances

Wetland protection through **zoning ordinances** may apply to: 1) specific wetland protection districts; 2) sensitive areas, conservation, or natural resource protection districts; and 3) combined floodplain/wetland districts.

Specific wetland protection districts provide the most suitable framework for a comprehensive detailed statement of regulatory purpose, findings of fact, and protection standards. The establishment of a specific district or ordinance is a logical way to address land-use conflicts where land values are high and numerous or significant wetland systems exist. It can set forth the procedures that are necessary to determine if a proposed use may adversely affect a wetland.

The establishment of a **sensitive area**, or a **conservation**, or a **natural resource protection district** is another zoning approach used to manage wetlands. Typically, wetlands are a subset of various land features whose uses are controlled within such a district. Other features commonly included in the district include: areas of steep slopes; streams, lakes, other water bodies; shoreline areas, and riparian zones; geologic hazard areas; significant plant and wildlife resource areas; and scenic resource areas. Sensitive areas districts often are created out of the practical need to steer

development away from hazardous areas with building limitations. However, increasingly sophisticated construction and engineering practices may pose a challenge to utilization of this approach to prevent wetland destruction.

Combined floodplain and wetland districts can be an effective method for wetland protection. Combining wetland protection with floodplain regulations to “protect the public health, safety, and general welfare of its citizens” reinforces the legislative basis for their enactment, thereby aiding in withstanding legal challenges to restrictions on land use. But there are certain limitations to this approach. Isolated wetlands and those not contained within the regulated floodplain would not be protected under this approach. Permitted uses pertaining to wetlands should have greater restrictions placed on them. Many floodplain ordinances typically permit agricultural practices and permit some filling, drainage, grading, and construction within the outer floodplain areas (i.e., outside the floodway), as long as structures are elevated to the “100-year flood” level and flood heights are not increased. These areas may contain wetlands.

Mapping needs should also be considered in combined ordinances. Different scales and base maps may exist for delineation of floodplain and wetland boundaries. Floodplain maps typically used are those prepared by the National Flood Insurance Program, whereas wetlands maps typically used are those prepared by the U.S. Fish and Wildlife Service. (Refer to previous chapters for discussions and illustrations of these maps.)

Subdivision Regulations

While most **subdivision regulations** do not specifically regulate wetlands, nearly all contain prohibitions against building in areas in which soil, subsoil, or flooding conditions would create public health or safety hazards if development took place. They also include a “cluster option.” This allows developers to group buildings in nonsensitive areas so that other areas can be maintained as open space without changing the overall density of the subdivision. Subdivision ordinances often contain clauses requiring developers to dedicate a portion of their land to the local government for recreational or open space purposes. Wetlands and other sensitive areas can be preserved in this manner. Construction standards and criteria are often contained within subdivision regulations or are referenced as separate technical codes that must be met when submitting plats for review. These standards can be expanded to cover wetland management considerations by specifying what construction practices are necessary to maintain wetland functions.

Summary

Regardless of the above method used—zoning ordinances and/or subdivision regulations, as with most local regulatory schemes, citizen opposition to wetland ordinances can be strong. Consequently, to promote success, local governments must ensure that their wetland measures are strong enough to provide the necessary protection and well drafted to withstand possible challenges.

A wealth of information concerning wetland protection may be found at the Association of State Wetland Managers website: <http://www.aswm.org>. Included is a model ordinance for regulating wetlands.

In addition, the American Planning Association (APA) has published a report “Protecting Nontidal Wetlands,” Planning Advisory Service Report 412/413. A copy of the full report may be ordered from the APA website at <http://www.planning.org>. Chapter 5 of the report contains a model nontidal wetland protection ordinance.

A number of other wetland protection ordinances may be found on the Internet. Again, the best location to start may be <http://www.google.com>. In the search box, type “wetland protection ordinances.” Select and download for study and classroom discussion “Wetlands Protection Model Ordinance” (3 pages).

Urban Stormwater Management

Urban stormwater management programs are invariably linked to land use planning and the regulation of land development through zoning and subdivision ordinances. This includes linkages to floodplain and wetland management ordinances. (The distinctions between “floods” and “stormwater drainage” were presented in Chapter 2.) In their application, drainage or stormwater management ordinances should not merely regulate, but rather serve as a policy statement of the community’s philosophy of dealing with stormwater runoff.

Some communities prefer ordinances that are very detailed and attempt to cover all problems that may arise. They feel enforcement of drainage provisions is easier if written into law. Thus, some administrators tend to include engineering criteria and design standards in ordinances in order to encourage uniformity.

In contrast, other communities feel that urban drainage ordinances should be limited to stating specific policies. Engineering criteria and technical details are placed in a reference document or documents to fully discuss specific criteria and standards and to keep them up to date. Elected officials can refer technical questions to the engineering department and devote their involvement to policy matters.

The major thrust of the reference document is to present examples in such detail that a design engineer can determine generally what is expected by the local government in different drainage control designs. The manual should not be a limiting document forcing the engineer to use standard designs and procedures. It should have the connotation of a document that suggests and informs rather than limiting or prescribing.

A closely related matter is whether a technical drainage ordinance should be based on specification standards or performance standards. (These terms and concepts were introduced in Chapter 13.)

Specification standards require the developer to use specific engineering and design approaches outlined in the ordinance. They have a number of advantages for the governmental agency employing them. First, specification standards are simple to administer because design solutions are required to have uniformity. Second, because they are easier to administer, small communities and counties with small staffs and little technical competence can undertake more elaborate regulatory programs than they could otherwise manage if they relied on performance standards. Likewise, specification standards may eliminate the need for costly technology needed to monitor alternative design solutions. Third, a developer knows in advance what requirements will be imposed. A final advantage to specification standards is that an enforcement officer can determine at an early stage of plan implementation or an early stage of construction whether the specification standards are being met.

On the other hand, performance standards have their obvious advantages. First, performance standards are far more flexible than specification standards. Technological change and innovation are likely to render specification standards quickly out of date, whereas properly drafted performance standards can accommodate such change. Second, the flexibility of performance standards may allow the developer to employ a less costly design solution on a given site. Rigid specification standards may require more costly solutions to stormwater management problems than are necessary. Third, performance standards help to focus attention on the goals that are to be achieved. Drafting performance standards reminds localities of the purposes of regulation and helps to avoid becoming obsessed with particular means of achieving those ends.

Knox County, Tennessee, has a comprehensive Stormwater Ordinance that may be viewed and downloaded from the following Internet website: <http://www.knoxcounty.org/>. Type “stormwater ordinance” in the search box.

Flood Warning and Preparedness Systems

Flood warning and preparedness systems are intended primarily to protect public safety. If there is an adequate period of time after a warning and preparedness plans are in effect, they may allow for some property protection.

Flood Warning Systems

The purpose of the flood warning system of a warning and preparedness program is to determine if a flood is impending and predict the time of its occurrence and its magnitude. It provides the trigger for putting the warning arrangements and preparedness plan into action.

The National Weather Service (NWS), within the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, has forecast offices covering the 50 states that issue routine weather forecasts and severe weather watches, warnings and advisories. A **flood watch** indicates that flooding is a possibility in or close to the watch area. Those in the affected area are urged to be ready to take action if a flood warning is issued or flooding is observed. Watches are issued for flooding that is expected to occur within 6 hours after the heavy rains have ended. A **flood warning** is issued for life/property threatening flooding that will occur within 6

hours. It could be issued for rural or urban areas, as well as for areas along the major rivers.

Urban/small stream advisories alert the public to flooding which is generally only an inconvenience (not life-threatening) to those living in the affected area. They are issued when heavy rain will cause flooding of streets and low-lying places in urban areas. They are also used if small rural and urban streams are expected to reach or exceed bankfull stage.

Often flood warnings issued by the NWS are not adequate in terms of advance time and specificity of location to serve the needs of localities, particularly those subject to flash flooding. In these, and other, instances, the NWS products are supplemented by local flood warning systems (LFWS), which, as outlined below, can range from simple to complex.

At the local level, two basic approaches are available for determining the likelihood of flooding. The one most commonly used is prediction of floods based on precipitation received in upstream portions of the watershed. The alternative approach is prediction of flooding based on measurements of upstream water levels in stream(s).

Approaches based on measurement of upstream water levels are generally the most accurate. However, they can only provide a length of warning time equivalent to the time required for floodwaters to travel from the upstream point of measurement to the critical area of the community. Systems based on rainfall generally provide longer warning times because of the additional time required for surface runoff to reach streams. Various systems can be developed by combining these basic approaches.

Determining the most effective type of LFWS for a community is a complicated problem. The type of system used will depend on the familiarity and comfort of community officials with the technological options. Perhaps recommendations by federal or state officials or surrounding communities that have a successful LFWS will be enough information to choose a system. There are two basic types of LFWSs: manual systems and automated systems.

Many of the LFWSs in operation today are **manual** self-help systems that are inexpensive and simple to operate. The manual self-help system is comprised of a local data collection system, a community flood coordinator, a simple-to-use flood forecast procedure, a communication network to distribute warnings, and a response plan.

The simplest and least expensive approach to data collection is to recruit volunteer observers to collect rainfall and stream/river stage data. Inexpensive, plastic rain gages may be supplied by the NWS to volunteer observers who report rainfall amounts to a community flood coordinator. The flood coordinator maintains the volunteer networks. More sophisticated automated rain gages may be necessary in remote areas or in situations where observers are not available. Stream gages also vary in sophistication from staff gages (painted on bridge pier or other vertical surfaces in or near the stream channel, or inexpensive gages either mounted on some fixed surface or freestanding) to Limited Automatic Remote Collection Systems, radios, etc.

The NWS forecast office for that area can often provide the locality's flood coordinator with a simple, easy-to-use forecast procedure. This procedure normally consists of tables, graphs, or charts that use observed and/or forecast rainfall and an index for flood potential to estimate a flood forecast. Flood forecasts vary from a categorical forecast of flooding to a numerical crest value. Forecasts may also include the time remaining before flood stage will be reached or the time when the crest will occur.

An **automated** LFWS is composed of sensors that report environmental conditions to a computer using an observation platform communication protocol and a second communication protocol by which information is sent between the base station and other computer system(s).

An automated LFWS has either a stand-alone configuration or a network configuration and can consist of the following equipment: automatic reporting river and rainfall gages, a communications system, automated data collection and processing equipment, a microprocessor, and analysis and forecasting software.

Some automatic rainfall gages report rainfall data every time a tipping bucket tips. This is known as event-type rainfall sampling. For river stage, every time a change in stage of a preselected increment is measured, a new river stage value is transmitted from the sensor to a base station.

Automated LFWSs have been designed, developed, and implemented by the NWS, other federal agencies, state and local governments, and private vendors; and they vary in design, capability, and operation. A community must assess its needs to determine the level of sophistication (and associated costs) required. Automated system operation may vary from a simple flash flood alarm gage that audibly announces imminent flooding to a continuous computerized analysis of precipitation and streamflow and a hydrologic model to forecast flood levels.

In the past two decades, a substantial growth in technology and a decrease in the cost of microcomputer systems have resulted in the development of automated flood warning systems. Three of the more prominent automated LFWSs described below include flash flood alarm systems, ALERT, and IFLOWS.

A **flash flood alarm system** consists of a water-level sensor(s) connected to an audible and/or visible alarm device located at a community agency with 24-hour operation. Water levels exceeding one or more preset levels trigger the alarm. If the system is configured to detect two preset levels, the rate of rise can be determined. The water level sensor(s) is set at a predetermined critical water level and is located a sufficient distance upstream of a community to provide adequate lead-time to issue a warning. Rain gages can also be located upstream of a community; each gage is preset with alarms that sound when a predetermined flood-causing rainfall amount is exceeded. Communication between the sensor(s) and a base station can be via radio or telephone.

The **Automated Local Evaluation in Real Time (ALERT)** system consists of automated event-reporting meteorological and hydrologic sensors, communications equipment, and computer

software and hardware. In its simplest form, ALERT sensors transmit coded signals, usually via very high frequency (VHF) and ultra high frequency (UHF) radio, to a base station, often through one or more relay or radio repeater sites. The base station, which consists of radio receiving equipment and a microprocessor running ALERT software, collects these coded signals and processes them into meaningful hydrometeorological information. Processed information can be displayed on a computer screen according to various preset criteria, with both visual and audible alarms activated when these criteria are reached. There are a vast number of types and manufacturers of ALERT hardware and software. Some systems have the capability of dialing up preselected lists of individuals or initiating other programmed actions when preset criteria are exceeded.

The **Integrated Flood Observing and Warning System (IFLOWS)** was developed, starting in 1979, by the NWS in a joint effort with selected states in the Appalachian region of the United States to improve flood warning capabilities in that region. This area was selected because of its susceptibility to flooding, its lack of existing warning systems, and available communication circuits to tie the area together. Over the years it has expanded to now cover portions of 13 eastern states.

IFLOWS is a wide-area network of ALERT-type systems with enhanced, full, two-way communications capability (voice, data, and text). These systems serve as regional data collection and information dissemination networks. In addition to performing real-time data acquisition and processing functions, IFLOWS software handles intercomputer networking and information transfer. IFLOWS computers collect and process remote sensor information; act as data concentrators, allowing more information to pass over a given communications channel in a fixed period of time; and serve as ports into regional communications networks. Not all ports into an IFLOWS network perform all of these functions continuously. They all, however, remain continuously on-line. In case of network failure, an IFLOWS computer can function as a stand-alone, ALERT-type base station.

Sensor technology for both IFLOWS and ALERT networks is basically the same. IFLOWS software is presently limited to precipitation and river-stage gage applications, while ALERT can handle several other parameters. IFLOWS networks have a backbone communications infrastructure. While the original IFLOWS concept envisioned an all-radio/microwave network, present systems employ leased telephone lines, satellites, VHF/UHF radios, and microwave communications links. IFLOWS networks presently extend into about 200 counties throughout 13 eastern states. This Automated Flood Warning Systems network connects numerous local flood warning systems, and integrates and shares information from approximately 250 computers and 1500 sensors.

IFLOWS networks (software, hardware, and communications) are supported by the NWS IFLOWS Program. The Program has a defined, centralized management structure primarily located in the Office of Hydrology. NWS Eastern Region Headquarters manages the NWS portion of network operations. IFLOWS, by its very nature, integrates system administration and operation. Multiple levels of government and various agencies at each level of government are involved in

operating the systems. Individual systems are usually networked at the state level. Connections between state systems are established at gateways, which are usually at NWS forecast offices.

A map showing the states participating in the system may be found at the following Internet website: <http://afws.net>. By clicking on a specific state, the counties included in IFLOWS are displayed. Additionally clicking on a specific county shows on a map, and lists, the location of the gages, along with rainfall amounts at the gages for recent time periods.

Vandalism of real-time gages is a problem. Stealing or using them as targets can eliminate an important source of data at a time when they are most needed. Monitoring and testing a warning system is often not an on-going activity. Consequently, the stations may be inoperative during a critical period.

Warning Dissemination

Flood warning dissemination is a key element of any flood warning and preparedness program. Warning dissemination is the mechanism by which local officials and the effected public are informed that a flood threat condition exists. Methods of initially warning key personnel may include audio alarms, voice dial-out systems to “call” key officials, or beeper or other cell or remote systems. Once emergency personnel have been activated, mass dissemination techniques come in to play. These techniques may include the use of public radio and television or special weather radios. Door-to-door warning dissemination can be used as well as sirens and public address systems. As noted in recent times, such as the public response to Hurricane Katrina, even with a warning dissemination system, some of the public in the path of the impending event do not heed the warning and act too late or not at all, or do not have the ability to leave the hazardous area.

Preparedness Plans

The function of the flood preparedness plan portion of a local warning and preparedness program is to guide and coordinate the response to a flood warning. It normally provides a large share of the benefits which justify expenditures on the flood recognition system and warning arrangements.

Preparedness planning identifies what must be done and who must do it. Emergency response actions are predetermined, documented, reviewed, and practiced in advance. **Because of change in local personnel and duties it is important to review the plan and to carry out plan exercises at least on an annual basis.** The lead time available, accuracy, specificity, and the reliability of the forecast and warning system dictate the types of emergency response actions that take place. More lead time provides more opportunity to take damage-reducing actions. Higher accuracy, increased specificity, and better reliability mean floodplain residents can focus attention on the exact areas and expected depths of flooding, making response actions more efficient.

Advanced warning can be used in a variety of ways to respond to impending flooding. Emergency response actions can include warning low-lying areas to evacuate; providing evacuation assistance to those who do not have transportation or other mobility; curtailing electric and gas service to prevent fire and explosions; carrying out law enforcement activities including traffic control,

property surveillance, and crime prevention; providing emergency medical service, care center, and shelter programs; and dispersing fire and rescue services. If there is more lead time, more aggressive activities can be accomplished to reduce property damage further such as moving public vehicles and equipment from low areas; removing, relocating, or stacking contents of structures; or initiating flood-fighting efforts (e.g., sandbagging). Each action taken as a result of advanced planning and increased warning time has direct consequences in terms of derived benefits.

As the emergency subsides, the recovery process begins. While memories and actions are still fresh, emergency procedures that were carried out should be reviewed and critiqued as a means to make improvements to the preparedness plan.

Acquisition

Acquisition of floodplains and wetlands has received increased attention as an effective floodplain management technique to guide future uses and remedy past mistakes. Hundreds of local and state governments have undertaken acquisition projects for a number of reasons and objectives. The Federal Emergency Management Agency has utilized acquisition of flood-damaged properties as a primary mitigation measure in the wake of a Presidential disaster declaration. The FEMA acquisition process is discussed later in this chapter.

Acquisition is an action by which a state or local government obtains an interest in land, either by full ownership through purchase, donation or land exchange; or a lesser interest such as an easement or leasehold. However, acquisition must be selectively applied. Often it is most effective when used in combination with other floodplain management tools, or in conjunction with other community development or redevelopment programs. This can include post-flood recovery measures to acquire and remove heavily damaged structures in lieu of repairing or rebuilding in the floodplain.

Advantages of Acquisition¹

Acquisition holds some significant advantages over other floodplain management tools.

- Achieve multiple community goals: Acquired floodplain lands can be used to meet other community objectives, compatible with proper floodplain management. Depending on the type of land and the nature of the flood risk, such community objectives as increased open space, active or passive recreation, urban or waterfront revitalization, and establishment of greenways, greenbelts, and nature study areas can also be achieved.
- Achieves multiple floodplain and wetland management objectives: In addition to reducing flood losses on the acquired property, through clearing the land of development and restoring it to pre-development conditions, it can expand the floodplain's flow carrying capacity causing a reduction in upstream flood peaks, and increase the flood storage area resulting in reduced

¹ Much of the following materials were taken from "State and Local Acquisition of Floodplains and Wetlands: A Handbook on the Use of Acquisition in Floodplain Management," U.S. Water Resources Council, September 1981.

downstream flood peaks. As a result, stormwater management costs may be reduced. By restoring the land, groundwater recharge can be increased, wetlands restored, and wildlife habitat improved.

- Provides for public use of acquired land: Total or partial acquisition is the only means by which a community can guarantee public use of land. Regulations can limit land use, but they cannot ensure public access. A community must normally acquire full or partial ownership if public use of the property is desired.
- Provides more complete and permanent protection than other measures: The risk of future flood losses or deterioration of natural resources and functions is a major consideration in any floodplain or wetland management program. Actions other than acquisition offer less than complete protection for loss reduction. Flood control structures, floodplain development standards, flood warnings and other measure to reduce the susceptibility to or impact from flooding all involve a residual degree of risk to occupants of floodplains, and may result in substantial damage if the flood for which they are designed is exceeded. Regulation of undeveloped floodplains to protect natural resources and functions also involves a risk of future changes in regulations, court challenges to the regulations, failure to control all undesirable uses, and inadequate enforcement. Acquisition, when combined with permanent evacuation of the floodplain, can provide complete protection if proper land management measures are implemented. It is also a permanent solution to pressures – at least from the private sector – to use land for purposes incompatible with flood hazards. Once floodplain or wetland property is acquired, the public agency can maintain the desired use. Acquisition of undeveloped areas can also provide more adequate protection for natural resources of floodplains and wetlands. Such protection may be especially important as natural resources and functions are lost in other floodplains and wetlands in a watershed or region.
- Corrects past mistakes in floodplain use: Much unwise development has occurred on floodplains and wetlands. Developed floodplains subject to flood damages present difficult and expensive floodplain management problems. Reducing flood damages and the risk to life and health to floodplain occupants can be difficult without causing a financial or social hardship for residents of the community. Acquisition and permanent evacuation offer the most effective means to correct past mistakes and break the cycle of flood damage, repair and further flood damage. It simultaneously provides opportunities for restoring natural floodplain resources and functions.

Disadvantages of Acquisition

Along with its many strong points, acquisition has limitations. Some of the most significant are summarized below.

- Can be expensive: If a community must pay full market value for the property to be acquired and must use only local sources of funding, acquisition may be considered too expensive although it is the preferred solution.

- Funding difficult to obtain: A community may have difficulty locating sufficient funds for acquisition. Except in post-flood recovery situations, discussed later, few federal and state programs are designed to assist with acquisition of floodplains and wetlands for floodplain management and wetland protection purposes. An extensive search of programs and restrictions on use of program funds is often needed to achieve a suitable funding package.
- Difficult to coordinate assistance: After funding and technical assistance have been secured, a substantial effort may be needed to effectively coordinate the different sources of assistance. Because the primary objectives of different government agencies and private interests willing to assist do not always coincide with those of the community or with one another, the project may not always proceed smoothly or at the optimum pace.
- Landowner objections, especially if condemnation is used: Landowners and others in a community sometimes view public acquisition of land as undesirable. Acceptance of acquisition will depend upon the particular circumstances involved, the public understanding of the need, and methods used. When a government decides to exercise the power of eminent domain and take land for public purposes from unwilling property owners, strong opposition may develop.
- Loss of property tax and utility revenue: Land and structures that are acquired by a public agency are generally removed from public tax roles. Utility revenue for water, sewer, waste disposal, and energy may also be lost when permanent evacuation occurs and former occupants relocate outside the community. Property taxes and utility fees that were generated are no longer available to contribute to community needs. On the other hand, the cost of public services such as flood emergency measures, rescue and relief may be reduced and the value of adjacent land enhanced.
- Often done piecemeal: Because of a number of the above factors, acquisition and relocation are often done piecemeal, leaving what is called a checkerboard pattern of vacant lots and buildings that either didn't qualify for the program or whose owners did not wish to sell and/or move.
- Public management required: After a community acquires property, it must assume responsibility for managing it, including liability for public use. Clearing and restoring the land to an essential pre-development state may be required.

Situations That Favor Acquisition

Acquisition is more useful for some types of floodplain and wetland management situations than others. Table 15-1 lists those where acquisition can be used most effectively.

Table 15-1. Floodplain Management Situations that Favor Acquisition

Developed Floodplains	Undeveloped Floodplains
<p>Acquisition to Reduce Flood Losses</p> <ul style="list-style-type: none"> • Land and structures that are subject to frequent and severe flooding <ul style="list-style-type: none"> ○ Property located in coastal high hazard (e.g., wave impact) zone ○ Property located in floodways ○ Property subject to severe erosion ○ Property subject to flash flooding without adequate warning • Structures and land that occupy needed flood storage areas causing increased downstream flooding. • Structures and land that are severely damaged during a major flood. Acquisition during the flood recovery stage can take advantage of the special opportunities presented at that time and benefit both public and private needs. <p>Acquisition to Meet Community Objectives in Addition to Reducing Flood Losses</p> <ul style="list-style-type: none"> • Land and substandard blighted structures commonly found in floodplains of older communities. Provides an opportunity to upgrade housing conditions for residents. • Floodplain property needed for community recreation, open space, or other purposes. 	<p>Acquisition to Prevent Flood Losses</p> <ul style="list-style-type: none"> • Floodplains and wetlands subject to development pressures that need to be maintained in their natural state to prevent development that would be subject to flood damage and to prevent an increase in upstream or downstream flood peaks. <p>Acquisition to Preserve Important Natural Resources</p> <ul style="list-style-type: none"> • Floodplains and wetlands important for groundwater recharge, wave reduction, pollution control, erosion control, critical habitats, prime agricultural lands, or other natural resources and are unprotected or insufficiently protected by regulations. <p>Acquisition to Meet Community Objectives in Addition to Maintaining Natural Resources and Reducing Flood Losses</p> <ul style="list-style-type: none"> • Floodplains and wetlands that can be maintained in their natural state to shape urban growth, prevent water pollution, reduce the cost of public services, provide open space and recreation opportunities, serve as buffer zones, and meet other community goals.

Relationship to Other Floodplain Management Methods

Acquisition alone is often the preferred method when a community desires to obtain other community objectives in addition to floodplain management. Acquisition may also be preferred

when critical floodplain and wetland natural resources and functions must be completely protected or restored.

Some floodplain management situations are best addressed with techniques other than acquisition. If the flood risk is low, and there is no need for public ownership of the floodplain, regulation may be more appropriate.

Most often, acquisition is best used in combination with other techniques. A comprehensive program of floodplain management will make use of all available methods for reducing flood losses and preserving and restoring floodplain natural resources and functions. These methods were discussed in previous chapters. Acquisition may be used to deal with some of the most vulnerable areas, or areas that can also serve other public purposes such as recreation. Other floodplain management methods may be used to deal effectively with less critical areas for which no public use of land is needed.

The following discussion focuses on the use of acquisition instead of or in combination with other methods for reducing flood losses and protecting natural resources.

Regulations and Development Policies

Regulations can be used to prohibit structures in floodways and coastal high hazard areas and to require elevation of structures in flood fringe areas. Development policies are a less direct method of controlling floodplain use. They include numerous measures such as limiting the availability of public services (utilities, roads) in flood hazard areas, placement of warning signs, and using taxes and other levies to discourage floodplain development or to encourage development compatible with the flood hazard. Acquisition is often seen as an alternative rather than complementary to regulations and development policies, and opposition to acquisition frequently centers on its high cost relative to development control by regulation and development policies.

Regulations and development policies are often satisfactory techniques for controlling future development on floodplains. However, even stringent regulations that prevent development may not fully protect floodplain natural resources, such as rare and endangered species, and may not allow for public use of land. Regulations cannot always be designed to pinpoint areas that require protection. If regulations are too stringent, or unevenly applied, property owners who feel their land is being unduly reduced in value may challenge the validity of the regulation. Rather than impose more stringent regulations, a community may elect to acquire those floodplains that it most desires to keep undeveloped,

As a community grows, floodplains that have remained undeveloped for many years may suddenly become attractive for development. Divergent interests may bring pressure to modify regulations to allow development in floodplain and wetland areas. Even though regulations may be effective at the present time, a safer approach may be for the community to acquire the land and remove the pressure for development. Growth in a community can also create a need to acquire floodplains for public use. Although regulations may serve to keep unsafe development from hazardous areas, they usually cannot provide for public use of the area.

Regulations are relatively ineffective in reducing flood losses and restoring natural resources and functions on floodplains that are already developed. Regulations can prevent or restrict any additional development but can only affect existing development over long periods of time. For example, regulations can require construction, reconstruction or improvements consistent with the flood risk or prevent the rebuilding of existing properties in the floodway after they are severely damaged. This approach for clearing the floodplain, or at least the floodway, may require decades to be fully effective, and may result in changes only after additional flood damage has occurred. Only limited improvements to natural resources and functions can be achieved. On the other hand, acquisition and evacuation of the developed floodplain can rapidly reduce the flood hazard and restore important natural resources and functions.

Individual Flood Protection Measures

Typically controlled by local ordinances, individual construction, reconstruction, or improvements can occur in identified flood hazard areas outside the regulatory floodway. Structures are required to be located above the level of the regulatory (e.g., 1 percent annual chance) flood. Some floodplain natural resources and functions can be preserved (e.g., flood flow capacity and flood storage) if structures are elevated without using fill.

Flood Forecasting and Warning Systems and Emergency Plans

There may not be a need for an extensive forecasting and warning system if the highest risk areas are acquired and maintained in an undeveloped state through acquisition, or cleared of development after acquisition. These would include riverine floodways, coastal high hazard areas, and areas subject to flash flooding. A lesser system might suffice for the residual developed flood risk areas.

Measures to Reduce the Impact of Flooding

As discussed in previous chapters, such measures might include information and education, flood insurance, tax adjustments, flood emergency activities, and post-flood recovery. When tied to other flood loss reduction measures, they can be used to encourage and provide financial assistance for acquisition of flood prone lands. Targeted information and education programs can build support for acquisition, tying to other community interests, goals and needs. Flood insurance requirements and premiums, particularly high actuarial rates, may encourage the offering of properties for public acquisition at less than fair-market rates. Tax adjustments may also provide incentives for sell of properties at reduced rates. Costly flood emergency measures may result in public and political support for acquisition of high-risk properties. Finally, in the aftermath of a Presidential disaster declaration, federal and state funding may become available to acquire substantially damaged properties, which are demolished or removed, and the land cleared of development. As revealed in a subsequent discussion of the Robert T. Stafford Disaster Relief and Emergency Assistance Amendments of 1988, some 25,000 properties have been acquired through post-flood recovery activities.

Acquisition Approaches and Techniques

Control of lands may be accomplished in two principal ways: fee simple or less-than-fee simple.

Fee simple: Acquisition in fee simple gives a community full title to and control of property. Acquisition may be from a willing seller or by condemnation. Fee simple is the most common form of acquisition. Many acquisitions using this method are made at fair market value. Others are made at less than fair market value as a result of various donation or purchase arrangements. Individual circumstances will determine which option is most appropriate in each case.

When property is to be purchased, the most desirable method is purchase from a willing seller. Usual procedures include determining ownership and property boundaries, agreeing on the purchase price, preparing documents for transfer of title, and arranging payment. During the early stages of an acquisition project, a community may find that some property owners are reluctant to sell. Some owners may simply not wish to sell, while others may feel that they will not be offered a fair price. This reluctance can sometimes be overcome if a few voluntary sales are made and the remaining property owners realize that the community is purchasing property at a fair price.

Although often unpopular, condemnation is sometimes necessary. Legal authority for condemnation for park, recreation, drainage, and other flood-related purposes is seldom a problem since condemnation (eminent domain) powers are available to most local governments. Three circumstances may require the use of condemnation: 1) When owners are unwilling to sell, 2) when the government and property owners cannot agree on a fair market price, and 3) when title to the property is not clear. Condemnation may be used to acquire property from a few holdout landowners after most properties have been obtained through voluntary sales or other means. However, in many instances funding, from community or outside sources, is based on dealing only with willing sellers.

Less-than-fee simple: A community may not need to obtain full title to a particular property in order to achieve project objectives. In other words, a property owner may be unwilling to give up title to the property. Techniques, such as **leases** and **easements**, are available that can sometimes satisfactorily meet the needs of both the community and property owner without a transfer of full ownership.

Leases.

A lease involves the temporary possession of property for a specified period. This technique may be particularly desirable when the property owner does not wish to sell, but is willing to give up use of the land on a temporary basis. The costs of leasing the property may be considerably less to the community than for obtaining full title. Conditions are included in the lease agreement as needed and agreed to by both parties. These can specifically address how the property is to be used during the term of the lease. The lease is effective for whatever period of time is specified – usually from one to 99 years—and may be renewable.

Easements.

An easement is the right to use land for a particular purpose. It may be affirmative (permits something to be done) or negative (prohibits the landowner from doing something). There are many kinds of easements. Among the most common are those for utility right-of-way (telephone,

electrical, sewer lines) or for roads and railroads. Easements are also frequently used to maintain property in its natural state or provide protection for wetlands, other natural attributes, or to limit the types of use to which the land may be put.

An easement can be forever (perpetual easement) or for a specific number of years (a term easement). An easement may be acquired by gift or purchase, but obtaining an easement does not involve transfer of fee title to the land. By acquiring an easement, a state or locality acquires a right to undertake certain activities or to prohibit certain activities on property belonging to someone else. The landowner maintains rights, as a private property owner, to all uses that would not interfere with the rights specified in the easement. The terms of the easement – prohibitions or permitted actions—may be drafted to meet the needs of the locality and the landowner. Most easements do not include the right of public access to the property. Even if the community holds an easement, the property owner retains the right to sell or lease the land at any time, and may retain some rights to limited development, subject to the terms of the easement. In the context of floodplain management, a conservation easement may be utilized whereby restrictions relate to retaining land in its natural or undeveloped state.

Potential Sources of Assistance in Acquisition

Private

Private, non-profit conservation organizations may be sources of funding for assisting in acquiring floodplain and wetland lands. Their interest and goals are related to a resource, a portion of which may be located in floodplains and wetlands.

Acquisitions by these organizations can be used to complement state and local land holdings or regulation of land. Land trusts (described later) may be created to acquire land by donation or purchase when the community is unwilling or unable to acquire the land directly, or to acquire the land on a temporary basis until the community is able to purchase the property.

Non-profit conservation organizations

One of the major advantages of acquisition by private conservation organizations is their flexibility. Often they can act more quickly than a public agency once a piece of desirable property becomes available. The private organization may, for example, be able to acquire a property before speculation causes an increase in the market value during the time it takes a community or state agency to make arrangements for the land transfer. They can also negotiate privately with landowners—a useful advantage when dealing with those who wish to avoid publicity.

Private conservation organizations also have other advantages. They can be effective in acquiring properties that overlap municipal boundaries or hold properties that a community can use for the matching share of state or federal open space acquisition programs. Also the private organization can act as middleman in the purchase or donation of land that will subsequently be transferred to a community.

Private conservation organizations may be national, state, or local in their operation. Nonprofit organizations like *The Nature Conservancy* and the *National Audubon Society* operate throughout the United States to acquire and preserve sensitive natural areas.

The Nature Conservancy is the leading national private conservation organization. Its activities are carried out through a network of regional and field offices and state chapters throughout the country. Areas for site selection are identified through Natural Heritage Programs, which identify endangered habitat or rare plant and animal species. Many of the heritage programs are now operated by state agencies. Criteria for assessing the importance of an area include relative ecosystem endangerment; condition, quality, visibility, and defensibility of the site; feasibility of protection; and comparative threats of destruction.

The Conservancy acts in several ways to obtain lands for public use. It purchases land using privately contributed funds. It accepts gifts of natural areas. It assists other groups, through administrative and financial support, in acquiring lands. Finally, it acquires, then later transfers, lands at the request of government agencies where the agencies do not have sufficient financial resources for acquisition at that time.

Much of the land targeted by these nonprofit organizations is wetland or has some water access, including much floodplain land. Along these lines, *Ducks Unlimited* has programs to preserve wetlands as waterfowl breeding areas. Other conservation organizations such as the *Sierra Club*, the *Isaac Walton League*, and the *National Wildlife Federation* are involved in a myriad of activities relating to land use and resource conservation.

State and local conservation organizations are usually formed by groups or individuals concerned about encroaching development and the loss of open space and other conservation and outdoor recreation matters. They are usually supported by a great deal of volunteer effort. Most local organizations operate within one community (although some work with groups of adjacent communities) and work in cooperation with the local government without receiving funds from the locality.

Acquisition by a local conservation organization may be desirable under a number of circumstances. There may be a lack of public funds at the local level for acquisition or difficulties in maintaining or supervising properties acquired by the locality. Some donors may prefer dealing with a private organization rather than the locality, since it generally operates outside the political realm. The private organization also may have more time (paid or volunteer) for time-consuming negotiations than the locality.

The conservation organizations can obtain land in most of the ways described above. One source that is growing in importance is mandatory dedication of land by developers (such as providing for open space and recreation in subdivision development). Conservation organizations may become the logical recipients of such dedicated properties in some instances: when the developer does not want to have maintenance responsibility; when the land is required to be donated to the locality, but

it foresees difficulties in supervision or public liability exposure; or when the locality is reluctant to accept and own a number of widely scattered or small sites.

Land owned by a conservation organization may or may not be open to general public access. Unrestricted access may be unacceptable in cases where there are fragile natural systems. However, there may be an attitude at the local level that if the open space is free of real estate taxes, it should be available for public enjoyment.

The Foothills Land Conservancy, located in Maryville, Tennessee, acquires land in the foothills region around the Great Smoky Mountain National Park through purchase, easements, and gifts of land to preserve destruction of the foothills from unplanned development. Since established in 1985, it now controls over 13,500 acres of land.

Land Trusts

Another type of organization is land trusts. Land trusts that operate at the municipal, regional, or state level preserve land for its natural, recreational, scenic, historical, or productive value. The number of land trusts has increased over ten-fold during the past three decades. They acquire land either as gifts from individuals, through direct purchase, or through the purchase of an easement. They are managed by a voluntary board of directors, may have both volunteer and paid staff, rely on memberships and donations for funding, and serve as outlets for conservation information. As with the case of private non-profit conservation organizations, they can usually act more quickly in acquiring land than governmental organizations, typically have the confidence and trust of the local community, and their non-profit status can result in tax benefits for the donor. *The Trust for Public Land*, a national land trust, has provided technical assistance to local trusts, as well as assisted in the acquisition of critical areas.

Public—Post-flood Recovery

After the 1993 Midwest flood, Congress amended the Robert T. Stafford Act (1988) to increase federal support for relocating flood prone properties in the aftermath of Presidential declared disasters. Under this program, the complete removal of structures from acquired properties was required and the land had to be dedicated “in perpetuity for a use that is compatible with open space, recreational, or wetlands management practices.” This is the principal federal program providing funding and technical assistance to states and localities for the purchase of flood prone properties. Utilizing the provisions of the act, over 25,000 properties have been purchased, the land cleared, and transfer of title has been given to the respective localities. Deed restrictions provide that the land cannot be resold, redeveloped, or used other than for a public purpose. The locality is responsible for property maintenance.

Acquisitions, called “buyouts,” typically follow the subsequent process:

1. Disaster event

A hurricane or other major weather system causes significant flooding in a large portion of a state or may involve several states.

2. Presidential disaster declaration

The impacted localities request that the Governor issue a disaster declaration for the flooded areas. Upon a determination as to the extent of property damage, the Governor requests that the President issue a federal disaster declaration for the affected areas. Typically, the President issues the declaration, designating certain counties, and all localities within those counties, as eligible for federal disaster assistance.

3. Federal assistance

Federal assistance is provided within the designated counties. The Hazard Mitigation Grant Program under the Stafford Act provides up to 15% of the total estimated federal assistance for “mitigation” projects – those designed to reduce future susceptibility to flooding. For example, if the total estimated federal assistance is \$100,000,000, then \$15,000,000 is available for mitigation. This program is the principal mechanism for acquiring severely damaged properties, as a consequence of flooding. The federal – non-federal cost-share is typically 75-25, but has for some very large disaster been 90-10. The state may pick up all or a portion (typically 50%) of the non-federal share.

4. FEMA notifies state of program availability

The Governor designates a state agency to coordinate the post-flood recovery effort. FEMA’s Hazard Mitigation Grant Program (HMGP) manager for that disaster formally notifies the state agency of the availability of the program to assist in acquiring damaged properties. Along with the notification, FEMA provides criteria for determining properties eligible for assistance.

5. State notifies local communities

The state agency formally notifies all units of government within the designated counties that federal assistance is available for the acquisition of eligible flood-damaged properties. Eligibility criteria information and the time period for receiving applications are provided.

6. Localities provide public information

The localities provide information to property owners affected by the disaster event through public notices and the conduct of informational meetings. Those eligible are provided applications that they can complete if they are interested in selling their flood-damaged property.

7. Locality submits applicant package to state

The locality collected the completed applications, checks for eligibility, assigns priorities among the applicants and submits an application package to the state agency within a designated period of time.

8. State assigns priorities

Typically, the state receives more applications for acquisition than funds are available. The agency therefore assigns priorities among and within communities for receipt of acquisition funds.

9. Community applications submitted to FEMA

The community application packages are submitted by the state agency to the HMGP program manager to verify property eligibility. FEMA also conducts a review of each eligible property to determine if there are any environmental protection and historic preservation issues that have to be resolved before the property can be acquired. These might include site environmental problems such as toxic wastes and structures that are on the national register of historic properties, or eligible for inclusion on the register.

10. FEMA provides funds

After the above reviews are completed, FEMA provides available funds to the state for “buyouts” of eligible properties within communities. All eligible properties may not be acquired because of limited funding.

11. State provides funds to community

The state, in return, provides funds to the communities based on previously established priorities.

12. Community makes offers to interested parties

Offers to acquire eligible flood-damaged properties are made, based on community-established priorities, to those who expressed an earlier interest in selling their property. The offers are based on fair-market value of the property before the disaster event. Because many months, possibly a year, have passed since the disaster event before these offers are made, there may be some property owners who no longer wish to sell because of a number of factors (e.g., they have restored their property, they think the offer is too low, their neighbors are staying, they cannot find suitable housing at another location, and other reasons.).

13. Property acquired

If the community’s offer is accepted, the property is acquired and the land cleared of any “improvements,” i.e., essentially restored to pre-development conditions. The Federal Relocation Assistance and Real Property Acquisition Policies Act of 1970 requires the payment of moving expenses and a “replacement housing payment” that consists of any additional funds beyond the fair market value of the acquired property required for a displaced resident to purchase decent, safe, and sanitary housing outside the floodplain, up to \$15,000.

14. Community becomes tenant

Title of the property is transferred to the community and it become responsible for property maintenance. The property cannot be leased or resold. According to the Congressional act under which funding is provided, the purchased land is to be dedicated “in perpetuity for a use that is compatible with open space, recreational, or wetlands management practices.”

Additional information on the use of public assistance in acquiring flood-prone properties may be found in the document “Property Acquisition Handbook for Local Communities” (FEMA 317) found at FEMA’s website: www.fema.gov/library. Use “Search by FEMA Publication Number” and type “317.”

Chapter Homework Assignment

1. In your present professional practice is it, or in your intended practice will it be, important to understand the language of land use regulations for floodplains, wetlands, and urban drainage, and how these regulations operate? Justify your response.
2. During the next class period there will be an agency representative sharing their experiences in assisting communities in developing flood warning and preparedness systems. Based on your reading of the chapter text regarding this subject, prepare a written question to ask the guest speaker.
3. Under what conditions do you feel acquisition would be an effective floodplain management tool?