



# **Floodplain Management in the State of Washington**

---

*A Status Report as of February 2004*

March, 2004  
Publication #04-06-016  
Washington Department of Ecology  
Northwest Regional Office

# Floodplain Management in the State of Washington

---

*A Status Report as of February 2004*

March, 2004

Publication #04-06-016

Washington Department of Ecology  
Northwest Regional Office

*If you require this publication in an alternate format, please contact Ecology's Shorelands and Environmental Assistance Program at 360-407-6096, or TTY (for the speech or hearing impaired) 711 or 800-833-6388.*

*This publication is available online at Ecology's Website at [www.ecy.wa.gov/biblio/sea.html](http://www.ecy.wa.gov/biblio/sea.html)*

# Floodplain Management in the State of Washington

*A Status Report as of February 2004*

---

## Contents

<b>Background .....</b>	<b>1</b>
<b>Evolution of the State Floodplain Management Law .....</b>	<b>1</b>
<b>Flood Control Assistance Account Program (FCAAP) .....</b>	<b>3</b>
<b>Washington's Statewide Floodplain Management Program .....</b>	<b>5</b>
Division of Emergency Management .....	5
Department of Fish and Wildlife .....	5
CTED Local Government Division .....	6
Washington State Department of Transportation .....	6
Department of Natural Resources .....	6
DEM/Ecology Memorandum of Agreement .....	6
SHB 3110 Committee .....	7
<b>Ecology's Current State Floodplain Management Program .....</b>	<b>7</b>
<b>Floodplain Management Practices in Washington – A Sample .....</b>	<b>9</b>

Publication #04-06-016  
March, 2004  
Washington Department of Ecology  
Northwest Regional Office

# FLOODPLAIN MANAGEMENT IN THE STATE OF WASHINGTON

## A Status Report as of February 2004

---

### **Background**

Washington has long been a leader among States in the realm of floodplain management. In 1935, the State Legislature enacted one of the first State floodplain management laws in the Country, which began a program that gave the State authority to issue permits for construction in designated Flood Control Zones (FCZ). The Flood Control Zones covered about one-third of the floodprone communities in the State. Adoption of the 1935 law followed severe flooding in 1933, a pattern that became common with many subsequent legislative initiatives. In 1969, the State enacted a prohibition on construction of residential structures in floodways, which applied only to the State Flood Control Zones. Because few of these zones had floodways depicted on maps at the time, structures were built in what are now floodways, and permit issuance under the FCZ program was spotty and varied widely by Region.

### **Evolution of the State Floodplain Management Law**

Washington's floodplain management law is found at Chapter 86.16 RCW. This law states that prevention of flood damage is a matter of Statewide public concern and places regulatory control within the Department of Ecology. In addition to State laws in the Revised Code of Washington (RCW), which are established through the legislative process, administrative rules are adopted to implement the laws and have the force and effect of State law. The Washington Administrative Codes (WAC) which implement Chapter 86.16 RCW are found at Chapter 173-158. Chapter 86.16 RCW is cited in floodplain management literature, including FEMA's National Assessment, as one of the first and strongest in the Nation. A major challenge to the law in 1978, *Maple Leaf Investors v. Ecology*, is cited in legal references to floodplain management issues. The Court upheld the law, declaring that denial of a permit to build residential structures in the floodway was a valid exercise of police power and did not constitute a taking.

In addition to Chapter 86.16 RCW, there are two other statutes that, along with their administrative rules (WACs) also address floodplain management activities in the State. Chapter 86.12 RCW, Flood Control by Counties, authorizes County governments the power to levy taxes, condemn properties and to undertake flood control activities directed toward a public purpose. Chapter 86.26 RCW, State Participation in Flood Control Maintenance, establishes the Flood Control Assistance Account Program (FCAAP) which provides funding for local flood hazard management efforts and sets criteria for the use of FCAAP funds. Portions of these three statutes were amended in 1991 by Engrossed Substitute Senate Bill 5411 to strengthen and coordinate flood hazard management activities Statewide.

The most important change to the State's basic 1935 floodplain management law at Chapter 86.16 RCW, other than adoption of the residential floodway prohibition in 1969, occurred in the late-1980s. Prior to 1987, two separate floodplain management programs existed in Washington State. The State Flood Control Zone (FCZ) Permit Program was administered by Ecology Regional Offices and applied to 16 rivers in Western Washington and two rivers in Eastern Washington; thus, there were 18 FCZs. Over one-third of the floodprone communities in the State (92 of 250) were located in a FCZ.

The National Flood Insurance Program (NFIP) was established in 1968. However, it did not have a serious impact on Washington communities until two things changed. First, the original program was voluntary and there were not many communities that participated until passage of the Flood Disaster Protection Act of 1973. This Act made flood insurance mandatory as a condition of receiving any Federal or Federally-related assistance; while community participation was still voluntary, the effect of the mandatory insurance requirement made it difficult for a community to not participate, since insurance would not be available in a non-participating community which, in turn, severely affected lending in such communities. The upshot of this was that by 1975, community participation had soared from a handful of communities to over 200 counties, cities and towns. All of these communities had to adopt a local floodplain management ordinance that met requirements of the NFIP, which meant that there were two floodplain management programs in many of these communities, local and State.

The second change involved an extensive mapping effort by FEMA. Detailed Flood Insurance Studies were required for all of the participating communities and the National Flood Insurance Act of 1968 placed that responsibility on HUD, later to become a FEMA responsibility after FEMA's creation in 1978. Most of these mapping efforts started in the late-1970s and were not completed until the early to mid 1980s. The State permit system and floodway prohibition were only functional if maps were available; when these maps started becoming available, the problem of two separate programs, a State permit system and a local floodplain ordinance, became obvious in terms of duplication and confusion between the two.

Thus, during the 1987 Legislative Session, the Legislature amended the 1935 State law by eliminating the State flood control zones and the duplicate permit process, specifying that an applicant would no longer have to get a permit from the State. The law directed communities to prohibit new residential development in designated floodways throughout the State, not just in the former FCZs. This was a major change, in that FEMA was providing maps throughout the State, not just in the FCZs. The law authorized Ecology to establish minimum State requirements (rules) which equal or exceed Federal requirements for floodplain management, and to disapprove local ordinances not meeting State and federal requirements. Ecology proceeded to adopt rules to implement the new law, which included a prohibition on most new development in all coastal high hazard areas (V Zones) and a flood protection elevation standard to elevate buildings one foot above mapped flood elevation levels, both of which exceeded Federal standards and both of which stirred much controversy.

In the 1989 Legislative Session, the Legislature again amended Washington's floodplain management law. These changes eliminated Ecology's authority to establish, by rule, statewide requirements which exceed the minimum requirements of the NFIP, thereby eliminating the more restrictive standards in Coastal V Zones and the one-foot flood protection elevation standard. The 1989 Law, which adopted NFIP requirements as State requirements, affirmed that local governments could adopt floodplain management regulations that exceed NFIP requirements, and retained the requirement that local governments were responsible for enforcing the State residential floodway prohibition. This provision prohibits the construction of new residential buildings in mapped floodways anywhere in the State, and prohibits the substantial improvement of residences in the floodway. The latter requirement includes prohibition of the reconstruction of a substantially damaged residence (damaged over 50 percent of the structure's market value).

The last significant change to the State's Floodplain Management Law occurred in the 1999 Legislative Session, when the Legislature enacted an exception to the residential floodway prohibition that stated that the prohibition does not apply to existing farmhouses in designated floodways that meet certain provisions. The resultant WAC 173-158-075 dealing with existing farmhouses allows repairs, reconstruction, replacement, or improvements to existing farmhouse structures located in floodways and on lands designated as agricultural lands of long-term commercial significance under RCW 36.70A.170. This includes provisions to either substantially improve such farmhouses, or repair them if they are substantially damaged.

The 1999 Legislation also allowed for reconstruction or replacement of substantially damaged residences other than farmhouses under certain circumstances. The resultant rule, WAC 173-158-076, authorizes Ecology to assess the risk for substantially damaged residential structures other than farmhouses that are located in floodways. Ecology will only act at the request of a local government; absent such a request, no repair or replacement is allowed. Such requests can only be for substantially damaged residential structures, not for substantial improvements of an existing residence that has not been damaged (here the basic law applies, i.e., there can be no substantial improvements of non-farm residences in the floodway).

The Ecology assessment must be based on a scientific analysis of specific conditions of the floodway, based on depths, velocities and erosion. The rule specifically states that flood depths cannot exceed more than three feet, flood velocities cannot exceed more than three feet per second, and there can be no evidence of flood-related erosion. These criteria were developed to reflect the fact that FEMA has mapped floodways throughout the State and this mapping has, in some instances, included floodway areas of shallow flooding and low velocities since the FEMA criteria is hydraulic conveyance, and these instances did not present a relative threat regarding life-safety issues.

### **Flood Control Assistance Account Program (FCAAP)**

Washington has had a Legislatively-established flood control maintenance program for over 50 years. The original program was passed in 1951, and was called the Flood Control Maintenance Program (FCMP). While it was a funded program, funding was sporadic, and mainly occurred in response to flood events.

In 1984, the Legislature enacted Chapter 86.26 RCW, State Participation in Flood Control Maintenance and established the Flood Control Assistance Account Program to assist local jurisdictions in comprehensive planning and flood control maintenance efforts. Ecology administers the program and distributes matching grants out of the FCAAP account to cities, counties and other special districts that are responsible for flood control. The rules under which Ecology operates the FCAAP are found at Chapter 173-145 WAC. This is one of very few State programs in the Country that provides grant funding to local governments for floodplain management planning and implementation actions. The program has been funded for \$4 million per Biennium since its establishment, with additional amounts provided after severe flooding events. Funding was reduced to \$2 million in 2003-2005, due to severe budget constraints.

In order to be eligible for FCAAP assistance, the flood hazard management activities of a local jurisdiction must be approved by Ecology in consultation with the Department of Fish and Wildlife. Also, a Comprehensive Flood Hazard Management Plan (CFHMP) must have been completed and adopted by the appropriate local authority or be in the process of being prepared in order to receive FCAAP Flood Damage Reduction project funds for a particular planning area. This policy evolved through years of the FCMP and early years of FCAAP in response to the observation that poor management in one part of a watershed may cause flooding problems in another part. Only through a comprehensive basin, watershed or stream planning process can this be avoided.

Local jurisdictions must participate in the NFIP and be a member in good standing in order to qualify for an FCAAP grant. Planning grants up to 75% of total project cost are available for comprehensive flood hazard management planning. Flood Damage Reduction projects can receive grants up to 50% of total project cost, and must be consistent with the CFHMP. Emergency grants are available to respond to unusual flood conditions. FCAAP can also be used for the purchase of flood prone properties, for limited flood mapping and for flood warning systems. In general, funding currently is running about 60% for planning and 40% for projects.

In the last full Biennium, 2001-2003, there were 37 projects throughout the State that were funded through FCAAP. There were 33 projects as shown in the following categories, with four additional projects that were special studies:

- 12 were for CFHMPs or updates to these plans. For example, complete CFHMPs were prepared for Clear Creek in Kitsap County, for Winthrop and for Pullman, while the second phase of these reports or plan updates were prepared for the Dungeness River in Clallam County, Grays Harbor County, Salmon Creek Basin in Thurston County, and the Naches River in Yakima County.
- 7 were Flood Damage Reduction Projects, ranging from biotechnical stabilization and habitat restoration work on the Naches River in Yakima County and the Green River in King County, to culvert work in Ferry County.
- 5 were acquisition projects of flood-prone structures, on the Quilcene River in Jefferson County, the Cedar River in King County, the Methow River in Winthrop, Clear Creek in Pierce County and the Similkameen River in Okanogan County.
- 4 were Channel Migration Zone studies which included work in King, Lewis, and Pierce Counties.
- 2 were Corps of Engineers/County Feasibility Studies for flood control projects, in Lincoln and Skagit Counties.
- 2 were grants to establish flood warning systems, in Kittitas and Pierce Counties.
- 1 project resulted in a flood emergency response plan, in LaConner.

As seen in this summary, there was a wide variety of FCAAP projects during the last Biennium. Significantly, there has been a similar array of planning and flood damage reduction projects in recent Biennia, as there is in the current round. There are currently 13 projects in this truncated round, most of which are for planning (7), two of which are for acquisition, two of which are for channel migration zone studies, and two of which are special studies.

## Washington's Statewide Floodplain Management Program

While Ecology has a very important role in floodplain management activities in the State with its leadership in implementing the State Floodplain Management Law at Chapter 86.16 RCW and the Flood Control Assistance Account Program, the agency is but a part of the State's overall floodplain management program. There are at least 10 other agencies involved in floodplain management on a statewide basis, five of which are major players. This is especially noteworthy in view of the evolving nature of floodplain management in the Northwest, in response to mandates of the Endangered Species Act and similar efforts. No longer can floodplain management be viewed only in the somewhat narrow context of flood loss reduction, hydraulic engineering approaches and flood insurance. More than ever, there needs to be a more holistic approach to floodplain management, emphasizing the biological and geomorphological aspects of stream and estuarine systems. This increasingly necessitates the expertise of other resource agencies of the State, especially the Departments of Fish and Wildlife and Natural Resources.

A complete discussion of the roles of Washington State agencies in floodplain management is presented in Appendix A of the July 1996 *Revised Washington State Flood Damage Reduction Plan*," prepared by the Washington State Military Department, Division of Emergency Management. That discussion will not be repeated here, other than for a brief summary of some of the key related agencies, followed by a summary of other activities of Statewide significance:

- **Division of Emergency Management.** DEM is a most important agency, in that this is the agency that coordinates State disaster mitigation, preparedness, response and recovery activities. DEM's Mitigation function is especially important, in that it offers technical assistance and funding in the post-disaster setting and, increasingly, for pre-disaster mitigation activities. The Agency administers the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation program and the Flood Mitigation Assistance Program. Many of the eligible activities in these programs are the same that can be funded through FCAAP. With greater funding available through the DEM programs, FCAAP has been able to be used to match the DEM programs. Especially important is the role DEM plays in funding communities to undertake all-hazards planning. In the past, this planning has been coordinated between the two agencies to achieve the same goals. There are many local planning efforts that utilize both DEM and Ecology planning funds because of the similarity in planning criteria.
- **Department of Fish and Wildlife.** WDFW administers the Hydraulic Project Approval (HPA) process, which requires permits for work in streams or work that can affect flows in the State's streams. Of great importance is the expertise the agency offers in terms of providing advice on the impact of development proposals on fish habitat. There are close to 300 communities in the State that have adopted the standard flood loss reduction ordinance prepared by FEMA and Ecology, but that ordinance does not address environmental protection in the State's floodplains; environmental protection of floodplains is generally regulated under the protective measures for wetland and riparian areas, and expertise in the riparian element is commonly sought from resources within the WDFW. Ecology does not approve any of its FCAAP projects, whether they be planning or flood damage reduction projects, without coordination and approval of WDFW.



- **Community, Trade and Economic Development, Local Government Division.** This Division administers the Growth Management Act at the State level, which includes administration of activities that are related to local Critical Areas Ordinances. With increasing emphasis on environmental protection of floodplains engendered by the Endangered Species Act, other elements of CAOs become very important for floodplain managers, especially the Fish and Wildlife Habitat Conservation Areas element of CAOs. It is estimated that in many communities, this element trumps the Frequently Flooded Areas element in terms of primacy in the regulation of development, especially on smaller streams. Observations reveal that on these streams there is marked reduction of development due to implementation of stream buffers and other preservation measures necessitated by the Fish and Wildlife Habitat Conservation Areas element, which has materially helped to, in turn, reduce flood losses in the State. The Local Government Division also has grant programs that can assist communities to locate development out of floodplains, and has the Washington State Building Code Council, which complements code mitigation activities undertaken by Ecology.
- **Washington State Department of Transportation.** While WSDOT involvement is limited mainly to highway right-of-way areas, the agency has extensive resources and expertise that can and often does contribute to floodplain management elements of projects throughout the State. The Agency is experienced at flood-flow modeling, both using conventional methods and expanding on these methods to include some of the more contemporary models. The Agency has much expertise in channel migration zone (CMZ) delineation and application, in view of the influence of CMZs on many of their projects. They have been able to contribute to some floodplain mapping efforts in the State, and their expertise is often sought on specific projects.
- **Department of Natural Resources.** DNR administers the Forest Practices Act which includes issuance of permits that involve practices relevant to floodplain management. They encounter many problems on lands they regulate that are often discovered on private lands, and their research capabilities and applications often serve as models for floodplain management practices elsewhere. This is particularly true with respect to fish habitat protection and enhancement, which is why much can be learned by other State agencies and communities from practices that might occur first on DNR lands.

**DEM/Ecology Memorandum of Agreement.** This MOA is dated August 3, 1995 and was signed by the Directors of CTED and Ecology (DEM used to be in CTED; it is now in the Military Department). The Agreement addresses the need to coordinate development of local flood hazard mitigation plans and Comprehensive Flood Hazard Management Plans, to assure that both accomplish the same objectives and will be accepted by all parties. The purpose of the Agreement is to ensure that a single local plan, when approved by DEM and Ecology, will meet State and Federal requirements for a variety of project funds. The Agreement established a single planning requirement for local flood hazard management plans, a common review process, integration of both planning processes with growth management planning, and similar integration between the FCAAP application and the Robert T. Stafford Act Section 404 application. Although this Agreement is now in need of updating in view of FEMA's all-hazards planning requirements brought on by the Disaster Mitigation Act of 2000 it, nevertheless, has elements that are still operative and serves as a model for coordination among State agencies.

**SHB 3110 Committee.** After the devastating floods of 1995, 1996 and 1997, the Legislature enacted Substitute House Bill 3110 to address problems brought out by these disasters. SHB 3110 resulted in convening an interagency and intergovernmental technical committee chaired by WSDOT in cooperation with Ecology. One of the purposes of this committee was to identify opportunities for coordination on flood related issues. The Committee prepared a report entitled: *Floodplain Management: Flood Hazard Reduction Projects and Agency Coordination*” dated February 1999, which presented recommendations developed by the Committee. One recommendation was to establish an ongoing floodplain management task force, with Ecology as the lead agency. Other recommendations involved improved access to information and funding, establishment of environmental mitigation standards, increased technical assistance, a review of various flood models, and expansion and updating of flood maps. This Committee has been convened periodically since issuance of the report, and is currently being used in the FEMA/State Map Modernization efforts. Members of the Committee are from the State’s DOT, CTED, EMD, DNR, WDFW and Ecology; other members are from local and tribal government, Federal agencies and private consultants.

### **Ecology’s Current State Floodplain Management Program**

The Department of Ecology administers the FCAAP described above and, in addition, is also the Governor’s designated State Coordinating Agency for the NFIP. As the State Coordinating Agency, Ecology receives an annual grant from FEMA to perform a broad range of floodplain management activities throughout the State. In the last two years, additional amounts have been provided to assist the State in gearing up for a bigger role in floodplain mapping through FEMA’s Map Modernization initiative. Thus, floodplain management assistance and floodplain mapping form the backbone of Ecology’s current State program, in addition to the FCAAP activities described above. The floodplain management assistance activities are outlined in FEMA’s Community Assistance Program, State Support Services Element (CAP-SSSE), and include the following major categories:

- Community Assistance Visits (CAVs)
- Community Assistance Contacts (CACs)
- Floodplain Ordinance Assistance
- Regional-State Program Coordination Meetings
- Local Officials Workshops
- Newsletters
- General Technical Assistance

CAVs are the major activity performed under the CAP-SSSE. A CAV is a scheduled visit to a community participating in the NFIP for the purpose of conducting a comprehensive assessment of the community’s floodplain management program and their understanding of the floodplain management requirements of the NFIP and the State law at Chapter 86.16 RCW. At these meetings, staff reviews local procedures for administering and enforcing their floodplain regulations, provides the community with the most current information on the NFIP and State regulations, and provides an opportunity for local staff to ask questions and discuss issues concerning any aspect of their floodplain management program. Field work is done in advance of the meeting, during which specific cases are cited such as newer buildings in the floodplain,

encroachments such as fills in the floodplain, and other activities that require review of how these activities were permitted. If documentation is not sufficient, additional information is requested. If the cases result in violations of the local regulations, the community is required to remedy the violation to the maximum extent possible. This can involve structural modifications to houses and other buildings, removal of fills in certain parts of the floodplain, etc.

CAVs offer the best opportunity to interact with local officials on all floodplain matters. FEMA suggests that all communities with detailed study on their floodplain maps be visited every three to five years. This target is met in very few States, if any. However, in Washington this may be changing. By the end of 2004, virtually all communities with detailed study will have been visited within the last five years, and it is anticipated that the State will henceforth be on a four-year cycle for those communities with detailed study in floodplains that are developable. Ecology performed CAVs in 42 communities during the previous year while FEMA performed 8, for a total of 50 communities that were visited. It is anticipated that this level of effort will continue in future years.

Ecology also performs Community Assistance Contacts (CACs) which are similar to CAVs, but less intensive and with no field work. There were 46 communities receiving CACs during the previous year. Review of ordinances is a particularly important activity, especially in view of the interrelationship between floodplain and critical areas ordinances. Ecology staff reviewed 72 floodplain ordinances during the previous year, and this number is expected to continue to be met in coming years.

Another major activity is the technical assistance function whereby Ecology is available to meet with community officials at their request regarding specific floodplain management matters. There are 286 communities that participate in the NFIP and that have floodplain ordinances. Frequently, community officials encounter problems that are difficult to resolve, and can benefit from State staff who may be able to assist based on experiences from other communities that have had similar issues. There were 82 technical assistance meetings during the previous year.

The FEMA Map Modernization initiative spurred considerable activity. Ecology initiated a collaborative process among State and Federal agencies, and with involvement of local officials, in an effort to identify and prioritize study needs throughout the State. Ecology apprised FEMA that the State would become a “mapping State,” i.e., that it would actually perform mapping activities in the Map Modernization effort (the only State in the Northwest to do this). Accordingly, Ecology developed a State Implementation Plan identifying study needs for the next three years, including the level of study, timing and approximate mileage involved in each community for which study was recommended. This basic document has been greatly refined, but the product is still a Statewide listing of floodplain study needs as best they are known.

Ecology advertised and went through the process of hiring a private firm to perform flood studies through an RFQQ process. A firm was selected through this process, and because the State is a “Cooperating Technical Partner” with FEMA, that firm may perform work for the State when funding becomes available. The objective of the State is to update and improve flood maps throughout the State. The significant change relates to the move to a digital map environment. This will involve integration and maintenance of the new digital data with the State’s existing data framework and GIS structure. The maps are not just viewed as a flood insurance rating tool

or as the basis for proper construction in floodplains. In Washington State, they are also the only tool on which a host of land use and natural resource decisions are based, including:

- Compliance with the State's Shoreline Management Act (SMA) that requires identification of streamside and coastal buffers;
- Compliance with the State's Critical Areas Ordinance (CAO) provisions that regulate floodplain development, protect wetlands and offer a basis for establishment of Fish and Wildlife Habitat Conservation Areas;
- Compliance with Washington's Growth Management Act (GMA) that seeks to limit urban sprawl into floodplains; and
- Compliance with Salmon habitat preservation requirements throughout the majority of the State in which most Salmonid species are listed as threatened or endangered under the Endangered Species Act (ESA).

### **Floodplain Management Practices in Washington – A Sampler**

Washington is one of the most flood-prone States in the Country. In the 27 year period from 1970 through 1997, Washington had 25 Presidentially-declared flood disasters, ranking it only below the States of California, Texas, Oklahoma and Louisiana in that category during that time. In 1997, Washington had the highest number of Presidentially-declared disasters in the Country. Our State also ranks high in terms of policies, claims and number of participating communities. Washington has more flood insurance policies than any other State West of the Mississippi, with the exception of California and Texas. It has more policies than all the Midwestern States except for Illinois and Ohio.

To cope with this problem, there have been numerous innovations by local governments in the field of floodplain management, efforts that exceed the minimum requirements established by the NFIP regulations. A few of these local efforts will be highlighted below, as will some current issues of a Statewide nature.

**Freeboard.** Freeboard is the term given for requiring structures to be built higher than the Base Flood Elevation (BFE). FEMA regulations only require that buildings be elevated to the BFE, not above it. The most prevalent freeboard standard is the requirement to build new structures one foot above the BFE. However, a few communities exceed the one-foot freeboard standard; e.g., Everett requires two feet of freeboard, and Chelan County requires three feet. It is estimated that over 75 percent of the State's communities have a freeboard requirement. This is a safety factor, it accommodates the one-foot rise that is built into FEMA's maps when encroachment occurs, and it results in significantly lower insurance rates.

**Cumulative Substantial Improvement Rule.** If a structure is to be improved over 50 percent of its market value (a substantial improvement), FEMA requires that the structure be elevated to or above BFE (or floodproofed if nonresidential). If, however, an applicant applies for permits in successive years that are each below 50 percent, they are not required to meet the FEMA standards even if they cumulatively exceed the 50 percent. Snohomish County's ordinance tracks improvements from the date they entered the Regular Program of flood insurance. If a second or third, etc., improvement finally exceeds the 50 percent, they are required to elevate, even though the current permit proposed an improvement that was less than 50 percent.

**Channel Migration Zones.** CMZs have become increasingly important with their inclusion in the State's new Shoreline Management Act regulations. However, well before enactment of the SMA regulations, many communities were actively delineating CMZs (some of these communities included Lewis County, Yakima County, King County, the Town of Winthrop, Pierce County, Clallam County, Whatcom County, and Walla Walla County among others). Although there is obviously active mapping of CMZs throughout the State, King County is the only known local government that has a specific ordinance controlling uses in mapped CMZs. They adopted Chapter 21A-24 of their rules and regulations entitled "Sensitive Areas: Alterations Within Channel Migration Areas" on June 14, 1999. This document discusses how CMZs were developed and prescribes uses within the moderate and severe channel migration areas on the maps.

**Deep and Fast Flowing Waters.** Pierce County's flood chapter has the standard language controlling uses in floodways, but exceeds the minimal FEMA definition of floodway by also including lands subject to deep and/or fast flowing waters. Deep and/or fast flowing waters are derived from a table in the ordinance that gives depths and velocities. For example, from the table, if water depth is 3 feet and velocities are 1 foot per second, lands beyond that threshold are included in the County's floodway and are regulated as such; another threshold example shows lands that exceed 2 feet of depth and 2 feet per second velocity to be within the floodway. This is considered to be a very innovative approach based on life/safety issues. The County redraws floodway lines on the map based on the depth/velocity criteria, thereby expanding the areas subject to the more restrictive floodway requirements.

**Prohibition of Fill.** Fill for structural support of residential buildings is prohibited in Skagit County's flood chapter. King County in essence has the same standard by requiring that any residential construction that can occur in the floodplain be flow-through construction, i.e., be built using post and piling construction only.

**Prohibition of Residences in the Floodplain.** Thurston County has a requirement in their flood chapter that results in a prohibition of new residential structures anywhere in the County's floodplains. This exceeds the State requirement prohibiting new residences in the floodway.

**Zero-Rise Criteria in the Flood Fringe.** FEMA regulations specify that if a development is proposed in the floodway, it is subject to the zero-rise requirement, i.e., the development must be analyzed through a step-backwater analysis and conveyance compensation calculation and must meet the zero-rise standard (0.00 on a step-backwater run). King County, Pierce County and a few other jurisdictions apply this same criterion not only in the floodway, but also in the flood fringe (the standard is 0.01 on a step-backwater run in King County).

**Setbacks.** Setbacks have become the rule, not the exception, in Washington State. Setbacks provide an added margin of safety by keeping structures away from higher velocity flood waters, reduce losses due to erosion and bank failure, and provide a riparian buffer to protect fish and wildlife habitat. It is the latter reason, *viz.*, habitat protection, that has spurred countless Washington communities to define buffers, usually through the Fish and Wildlife Habitat Conservation Areas section of local CAOs. These buffers often encompass areas larger than identified floodways; on smaller streams, they normally are wider than the floodway. This provision is perhaps the most effective floodplain management practice in the State at this time.

**Compensatory Storage.** FEMA and the State’s minimum requirements allow filling in the flood fringe portions of the floodplain. This is based on the conveyance criterion which specifies that if the floodway is left open for conveyance, there will be no greater hydraulic rise than one foot anywhere in the floodplain due to encroachment. However, it does not address hydrological changes caused by fills that make it easier for floodwaters to concentrate faster in and near the channel, thereby often raising flood levels downstream. Many communities therefore have compensatory storage or “cut and fill” provisions in their ordinances that require developments to compensate for loss of flood storage caused by filling in the fringe, by removing an equal amount of material in the floodplain near the proposed development. Examples of communities that have this provision in Washington are too numerous to mention here.

**Higher Floodway Surcharge.** FEMA specifies a one-foot increase as the surcharge criterion used in defining the hydraulic floodway on their maps. However, some States specify a higher standard. Wisconsin, for example, requires a 0.1 foot standard, which means that for maps in Wisconsin, floodways must meet that standard; this results in a significantly wider floodway on the maps and a smaller developable area. One example of this requirement in Washington is on the upper Bear Creek in Redmond and King County.

**Septic System Prohibition.** Many cities in the State prohibit new septic systems in the floodplain (there is usually a sewer system to hook up to, however). Several other jurisdictions have limitations on septic systems; e.g., they are not generally allowed in the floodway in Thurston and Whatcom Counties, can only be built in the floodplain in King County if there is no practical alternative but cannot be placed within the severe CMZ, and there are other limitations that are practiced elsewhere in the State’s communities.

**Enclosures below BFE.** Structures built on foundation stem walls in the floodplain with the lowest habitable floor several feet or more above grade are usually built properly with adequate flood openings to allow water in to equalize pressures, and with areas below the BFE unfinished and used only for parking, building access, and limited storage. However, there is a tendency for some homeowners to convert this below-BFE space into habitable uses. To keep these violations from occurring, some communities require stem walls to be no more than 4 feet in height, and/or prohibit standard doorways or interior stairways to limit interior access options. Others require homeowners to pledge not to finish below-BFE areas either by signing non-conversion agreements or by deed restrictions (King County).

**Determining BFEs Where They do not Exist.** FEMA maps often display streams as “Unnumbered A Zones,” which means the lateral extent of the floodplain is shown but elevations (BFEs) have not been determined. These are developed through a much lower level study than that which is derived through FEMA’s standard detailed study methods. Some communities in Washington compensate for this shortcoming by requiring that the proponent of a proposed development in the Unnumbered A Zone perform a study to develop a BFE for the site. Pierce County has specific requirements for performing this kind of study; King County also requires such analyses along with a few other communities (mostly counties) in the State.

**Subdivisions and Floodplains.** FEMA’s regulations do not prohibit new subdivisions in floodplains; rather, they prescribe minimum criteria related to drainage and safeguarding utilities

and facilities in new subdivisions. Some Washington communities go beyond the FEMA minimum criteria by just not allowing subdivisions in floodplains. This is effectively controlled in King County, where new building lots have to contain at least 5,000 square feet of buildable land outside the floodplain. Similar measures exist in Clallam County, Jefferson County and Bellingham, among others.

**Hazardous Materials.** Petroleum products, chemicals and other toxic substances located in the floodplain can leak during a flood causing health and environmental problems; they should be stored outside the floodplain or, at a minimum, be elevated higher than the BFE and anchored. King County is an example of a community that regulates these materials by requiring removal of temporary structures or substances hazardous to public health, safety and welfare from the floodplain during the flood season from September 30 to May 1.

**Critical Facilities.** Critical facilities such as schools, fire/police stations, nursing homes, hospitals, chemical storage tanks, etc., if impacted by floodwaters, could have a significant negative impact on water quality, special populations and emergency response. Most Washington communities have retained a requirement from the 1987 State law and model ordinance that specifies that new critical facilities must be, to the extent possible, located outside of the 100-year floodplain, unless no feasible alternative site is available. If they are constructed in the floodplain, they must have their lowest floor elevated three feet above the BFE or to the 500-year flood level, with access to the facility protected. Communities with this provision receive special credit under the Community Rating System.

**Water Wells.** Washington State law, at WAC 173-160-171, requires that water wells must be located on high ground that is out of the floodway. This provision is found in local ordinances.

**Floodway Prohibition.** Construction of new residences and substantial improvement of existing residences within Washington's floodways, are prohibited. The exception is farmhouses that serve functioning farms; they can be replaced, repaired or improved (including substantial improvements) subject to certain conditions. This includes replacement or repair if the farmhouse suffers substantial damage from any peril (flood, earthquake, fire, wind, etc.). Non-farm residences, on the other hand, cannot be replaced or substantially improved in floodways. However, if non-farm residences are substantially damaged (more than 50 percent damage), under limited circumstances related to depth of flood water, velocity and erosion, they can be repaired. They can be repaired if the depth of flooding is less than 3 feet, the velocity is less than 3 feet per second and there is no evidence of flood-related erosion.

**FEMA Fish-Flood Ordinance.** Natural resource agencies at every level of government have consistently emphasized the contributions of floodplains to healthy fish habitat. With the recent listing of several salmonid species as threatened or endangered under the Endangered Species Act in large areas of the State of Washington, the need to protect and restore aquatic habitat has taken on a new urgency. FEMA Region X dealt with this by taking its basic model ordinance that enables communities to comply with NFIP and State floodplain management requirements, and added several sections that address aquatic habitat. This effort addressed CMZs, riparian buffer zones, several watercourse alteration requirements, fill prohibitions, vegetation and permeable surface requirements, and much more. The effort was assisted and strongly supported by the State.

