

FLOOD HAZARD MITIGATION PLAN

CITY OF MYRTLE CREEK

Adopted
December 15, 1998

Prepared for the
City of Myrtle Creek
by

Umpqua Regional Council of Governments

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Flood Hazard Mitigation Plan

City of Myrtle Creek

This plan was prepared for the City of Myrtle Creek with the assistance of Douglas County Sheriff's Office Emergency Management Division and the Umpqua Regional Council of Governments. In addition,

this plan was partially funded through the Federal Emergency Management Administration and the Oregon Economic Development Department's Oregon Community Development Disaster Recovery Grant Program.

SECTION 1.0 INTRODUCTION

The City of Myrtle Creek is located in southern Douglas County, Oregon. The physical characteristics of the City of Myrtle Creek, to a large extent, contribute to the flood hazards and flood potentials throughout the Community.

Floods and accompanying landslides represent the most common and best known of the natural hazard threats in Myrtle Creek. They also encompass the broadest range of characteristics among natural hazards. Floods can occur quickly, as in flash floods, or slowly, as those resulting from the spring thaws. Floods can be of extreme magnitudes in confined locations, such as canyons, or a costly nuisance, as in broad river valleys. The topography and geology of the Umpqua River Basin are conducive to runoff, and peak flows on many of the tributaries occur within hours of the passage of weather fronts. Historically, the highest flows usually occur during the period from November through March as a result of the heavy rains augmented by snow melt. Localized flooding in Myrtle Creek occurs on a semi-annual basis and often affects the safety of property and/or life as does major flooding events.

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On December 23, 1996, President Clinton declared three southwestern Oregon counties eligible to receive federal disaster assistance for damages due to flooding, land and mud slides, wind and severe storms. Douglas, Coos and Lane counties were eligible for disaster assistance due to damages incurred during the incident period of November 17, 1996, to December 11, 1996 (see Figure 1 for a table listing the FEMA programs provided for each county). Assistance was provided under FEMA-DR-1149-OR.

Then, on January 23, 1996, President Clinton declared four counties (Jackson, Josephine, Klamath and Lake) eligible for disaster assistance due to damages resulting from severe winter storms, land and mud slides and flooding that occurred from December 25, 1996, through January 6, 1996. Assistance was provided under FEMA-DR-1160-OR. Six additional counties (Baker, Gilliam, Grant, Morrow, Wallowa and Wheeler) were added to the declaration on January 29, 1996. On February 14, 1996, three more counties (Coos, Douglas and Lane) were added to the declaration, and on March 21, Umatilla County was added, bringing the total number of counties declared for assistance to fourteen. In addition to FEMA assistance, the U.S. Small Business Administration provided assistance to affected areas in the form of low-interest loans. Also, numerous voluntary agencies provided assistance, and the State of Oregon provided Disaster Unemployment Assistance, and Individual and Family Grants.

SECTION 1.1 PURPOSE, AUTHORITY AND GENERAL OVERVIEW

The purpose of this plan is to provide hazard mitigation recommendations in light of the recent disaster events in Myrtle Creek and the State of Oregon (DR-1149 and DR-1160). For the purposes of this plan, the definition of *Hazard Mitigation* will be defined as “*any action taken to eliminate or reduce the risk to human life, property and the environment posed by a hazard.*”

It should be noted that all information and recommendations contained in this report may serve as the basis for an update or revision to the State of Oregon’s *Natural Hazards Mitigation Plan* (required under Section 409 of the Stafford Act). In addition, all mitigation policy recommendations presented within this plan should be implemented as soon as possible by Myrtle Creek to help prevent and offset similar disaster related damages that could occur in a future flood event.

The authority for development of this report is derived from an interagency agreement entered into by twelve federal agencies, coordinated and led by FEMA. The agreement, signed on July 10, 1980, established a common policy statement and implementing guidelines with respect to common flood disaster planning and post flood recovery practices. Recently, the intent of the inter-agency agreement has been extended to include non-flood disaster events as defined under 44 CFR, Section 206.404 (b) and (c). In addition, this agreement also establishes an Interagency Hazard Mitigation Team (IHMT) in each of FEMA’s ten regional areas for the purpose of preparing hazard mitigation recommendations during the post-disaster recovery phase, and to present those recommendations in a report format. Compliance of the inter-agency agreement is monitored by the U.S. Office of Management and Budget, the President’s Council on Environmental Quality and the U.S. Water Resources Council jointly oversee compliance to this agreement.

It is the intent of this plan to convey new recommendations derived from the DR-1149 and DR-1160 IHMT process and supplement the recommendations of the FEMA-DR-1099-OR Report. President Clinton declared 14 Oregon counties eligible for federal disaster assistance on February 9, 1996, under DR-1099. That disaster was caused by damages from high winds, severe storms and flooding. FEMA and Oregon Emergency Management convened a meeting of the IHMT for the May 2, 1996, event with the intention of developing hazard mitigation recommendations, which were published in the previous IHMT Report.

SECTION 1.2 WEATHER CONDITIONS RESULTING IN DR-1149

A severe winter storm, which produced near record flooding on the south Oregon coast, began early on the morning of November 17, 1996 and continued through November 19, 1996. The storm, which consisted of high volumes of rain and strong gusting winds, caused major damage to public infrastructure in three counties in southwestern Oregon. In addition, during the same period of time (November 17-19), a cold upper level low remained over the eastern Pacific off the Washington coast, with a southwest to west flow aloft over the southern third of western Oregon. Moderate to strong upper level flow brought repeated surges of moist sub-tropical air inland over the southwestern portion of the state. The combination of cold air to the north and warmer, moist flow from the south was influenced by geographic lifting (lifting of the airmass around mountainous terrain). This resulted in moderate to heavy rainfall over the southwestern portion of the state, particularly in the area of Coos, Douglas and Lane counties. Colder air moved over the area on November 19, 1996 causing the rainfall to decrease.

SECTION 1.3 WEATHER CONDITIONS RESULTING IN DR-1160

Strong winter storms beginning in early December, 1996 and continuing through December 15, 1996 began building the snowpack over the southwestern and northeastern portions of the state. Water equivalent of the snow pack ranged from two to six inches in the southwest to above twenty inches in the northeastern counties. A storm that brought heavy snows to the Cascade Mountains on December 19 and 20, 1996, was followed by widespread rain showers on December 21, 1996. In northern Oregon, heavy rainfall on the coast and in the Willamette Valley caused already full rivers and their tributaries to rise above flood stage in several locations. Rivers continued to rise throughout Oregon during the next several days.

Beginning on December 25, 1996 a moist southwesterly flow developed, originating near the Hawaiian Islands, and began moving toward Oregon. This flow moved inland over the state by December 28, starting a series of storms that lasted through January 1, 1997. The moist southwesterly flow that existed during this period was also influenced by geographic lifting, which produced repeated periods of moderate to heavy rainfall. The warm air associated with this flow also lifted the freezing level to above 10,000 feet by December 30, 1996. The melting snow pack and moderate to heavy rainfall that resulted from these conditions produced near record flows on rivers and streams throughout the disaster area. Rivers in western Oregon began decreasing in flow by January 3, but rivers in eastern Oregon remained high through January 5 due to the higher water equivalent of the eastern snowpack.

SECTION 1.4 DAMAGE IMPACTS - DR-1149 and DR-1160

For both disaster events a combination of high river levels, accumulated silt and debris, land and

mud slides and saturated soils presented an imminent threat to public safety. The DR-1149 event resulted in eight fatalities due to flooding and landslides throughout the state.

Both disaster areas suffered the ill effects from land and mud slides. Saturated ground also caused numerous sink holes throughout the impacted area. The combined effects of land/mud slides and sinkholes damaged many roads and facilities. As a result of road closures, many rural residents, and whole communities, were isolated for extended periods. Road closings affected access to private and federal timber harvest areas. Major highways experienced repetitive damage, including Interstate Highway 5, U.S. Highway 101 and State Highways 42 and 38.

Land and mud slides contributed significant amounts of sediment to rivers and streams as saturated soil flowed heavily into channels. Numerous irrigation ditches and streams were damaged heavily, some filled with silt six to eight feet deep. The large volumes of silt and sediment transported in the water restricted flow into water supply and treatment facilities.

Municipalities throughout the disaster impacted counties suffered from problems associated with failed water and wastewater treatment and pumping systems. The City of Ashland in Jackson County was without water and sewer service for ten days. In addition to problems caused by high sediment loading, trees, rocks, and vegetation that washed into waterways caused significant problems to public and private bridges, culverts and roadways. Many of these were unable to withstand the combined effects of flooding and debris (log jams), causing them to fail or receive significant damage. Land and mud slides, as well as stream bank erosion, caused numerous trees and power lines to be downed, leaving hundreds of customers without electrical service. Parks, trails and bike paths adjacent to streams and rivers were also severely impacted by bank erosion and high water levels. Associated parking lots and restroom facilities were destroyed.

Significant flood damages occurred during both disaster events as well. Several rivers throughout both disaster areas peaked well beyond flood stage. Flooding resulted in evacuations and road closures, as well as damage to structures and facilities. During the incident period for DR-1160, Governor Kitzhaber activated the National Guard to perform search and rescue operations, evacuations, damage assessment, potable water transport, truck transport, traffic control, sandbagging, security, debris removal and other activities. More than 500 people were cared for in 19 American Red Cross (ARC) shelters. The ARC operated five fixed and six mobile feeding units, serving almost 8,000 meals. Most of those sheltered lived in structures that were destroyed or experienced major damage. These structures were either mobile homes or dwellings in or near flood plains, and most were not covered by flood insurance policies. The elderly made up a large majority of those persons with the least financial means to recover from the DR-1160 disaster event. These people reside mostly in retirement mobile home parks located in flood plains.

In addition, both disaster events greatly impacted agricultural interests, damaging or destroying

crops, outbuildings and equipment. Erosion of productive soils and deposition of debris in agricultural areas caused significant problems. Many businesses throughout the disaster areas suffered from direct damages or lost revenues, resulting in increased economic impacts throughout the disaster areas.

The State of Oregon is currently recovering from seven disasters, the largest being DR-1099. The weather events and resulting damages for these disaster declarations (DR-1149 and DR-1160) closely resembled those of DR-1099, which resulted from high winds, severe storms and flooding that occurred during late January and early February 1996.

SECTION 1.5 STATE LAND USE CAPABILITIES

Senate Bill 100 in 1973 created the Land Conservation and Development Commission (LCDC) and directed it to establish new statewide planning goals and guidelines. After extensive review including public hearings and workshops the LCDC adopted statewide planning goals 1 through 14 in December 1974. The commission later adopted Goal 15 (for the Willamette River Greenway) in 1975, and Goals 16 through 19 on coastal resources the next year. The bill also created the Department of Land Conservation and Development (DLCD) as LCDC's administrative arm.

Oregon's Land use laws (Statewide Planning goals ORS 197.215, and 227) provide the regulatory framework within which to strengthen implementation of flood hazard reduction measures in terms of identifying hazards and adopting long term local hazard reduction plans. One of the impediments to strengthened statewide planning however is that State Planning Goal 7 does not contain directions for local jurisdictions to initiate flood hazard planning, because it does not include definitive requirements for local jurisdictions to address specific hazards. Lack of administrative guidance, has resulted in inconsistent administration of this planning goal, ie: Communities are not required to prepare and adopt hazard reduction plans. Planning for flood hazards should be done by drainage basin. Cities cannot determine their own fate without input/consideration of upstream events and controls. Oregon's land use laws needs to relate to this fundamental fact and provide consideration for basin wide plans.

Floodways that are depicted on National Flood Insurance Program maps are generally more highly hazardous areas, but are not zones where structures are prohibited. They are conveyance areas where construction can occur if certain engineering performance standards are met. When this happens, it often places structures at significant risk, in terms of depths and velocities, even though they are legally placed. To avoid this, several States have enacted measures that prohibit residential development in flood ways, or at least in specific floodway situations where life and safety may be in jeopardy. Damage to structures can be minimized by reducing the number of

structures located in the floodways, or at least in specific floodway situations where life and safety may be in jeopardy. Damage to structures can be minimized by reducing the number of structures located in the floodway and/or in areas that are highly hazardous based on depth/velocity criteria.

SECTION 1.7 LAND USE PLANS AND DEVELOPMENT REGULATIONS

Land use planning is a necessary and useful tool for addressing flood problems. Through land use planning regulations a jurisdiction is able to reduce future flood damages by controlling the density, location, construction and type of development that may occur in a hazardous area. The City of Myrtle Creek administers planning requirements and regulations that work to control development in environmentally sensitive and hazardous areas. Myrtle Creek also strives, and is seeking to improve, implementation methods that work to mitigate potential hazards.

In 1968 the federal government began the *National Flood Insurance Program* (NFIP) as a way to limit future development in the floodplain and thereby prevent additional flood damages. The NFIP, which is administered by FEMA, provides federal flood insurance to residents of communities that adopt minimum floodplain regulations. Myrtle Creek adopted these regulations in 1978 in the form of its first flood hazard ordinance.

A primary tool for flood regulation in Myrtle Creek is the Flood Hazard Overlay Zone (FH) contained in Section 1.05.1 of the City's Zoning Ordinance. The purpose of the FH Zone is to promote the public health, safety and general welfare and to minimize public and private losses or damages due to flood conditions in specific areas by provisions designed to:

- protect human life and health;
- minimize expenditure of public money for costly flood control projects;
 - minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the public;
- minimize prolonged business interruptions;
 - minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazards;
 - help maintain a stable tax base by providing for the sound use and

development of areas of special flood hazard so as to minimize future flood blight areas;

– ensure that potential buyers are notified that property is in an area of special flood hazard; and to ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.”

To accomplish this purpose, the FH Zone contains methods and provisions for:

- restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters.
- controlling filling, grading, dredging, and other development which may increase flood damage; and
- preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or may increase flood hazards in other areas.

There are other requirements in the County’s Land Use and Land Division Ordinances that provide flood protection. These included required setbacks from waterways and protection of wetlands and drainage ways.

Federal and local flood program establishes a 100-year floodplain which is divided into two zones: a “floodway and a “flood fringe.” The “floodway” is defined as the channel of a river or other water course and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water elevation more than one foot. The “flood fringe” is the area of the floodplain lying outside of the floodway, but subject to periodic inundation from flooding. Development may be permitted in such areas if it satisfies conditions and requirements regarding the height of the structure’s first floor above the projected 100-year flood elevation, “flood proofing” construction, displacement of flood matters, and related concerns. Currently a structure’s first floor must be constructed one foot above the projected 100-year flood level within the 100-year “flood fringe” area.

Floodplain boundaries are delineated on FEMA's Flood Insurance Rate Maps (FIRMs). This delineation also includes a 500-year flood area which currently is not subject to local regulation beyond the 100-year flood boundary.

SECTION 1.8 REMAINING ISSUES AND NEEDS

Critics of FEMA's floodplain management system have pointed out that it has actually led to increased flood damages in the United States. This occurs in part because the program encourages development in the floodplain by providing federally backed flood insurance for damages to houses and property within the floodplain. Financial incentives for developing within the floodplain, along with a false sense of security from regulations that may not be adequate, impose additional costs on property owners and tax payers.

During the 1996 floods, flooding did occur to residences within the City that were elevated one foot above the projected 100-year flood. Some attribute this to the fact that the 1996 flood exceeded a "100-year flood," but such severe flooding appears to occur much more frequently than once every 100 years.

One solution to the flooding problem is to require higher elevation of the first floor of new structures within the floodplain. A much safer standard is to require that all new structures be elevated or flood protected to an elevation of three feet above the FIRM flood level within the 100-year floodplain and to an elevation of one foot above the flood elevation within the designated 500-year floodplain. Myrtle Creek should continue to administer all other existing regulations that protect development from flooding. The City should also evaluate and consider the implementation of the Community Rating System (CRS) that provides a monetary incentive to abide by flood regulations through a reduction in flood insurance premiums.

Protecting new development from flooding is a necessary preventative solution to flooding, but this does not solve flooding and erosion problems for structures that have already been built in hazardous areas. These structures and properties receive significant protection from existing measures, including the City's flood warning and emergency response programs and numerous levees and revetments. The overall potential for flood damage, however, remains high. What then should be the program for the future?

There are a number of solutions Myrtle Creek can choose from in addressing these problems. It can expand the use of levees, bank stabilization and channel maintenance activities. As part of this approach, the local governments must find new ways of designing, building and maintaining these facilities to increase their effectiveness and reduce their costs and impacts. We should also

look for ways, to reduce their costs and impacts and increase the effectiveness of projects that have already been built.

Alternatively, local jurisdictions can support modifications to the endangered structures themselves (for example, relocating or elevating homes) that make them less susceptible to the hazard. This is usually a permanent solution that eliminates most maintenance costs and can provide many other benefits, such as open space, improved flood storage and conveyance, and habitat. However, in many cases, however, especially where a large number of highly valuable structures are involved, this may not be the most desirable or cost-effective solution.

The City can continue to provide flood warning and flood fighting assistance, looking for ways to improve monitoring, analysis and dissemination of information, and expanding its flood fighting abilities. However, while flood warnings are primarily useful in saving lives, they do little to reduce major structural damage, since options for protecting structures and their contents are very limited during the flood event.

Public education regarding flood hazards can be expanded, and the maps and other tools used to implement floodplain regulations improved. Flood control projects, floodplain regulations and other proposals can be developed and reviewed cooperatively by all jurisdictions in a basin, to ensure that problems are not transferred from one site to another.

These options, and many additional alternatives, are not mutually exclusive. The challenge facing the City is to develop a management program that can select from a wide range of ideas and choose the most cost-effective, environmentally acceptable, and permanency to reduce flood hazards. Yet much remains to be done. Many of the programs and projects proposed in this plan will first require additional information and analysis before they can be undertaken. Moreover, it will undoubtedly be necessary to revise this plan as new information and circumstances require. Nevertheless, this plan represents a good first step in addressing a complex problem.

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SECTION 2.0 GENERAL POLICIES

This section of the plan recommends policies to direct floodplain and watershed management activities within Myrtle Creek. The policies provide a set of operating principles to guide the City's flood hazard reduction efforts over the long term.

Policies are divided into seven categories: general policies; floodplain land use; watershed management; flood hazard reduction projects; river channel maintenance; flood warning; information and education; and emergency response.

The general recommendations listed below are intended to act as a guiding instrument for further

implementing hazard policies and minimizing future flood damage within the City of Myrtle Creek.

SECTION 2.1 NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program provides disaster assistance to public agencies and makes flood insurance available to private land owners. Communities must adopt regulations intended to reduce flood hazards in order to qualify residents for flood insurance. Communities can also qualify their residents for flood insurance premium discounts by adopting regulations that exceed federal minimum standards. The adoption of this plan and the regulations proposed by this plan will enable the City to make an application for the Community Rating System (CRS). Based on the total number of points received, the City would be assigned to one of ten classes. The discount on flood insurance premiums would be based on our assigned class.

9 Policy Recommendation #1

Myrtle Creek should not only meet, but also exceed the federal minimum standards for National Flood Insurance Program Qualification in order to better protect public health and safety, and to achieve flood insurance premium discounts by qualifying for the CRS Program.

SECTION 2.2 RESTRICTING DEVELOPMENT IN HAZARDOUS AREAS

New development in flood hazard areas increases risks to life, health and property. In some areas, the risks are so severe that no development should be allowed. In other areas, flood risks may be minor enough that development, built to certain standards, could be permitted. In either case, prevention of future problems through land-use planning and regulation is far more effective, permanent, and less expensive than trying to correct problems after they have been created.

9 Policy Recommendation #2:

New subdivisions, residential and commercial development, and substantial improvement of commercial and residential structures should be prohibited on lands identified as a floodway.

9 Policy Recommendation #3:

Development may be allowed in areas of lesser flood hazard of identified floodplain (flood fringe) only if it can be built to withstand flooding without suffering significant damage.

SECTION 2.3 REDUCING FLOOD IMPACTS TO EXISTING DEVELOPMENTS

Even if new development and substantial improvements are designed to minimize the risk of flooding or bank erosion, many developments built in the past will continue to be subject to these hazards. Reducing flood-related problems thus requires not only prevention, but remedial action as well.

9 Policy Recommendation #4:

Myrtle Creek should seek to reduce the risk of severe flood hazards and damages experienced by existing public and private developments.

9 Policy Recommendation #5:

New development or other actions should not be allowed to increase flood risks to existing properties and development.

SECTION 2.4 REDUCING LONG TERM PUBLIC COSTS

Reducing flood hazards to existing developments can be extremely expensive. This is especially true of projects that require ongoing, intensive maintenance, and projects that transfer flood and erosion problems to other sites, necessitating more projects elsewhere. Endangered properties need to be protected in ways that will not require ongoing, escalating expenditures for flood control.

9 Policy Recommendation #6:

Where possible, flood hazard reduction projects should be selected, designed, and implemented to be permanent or low-maintenance solutions to flood problems.

SECTION 2.5 PROTECTING NATURAL RESOURCES

Flood control projects built in the past often degraded natural resources and functions. For example, levees were typically placed right on riverbanks. As a result, the broad, natural

floodplain was no longer available to store and convey floodwater. Some of these levees also eliminated stream side wetlands by separating them from the river. Side channels, vital as rearing habitat for juvenile salmon, were similarly cut off by both levees and revetments. Past maintenance practices added to these problems by requiring that both levees and revetments be kept bare of most vegetation, eliminating the natural riparian corridor that provides important fish and wildlife habitat.

9 **Policy Recommendation #7:**

The existing flood storage, conveyance functions and ecological values of floodplains, wetlands, and riparian corridors should be protected and, where possible, enhance or restored.

SECTION 2.6 MULTI-OBJECTIVE MANAGEMENT OF WATER RESOURCES

Rivers, streams, floodplains, wetlands, and riparian corridors--as well as the fish and wildlife that use them--are public resources. Any projects or programs affecting them therefore need to consider these competing public resources.

9 **Policy Recommendation #8:**

Flood plains, rivers, streams, and other water resources should be managed for multiple uses--including flood and erosion hazard reduction, fish and wildlife habitat, agriculture, open space, recreation, and, where appropriate, water supply.

SECTION 2.7 INTERGOVERNMENTAL COORDINATION

Watersheds do not follow jurisdictional boundaries. Actions taken by the City in one part of a drainage basin--whether it be a land-use plan, development permit, or capital improvement project--can affect flood and erosion problems experienced by other jurisdictions within the watershed.

9 **Policy Recommendation #9:**

Myrtle Creek's floodplain and watershed management activities should be planned and implemented in close cooperation with watershed councils, cities, counties and other agencies sharing jurisdiction in each basin.

SECTION 3.0 FLOODPLAIN LAND USE POLICIES

Development in the floodplain creates two types of problems. First, because of its location in a hazardous area, the development itself is at risk from inundation and/or erosion. Second, such development can increase risks to neighboring properties by creating a barrier to the conveyance of flood waters (thus causing backwater flooding upstream) and reducing the area available to store and slowly release flood waters (thus increasing velocities and erosion downstream).

9 Policy Recommendation #10:

The goal of the land use policies should be to reduce flood risks to future developments and prevent them from increasing risks to surrounding properties.

SECTION 3.1 DEVELOPMENT IN THE FEMA FLOODWAY

FEMA designates a portion of the 100-year floodplain as a “floodway”. The floodway is generally mapped as being immediately adjacent to the channel, and is often associated with deep, rapidly moving water. A minimum requirement for communities wishing to participate in the National Flood Insurance Program (NFIP) is that any new development within the 100-year floodway will not cause any rise in the elevation of the 100-year flood. (The NFIP enables residents of eligible communities to obtain federally backed flood insurance and disaster assistance.) These restrictions also apply to “substantial improvements”--defined as reconstruction or improvement of an existing structure in which the work equals or exceeds fifty percent of the structure’s value before it was improved.

9 Policy Recommendation #11:

New subdivisions, residential and commercial development, and substantial improvements to residential structures should be prohibited from encroaching into the floodway delineated on the Floodway and Flood Boundary Maps produced by the Federal Emergency Management Agency.

SECTION 3.2 FLOOD PROTECTION CONSTRUCTION STANDARDS

In areas of lesser flood hazard (e.g., areas of shallow and/or slow-moving water such as the flood fringe), floodplain structures can be protected from serious inundation damage by using special construction techniques. For example, homes can be elevated above flood levels and built so

they allow flood waters to pass through the foundation and lower, uninhabited floors. The NFIP requires that new and substantially improved homes be elevated “to or above” the 100-year flood elevation and be built to allow for the entry and exit of flood waters. The State of Oregon requires that homes be built so that the lowest floor is one foot above the 100-year flood elevation. Past flood events indicate that flood depths can exceed the mapped 100-year flood elevation, making existing standards inadequate.

9 **Policy Recommendation #12:**

New development and substantial improvements in the floodplain should be constructed so that they can withstand the 100-year flood without sustaining significant damage. They should be built so that the lowest finished floor is three feet above the projected 100-year flood within the designated 100-year flood fringe and one-foot above within the 500-year flood fringe. Areas below the lowest finished floor of residential structures should be designed to allow for the entry and exit of floodwaters.

SECTION 3.3 FLOOD PLAIN LAND USE

Certain types of land uses are more compatible with flooding than others. Land uses that leave wide areas of the floodplain open will help preserve its storage and conveyance functions, minimizing flooding and erosion impacts to neighboring properties. Also, the fewer structures in the floodplain, the lower the potential for damage.

9 **Policy Recommendation #13:**

In areas designated “rural residential” in the Myrtle Creek Comprehensive Plan, land uses which preserve the natural flood stage and conveyance functions of the floodplain--such as agriculture, open space, fish and wild life habitat, and recreation--are preferred within the floodplain.

9 **Policy Recommendation #14:**

Critical facilities and land uses which would present special risks--such as hazardous waste storage facilities, hospitals, schools, nursing homes, and police and fire stations--should not be built in the floodplain unless no reasonable alternative is available. If located in the floodplain, these facilities and the access routes needed for their operation should be built in a manner that protects public health and safety during at least the 100-year flood. In addition, special measures should be taken to ensure that hazardous or toxic substances are not released into flood waters.

SECTION 3.4 MIGRATING RIVERS

Some rivers in Myrtle Creek, particularly along the lower reaches, “migrate” laterally, endangering properties along their banks. Areas that are at risk due to channel migration are sometimes outside the mapped floodplain, so that residents may not be aware of the risk. Attempts to control channel migration through structural means, such as revetments, are costly and are not always effective along very unstable rivers. Prevention through land-use regulation is often a more cost-effective solution.

9 Policy Recommendation #15:

Channel migration hazard areas should be identified through geomorphologic analyses and review historic channel migration patterns and rates. Land-use regulations should be adopted and applied in order to preclude unsafe development in these areas.

SECTION 4.0 WATERSHED MANAGEMENT POLICIES

A comprehensive analysis of flooding problems and solutions must look not only at the floodplain, but at the entire watershed that drains to the floodplain. Watershed features that influence the volume and rate of flow in large rivers include climate, topography, geology, soils and land cover. This section proposes policies to direct watershed land-use decisions in the large river basins.

SECTION 4.1 IMPACTS OF BASIS WIDE LAND USE ON FLOODING

Development and clearing in a basin can increase both the peak rate and volume of runoff reaching rivers and streams. As noted earlier, this can increase the depth and extent of flooding downstream. It can also intensify erosion, especially during small-to moderate-size events (e.g. 20-and 10-year flows).

9 Policy Recommendation #16:

Watershed councils should undertake or participate in the development of watershed analysis and comprehensive basin plans of their respective watersheds.

9 **Policy Recommendation #17:**

Basin plans should estimate the downstream effects of the increased runoff rates and volumes caused when development is designed for rate control.

9 **Policy Recommendation #18:**

Where significant downstream impacts will result from increased runoff rates and volumes, new upland uses should be required to either control runoff rates and volumes or to incorporate other equally effective measures to protect downstream properties.

SECTION 5.0 FLOOD HAZARD REDUCTION PROJECT POLICIES

Local jurisdictions have built or sponsored capital improvement projects (CIPs) for flood control along the major rivers. These CIPs consist primarily of revetments, levees, and structures associated with levees--i.e., pump plants and flap gates. At present, very little new construction of these types of projects is being done. The majority of flood control efforts focus on maintenance of projects.

This section recommends policies to guide a new, comprehensive program that can implement a range of “flood hazard reduction projects,” not just traditional CIPs. These projects include, for example, innovative types of projects such as setback levees and soil bio-stabilization bank protection; relocation, acquisition, and elevation of flood-prone homes; and redesign or removal of existing river facilities that are susceptible to damage or are causing significant impacts to other sites.

The policies are listed in the approximate order of the decisions that have to be made in developing a project. They address the selection, design and implementation of new projects as well as the maintenance of existing and future projects.

SECTION 5.1 FLOOD HAZARD PROBLEMS

Floods damage many different types of property and create a variety of hazards. Spending public funds for flood protection may be more appropriate for some types of properties than others. For example, City facilities like roads, bridges, and parks represent a taxpayer investment; an important part of the public infrastructure. Due to the economic importance of agriculture to the City, such land uses should be afforded some level of protection. Expenditure of public funds to reduce flood hazards to these properties is appropriate. However, whether or not local jurisdictions should spend its funds to protect other property is currently unclear, particularly

where other types of development may not have the type of location limitations as agricultural.

9 **Policy Recommendation #19:**

The following types of properties and problems should be eligible for protection:

1. Properties where there is an imminent threat to public health or safety;
2. Any public property (such as a road, bridge or park) within Myrtle Creek if endangered;
3. A City action that caused or contributed to the problem; Property for which the City has acquired development rights (e.g. agricultural land) is endangered;
4. There is a threat of severe damage to private homes, businesses, or agricultural uses.

The following types of properties and problems should be ineligible for project assistance or sponsorship from Myrtle Creek:

1. Undeveloped nonagricultural private land (e.g., a lawn, private forest land, etc.) eroding or inundated, with no imminent and severe threat to public or private structures;
2. Federal and/or state property alone is endangered;
3. Future development potential is precluded (e.g., a property cannot be issued a development permit because of a flood-related problem);
4. Private roads and bridges are endangered, with no imminent threat to public health and safety.

SECTION 5.2 PROBLEM PRIORITIZATION

A large number of public and private properties in Myrtle Creek experience flood related hazards and damages. Neither the funding nor the staff will be available to address all these problem sites at once, or perhaps ever. To ensure that new projects are implemented to address the most important problems first, a defensible policy is needed to prioritize problems.

9 **Policy Recommendation #20:**

In determining the priority of a problem, the following factors should be taken into consideration: consequences, urgency, responsibility, and opportunity. These factors are described below.

Consequences: The primary determinant of a problem's priority is the consequences that would result if no project is implemented. Consequences should generally be prioritized in the following order:

1. **Threats to public health and safety**

Threats to public health and safety include threats to critical facilities (e.g., hospitals, schools, nursing homes, and emergency response facilities) and/or health-related infrastructures (e.g., water supply systems, sewer lines). The presence of deep, high-velocity flows carrying debris through populated areas also constitutes a threat to life and limb.

2. **Damage to public infrastructure and developed public property**

Public infrastructure and developed public property includes, but is not limited to, roads, bridges, utility systems, public buildings, and parks.

3. **Damage to private structures**

Private residential structures should receive higher priority than non-residential structures.

4. **Damage to significant natural resources**

Significant natural resources are defined to include fish and wildlife species and their habitats that are considered regionally significant.

5. **Damage to undeveloped public land**

Undeveloped public land refers to both publicly-owned open space and land for which development rights have been purchased, such as agricultural land.

6. **Urgency**

Urgency is a measure of how quickly action needs to be taken in order to prevent a problem from growing worse and requiring an increasingly costly solution. For example, the magnitude of an erosion-related problem will generally increase over time if not addressed. In comparing problems where equal consequences would result if no action were taken, the most urgent problem should be addressed first.

7. **Responsibility**

Another important factor is whether the problem is related to a facility that Myrtle Creek has a legal commitment to maintain. In comparing problem sites with comparable consequences and urgency, those associated with facilities that Myrtle Creek has a legal commitment to maintain should be a higher priority than sites where no such commitment exists.

8. Opportunity

Although consequences, urgency, and responsibility are the primary factors in determining problem priorities, projects can sometimes present opportunities for meeting multiple objectives. Examples include projects that enhance ecological resources, provide public access to the river system, and/or provide opportunities to cooperate with private land owners or other jurisdictions in funding and implementation of the project. The prioritization procedures should allow flexibility to higher priorities for projects that meet multiple objectives.

SECTION 5.3 MODIFICATIONS TO CRITERIA

The problem prioritization criteria described in Policy FHR-2 are intended to provide general guidance in prioritizing flood-hazard related problem sites throughout the City. However, detailed basin plans need to be prepared for Myrtle Creek's stream and river basins. In many cases, the detailed information compiled for a basin plan may indicate the need for prioritization policies that are tailored to the specific conditions in the basin.

9 Policy Recommendation #21:

Basin-specific modifications to the Problem Prioritization Policy (policy FHR-2) may be made in accordance with the recommendations of adopted basin plans.

SECTION 5.4 ALTERNATIVE EVALUATION AND SELECTION

When developing solutions for each problem site, a number of alternatives will likely be available. Moreover, while a problem may be deemed a high priority because of its consequences, the alternatives available for solving it may be prohibitively expensive or create unwanted impacts. Myrtle Creek needs a consistent, clear and objective method for comparing and selecting alternatives to ensure that public funds are spent wisely.

9 Policy Recommendation #22:

Project alternatives should be evaluated according to the following criteria:

1. **Risks To Life And Public Health.** The effect of the project on public health and safety should be evaluated both upstream and downstream of the site. The project should have a beneficial or negligible impact on public health and safety.
2. **Benefits Versus Costs.** Benefits are measured as the effect on flood damages over the entire river or stream system; costs are measured as public and private costs for implementing and maintaining the solution over the long term. Flood damage reduction benefits over the entire river or stream system should exceed long-term costs.
3. **Environmental Impacts.** The environmental impacts of the project include its effect on fish and wildlife habitat, wetlands, water quality, and other elements protected by law. Impacts should be evaluated both upstream and downstream of the project site. The net environmental impacts of the project (plus any mitigation measures) over the long term should be positive or negligible.
4. **Consistency With Applicable Land-Use Plans And Regulations.** The project should be consistent with land-use plans for the area and should not conflict with regulations governing activities in the floodplain and riparian corridor (e.g. from stream buffers), unless the project benefits justify seeking an exception from applicable regulations.

SECTION 5.5 VOLUNTARY ACQUISITION & CONDEMNATION

One alternative for reducing flood hazards is the relocation or acquisition of flood-prone structures. However, if acquisition of threatened buildings is selected as the preferred solution (using the criteria listed above), some property owners may be unwilling to sell. If this is the case, the City will need to decide whether to condemn the property, or allow the property owner to remain.

9 Policy Recommendation #23:

Except under very limited circumstances, City acquisition of threatened buildings should be voluntary on the part of the property owner. Condemnation should be considered only under the following circumstances: 1) federal, state and/or local regulations prohibit reconstruction of the building; 2) the property in question is causing significant flood damage to other properties; 3) a property owner refuses to sell a portion of an area in which

the majority of property owners have agreed to sell to the City, or 4) a property owner refuses to sell an area needed to complete an approved capital improvement project.

SECTION 5.6 USING LAND CREATED BY ACQUISITION

If structures are relocated or acquired and demolished by the City, vacant land will be created. Much of this land, because it is along major rivers, will have value as open space.

9 Policy Recommendation #24:

Open land created by the relocation or acquisition for structures should become either a City easement (if the structure is relocated to another site on the same lot) or be owned, managed and retained by Myrtle Creek as open space, riparian corridor, agriculture, wetland or a recreation area.

SECTION 5.7 LEVEL OF PROTECTION

Projects built to protect property from inundation are usually designed for a certain magnitude of flood event. Events that exceed this “designed level of protection” will overtop the project; lesser events should be contained by the project. In the past, many residents of levee-protected areas have assumed they had protection from the 100-year event, when this was not always the case. Clear guidelines are needed on what level of protection exist and new what projects should provide.

9 Policy Recommendation #25:

New flood hazard reduction projects, whether protecting new or existing development, should seek to provide protection from the 100-year, future conditions flood, plus a margin of safety. Existing flood hazard reduction projects protecting existing developments should be maintained at their current level of protection unless the alternatives evaluation shows that a different level of protection is warranted.

SECTION 5.8 MULTI - OBJECTIVE FLOOD HAZARD REDUCTION PROJECTS

Because they occur in the floodplain and riparian corridor, flood hazard reduction projects can

impact fish and wildlife habitat, wetlands, and important open space and recreation opportunities.

9 **Policy Recommendation #26:**

Myrtle Creek should, wherever reasonable, design flood hazard reduction projects to include preservation or reestablishment of wetlands and fish habitat areas, and to be compatible with open space and recreation opportunities.

SECTION 5.9 DESIGNING FOR LOW MAINTENANCE

Project designs can have a large impact on future maintenance needs. For example, if the riverward slope of a levee or bank stabilization project is too steep, and/or the base of the project is not supported by large “toe rock,” the project will tend to be undercut by the river and continuously slough into the channel. Placing projects right on the banks can also increase maintenance needs by concentrating the force of flows. Finally, the materials used to build a project (e.g., soil, riparian, vegetation) and the way they are placed can have a large impact on the stability of the project and thus its future maintenance needs.

9 **Policy Recommendation #27:**

Local jurisdictions should, wherever possible, design projects in ways that require minimal or no maintenance over the long term. Levees and bank stabilization projects should include, where possible, toe rock, setback areas, vegetated stream banks, gentle river slopes, and materials and placement methods that provide long-term stability to the interior and face of the project.

SECTION 5.10 ALTERNATIVE TO MAINTENANCE

Current maintenance standards require returning damaged projects to their original design or as-built condition. In some cases, however, the original design of the project contributes to repetitive damage of the project. For example, the face of the project may be too steep, causing it to be unstable and slough into the river. These types of problems contribute to higher maintenance costs.

9 **Policy Recommendation #28:**

Myrtle Creek should evaluate alternatives to returning an existing project to its pre-damage condition when the original design appears to: 1) contribute to high maintenance costs, 2)

provide inadequate protection from inundation and erosion hazards, 3) transfer problems to other sites, 4) degrade riparian habitat, 5) experience repetitive flood damage and repair cost, or 6) prevent an opportunity for habitat enhancement. This evaluation should occur on an ongoing basis. Alternative recommendations should be incorporated into the responsible jurisdiction or agency's maintenance and/or capital improvement priorities. This policy is not intended to prevent emergency repairs necessary to address extreme threats to the public health and safety.

SECTION 5.11 MAINTENANCE VERSUS NEW PROJECTS

Maintenance of river facilities, which typically involves the repair of a facility to its pre-damage condition, is generally performed without detailed analysis or design. However, if more substantial changes to an existing project are considered, the impacts of those changes of flood elevations and other aspects of the river system should be considered. Moreover, if the facility has been subject to repetitive flood damage then alternatives to maintenance should be evaluated under policy FHR-11.

9 Policy Recommendation #29:

Any project that significantly changes the cross-section geometry or length of an existing flood-or erosion-control facility should be considered a new project, and should be analyzed, prioritized and implemented as such. Projects that do not significantly change the cross-section geometry or length of an existing facility should be implemented as part of a maintenance program.

SECTION 5.12 PUBLIC AWARENESS OF FLOOD HAZARDS

Many current and prospective residents of flood-and erosion-prone areas are unaware of either the hazards associated with the property, Myrtle Creek regulations that limit development in these areas, what they should do in a flood emergency, or what forms of disaster assistance are available. Myrtle Creek should continue to serve a role in improving awareness of these issues and thereby reducing the likelihood of injuries and damages in these areas.

9 Policy Recommendation #30:

Myrtle Creek should make the following information available to current and prospective residents and landowners in flood hazard areas: 1) the known flood risks to their property and safety; 2) steps they can take to protect themselves and their belongings from flooding;

3) regulations affecting floodplain development activities; and 4) types of disaster assistance available. This information should be provided in advance of flood emergencies, during the emergency itself (through the Myrtle Creek Public Works Department), and after the emergency; has passed.

SECTION 5.13 EMERGENCY FLOOD WARNING

Myrtle Creek presently issues emergency flood (as well as other) warnings by a variety of means including:

1. The Emergency Alert System (EAS), formerly known as the Emergency Broadcast System (EBS);
2. Activation of local emergency responders and agencies through public sector VHF radio frequencies; and
3. Prerecording on the emergency public information telephone line; and the use of telephone call lists.

9 Policy Recommendation #31:

Myrtle Creek should take steps to protect and enhance existing emergency public warning systems as well as develop diversified methods of making such warnings available to the public.

SECTION 5.14 CITY'S ROLE IN RESPONDING TO EMERGENCIES

Many different agencies and jurisdictions play a role in responding to flood emergencies. The specific responsibilities of each of these agencies must be clear to avoid confusion or miscommunications during the emergency. Myrtle Creek's role relative to other jurisdictions during flood emergencies needs to be clearly understood.

9 Policy Recommendation #32:

Myrtle Creek is the lead jurisdiction in managing and coordinating emergency public health, safety and welfare services before, during and after flood emergencies within the City. Myrtle Creek should coordinate emergency preparedness and response with all other agencies and jurisdictions who have a role in responding to flood emergencies.

SECTION 5.15 SANDBAG DISTRIBUTION

During flood emergencies many citizens called the City seeking sandbags and sand to protect their property.

9 Policy Recommendation #33:

Myrtle Creek should provide a limited supply of sand and sandbags for private property owners during flood emergencies. Citizens should be responsible for requesting, picking up, filling and placing sandbags, as well as cleaning up sandbags and sand on their property after floods. Sandbags should be placed as close as possible to the foundation of the structure being protected.

SECTION 6.0 FLOOD HAZARD EDUCATION

Education is an important and low-cost tool in reducing flood hazards. Public awareness of flooding risks can discourage development in hazardous areas, encourage measures (such as elevation of homes) to reduce flood hazards, and improve citizen response to flood emergencies.

Education can occur in a variety of ways. Materials such as brochures and maps can be printed and distributed to large numbers of floodplain residents to give them important information. Special events can be held to teach and practice emergency measures such as filling sandbags. Ordinances can be passed to encourage or require disclosure of flood hazards during real estate transactions.

This subsection describes recommendations to develop and distribute materials on flood hazards, respond to citizen inquiries, sponsor special events to improve public awareness of flood hazards, and develop an ordinance to require disclosure of flood hazards in real estate transactions. Each of these tasks is described below.

SECTION 6.1 EDUCATION MATERIALS AND INFORMATION

Informed citizens can do a number of things to prepare themselves for a flood emergency. However, many property owners are unfamiliar of preventative flood-control measures; some may even be unaware they live in the flood plain. Citizens who may be considering purchase of flood-prone property could also benefit from a good understanding of flood risks and

development regulations in floodplain areas.

In 1987 a public awareness study prepared for the Washington State Department of Ecology recommended direct mailings to property owners in the flood plains as the “most positive way to ensure notification” of flood hazard information. In addition, the study cited research by the State of Illinois that concluded flood hazard information need not be packaged in a flashy manner to be effective; simple brochures and fact sheets were equally well received by the public (Flood Loss Reduction Associates 1987).

SECTION 6.2 FLOOD HAZARD DISCLOSURE ORDINANCE

Many property owners purchase land with little or no knowledge of its floodplain status. Because property located in flood hazard areas may look serene and beautiful in the spring or summer, new residents may not realize the little stream near their property becomes a raging river during flood season.

Current Oregon State law does not require the disclosure of floodplain information to the potential property owner. Federal law does require disclosure of whether property is in a mapped flood hazard area when a potential property buyer applies for a federally-backed mortgage. However, this requirement is not consistently carried out by mortgage lenders.

Other states, such as California and Wisconsin, have adopted mechanisms for flood hazard disclosure. In California, the seller or seller’s agent must provide floodplain disclosure in writing to all potential buyers before transfer of title. The buyer must be notified that the property is located in a flood hazard area as defined by FEMA’s Flood Insurance Rate Maps and all buyers must obtain flood insurance as a condition to obtain financing.

In Wisconsin, the state Real Estate Licensing Board requires the seller to disclose flood Hazard information to home buyers on the “Offer to Purchase” form which accompanies all property sales.

9 Policy Recommendation #34:

Myrtle Creek should establish a flood hazard disclosure ordinance that would require flood hazard disclosure by real estate agents. It is important that potential home buyers are aware of flood hazards when considering purchase of a property; this is one of the only ways to reach potential property owners.

The experience of other jurisdictions shows that disclosure is most likely to be successful if

affected parties such as Realtors, home buyers, and lending agents are all involved in development of the ordinance.

9 **Policy Recommendation #35:**

Myrtle Creek should establish a task force of all interested parties in the ordinance drafting and review process.

SECTION 6.3 FLOOD WARNING & EMERGENCY RESPONSE

An effective flood warning and emergency response system is an important tool in reducing flooding-caused deaths, injuries, and property damage. The goal of such a system is to give floodplain residents time to react to flood events, and extra warning time respond by evacuating, avoiding threatened areas, and taking steps to protect possessions.

Technological advances, as well as the many lessons learned by the City, suggest improvements could be made. This section describes a number of potential improvements in the City flood warning system.

SECTION 6.3.1 FLOOD WARNING

The National Weather Service (NWS) has a River Forecasting Center in Portland, Oregon which has responsibility for forecasting flows on rivers in Washington, Oregon, Idaho and western Montana using computer models. The Center provides forecasts for the North and South Myrtle Creek.

This information is disseminated to Myrtle Creek in several ways. The LEDS system (Law Enforcement Data System) provides the warning via teletype to the Sheriff's office, Emergency Operations Center (EOC) and the 9-1-1 Center. This information is also relayed to these same locations on the NAWAS circuit (National Warning System) from the State EOC.

Both the EOC and 9-1-1 center play a role in issuing emergency public information. Flood warnings are immediately provided to area radio stations. The Emergency Public Information Officer (PIO) regularly updates the radio stations from the EOC, providing detailed information through over-the-air live and pre-taped broadcasts.

SECTION 6.3.2 FLOOD WARNING TO PUBLIC AGENCIES

Another major facet of Myrtle Creek’s emergency warning system is the capability to disseminate flood warnings to local governments, emergency responders and state and federal agencies. Flood warnings are issued using the same procedures used anytime the emergency warning system is activated for major emergencies.

All agencies and emergency responders that operate on public sector radio frequencies with paging capability can be activated (notified) through a “page-out” by the 9-1-1 center upon request of Myrtle Creek. All other local governments (including schools) as well as state and federal agencies with local offices, are notified using a phone tree which is updated regularly.

During the February 1996 Flood, following the initial warning, many persons in the public sector had trouble learning about current conditions as the event wore on.

9 **Policy Recommendations #36:**

Agency and field personnel need to ensure adequate lines of communications with their sector chiefs who are (or should have been) located in the EOC throughout the event. These sectors include fire, law enforcement, EMS, public works, public health, and community development/damage assessment.

9 **Policy Recommendations #37:**

To the extent that agencies do not fall within the above lines of communications, then the agency should incorporate within its structure, the capability to receive updated information from one or more of the sources discussed in this section including NOAA Weather Radio, or local radio station.

SECTION 6.3.3 FLOOD WARNING CALL LIST

Upon receipt of a flood warning by Myrtle Creek’s EOC, City personnel begin telephone notification of persons identified within flood call list. Call list notifications should include the best available information provided for by the City’s EOC personnel. Due to the complexity of flooding conditions, such information is often just our “best guess” as to whether properties will be subject to flooding.

9 **Recommendations #38:**

Myrtle Creek should implement a flood hazard call lists to notify residential and

commercial property owners of pending danger associated with a flood event. In addition, if Myrtle Creek, or some other local organization, assumed responsibility for notifications and call list maintenance for Myrtle Creek residents, the list could potentially be expanded to include other unincorporated areas. Such new areas would also have a local person or “flood warden” who would keep the notification lists updated, receive the initial warning from the City and then call the persons in their area who have expressed a desire to be on call lists.

SECTION 6.3.4 DISSEMINATION OF RIVER GAUGE READINGS TO PUBLIC

It has been suggested that river readings from the hydrography recorders be made available to the public through cable T.V. companies on local access channels. In order to provide this service, hydrograph recorders must exist at key locations on rivers or tributaries that threaten potential flooding. These devices are owned and operated by either the Oregon Department of Water Resources, or the United States Geological Service. However, an interactive phone link would provide access to all other users. For the USGS gages there is interactive access on the Internet at <http://www.oregon.wr.usgs.gov>.

Four other methods have been proposed to provide river level information to the public: Electronic Mail, List server, Electronic Bulletin Board and Internet; each of these is described as follows:

- Ø Electronic Mail (E-Mail): A method of sending messages person to person electronically, assumed to have the ability to “Bulk” outgoing mail from a single user to “Many” recipients.
- Ø List server: A software program running on a dedicated computer system, capable of replicating incoming messages and copying them to multiple recipients. Recipients may add or subtract themselves from the list as desired.
- Ø Electronic Bulletin Board System (BBS): A dedicated computer system with modems and phone lines attached, allowing persons with a home computer equipped with a modem to dial into the system and exchange information with other BBS users. Assumed to support several dial in users at a time, may have the ability to deliver E-mail between BBS users and, may have the ability to allow multiple users to “Chat” with each other in real time.
- Ø Internet: This is not a method so much as a communications infrastructure supporting several methods for accessing information on computer systems.

Generally, the List server and E-Mail are dependent on a working Internet to provide the communications between systems. For our purposes, the “Internet” method of communicating will be one or more of FTP, Finger, or HTTP protocols, all of which are designed to provide information of various types of demand.

By using an E-Mail system, forecast and alert information could be distributed to the public. It should not be depended on as the only means of sending alerts, as E-Mail requires the recipient to actively check for receipt of mail. Myrtle Creek’s E-Mail system may be adequate for this type of service with little modification. Successful inter-net notification systems depend on a leased line connection which is available at all times, however, such systems are often limited by speed. To provide reliable service under adverse conditions, the server software and hardware should be upgraded. Because of the person-to-person nature of E-mail, distributing river level information would be limited to named recipients only.

A List Server would only be appropriate for forecasts and current condition information because of the lack of the ability to direct the message to specific recipients. The City currently operates a List Server, however it is the same server software as services the E-Mail and would not be adequate for the needs discussed here. It depends on a leased line connection which is available at all times, however, it is of limited speed. To provide an adequate system would require upgrading both the server software and hardware.

A BBS would be appropriate for forecasts and current conditions. The City does not currently operate a BBS. To set up a BBS would require the purchase of a complete computer system, BBS software, modems and telephone lines, as well as the time and resources to set it up and operate it. All of the Internet solutions are appropriate for forecasts and current condition information only, as they serve to handout information on demand.

9 **Policy Recommendation #39:**

Based on the relative cost of City system versus the present availability of river level information already provided on the Internet by USGS, it is recommended that the City publicize the existing USGS Internet services.

SECTION 6.3.5 NEIGHBORHOOD FLOOD WARDENS

Even with the phone and broadcast improvements recommended above, flood warning information may not reach everyone who could benefit. One way to reach even more floodplain residents would be to assign “Neighborhood Flood Wardens”--citizen volunteers who could

notify their neighbors when a flood is expected, how big it may be, and what precautions they should take. These volunteers could attend special training sessions given by Myrtle Creek once a year, and could be placed on the City's priority call list so that they would be notified of a flood alert.

Neighborhood volunteers could be helpful at other times of the year, too. They could greet new residents with a "welcoming package" including information about flooding, the flood warning system, and precautions they can take to protect their lives and property. Having citizens distribute and explain this information to their neighbors could be extremely effective.

9 **Policy Recommendation #40:**

Myrtle Creek should set up a network of neighborhood "Flood Wardens" in populated floodplain areas where there is a community interest to do so. These citizen volunteers should provide new residents with important flood preparedness information and, during flood events, should convey flood warnings to their neighbors. Myrtle Creek should place their names on the priority call lists. It should also hold a training session for these volunteers once a year, both to educate them about flood preparedness and the flood warning system, and to hear from them regarding how various aspects of the program are working.

SECTION 6.3.6 SANDBAG DISTRIBUTION & USE

Policy ER-2 states that Myrtle Creek will provide sandbags for private property owners during flood emergencies, but that citizens will be responsible for requesting, picking up, filling and placing sandbags, as well as cleaning up sandbags and sand on their property after floods.

One obstacle to implementing the sandbag policy is that many homeowners do not know how to properly use sandbags once they get them. They often attempt to redirect streams, or sandbag their entire property, rather than simply protecting their homes. This can lead to increased flood hazards elsewhere. Or, they may be unsure how to fill the bags, or where and how to place them. Sandbag users need to be informed of how to use the bags, and instructed to only use them to protect their homes, before the City starts distributing them.

They also need to know where the sandbag distribution centers are located. Depending on the sites chosen, reaching these centers may be impossible for some residents during the flood.

9 **Policy Recommendation #41:**

Myrtle Creek should stockpile sand and sandbags at the Public Department shops. It is

recommended that sand and sandbags be stockpiled at each of these locations at the beginning of each flood season. In situations where citizens are unable to pick up materials themselves (i.e., because they are elderly or disabled), staff from the Myrtle Creek Office of Emergency Management (OEM) should assist in coordination volunteers for emergency sandbagging.

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9 **Policy Recommendation #42:**

To ensure proper use of materials, Myrtle Creek should provide sandbag training annually and an information brochure detailing proper use of sandbags to all people picking up materials from the EOC.

SECTION 7.0 COMPLAINT RESPONSE & ENFORCEMENT

The adoption of the ordinance amendments proposed in this plan will give Myrtle Creek additional floodplain regulations. It is hoped that these regulations will prevent new structures from being built in places or in ways that would place them at serious risk from flooding. Unfortunately, having regulations “on the books” does not ensure that they will be effective in the field. Without adequate enforcement, regulations may never be translated into reality.

Enforcement actions often begin with a citizen complaint about an apparent violation. Citizens can be valuable “eyes and ears” in the field to alert the City to regulatory violations that would otherwise have gone unnoticed.

However, many citizen complaints are not about a code violation at all. For example, often citizens call about problems with locally maintained drainage or flood control facility. In these cases, local maintenance crews may need to be alerted. At other times the complaint may not involve a problem that is the City’s responsibility, but it still requires investigation and a response, or referral to another agency.

To address these needs, this element of a work program would respond to citizen complaints and enforce City regulations along each of Myrtle Creek’s major rivers.

SECTION 7.1 RIVER STEWARDS

Enforcement of City regulations is an enormous task. At the present time Myrtle Creek has one full time officer charged with enforcement of City ordinances dealing with building, sanitation, planning, zoning, environmental health and public works. Frequently, this officer is able to work

with violators to bring them into compliance, but sometimes stricter enforcement measures, such as the imposition of fines are necessary to ensure compliance with regulations.

With only one officer for the entire City, the present workload poses a significant challenge to ensuring compliance across the board. While many violations are reported by citizens or detected by staff during the construction process, many other illegal activities go unreported and uncorrected. This is largely due to the fact that the City does not have enough field staff to detect all violations as they happen.

The adoption of new, stricter floodplain regulations will increase the burden on the City's enforcement staff and the need for new and innovative solutions. Not only will the need for enforcement probably grow over what it is today, by the complexity of the issues involved, such as floodplain modeling will require that enforcement staff have more technical expertise.

SECTION 7.2 IMPROVED COORDINATION OF KEY ISSUES

Intergovernmental agreements are authorized by Oregon law to permit local governmental units to act together for efficient, effective service delivery. Intergovernmental agreements must be approved by the legislative bodies of each party to the agreement.

9 Policy Recommendation #43:

Myrtle Creek should improve coordination and seek intergovernmental agreements as necessary to meet the overall goals of:

- Ensuring that the flood hazard regulations and policies of one jurisdiction are consistent and compatible with neighboring jurisdictions efforts to reduce flood hazards;
- Coordinating standards, assessments, and priorities for maintenance and capital improvement projects;
- Achieving equitable distribution of costs for implementing flood hazard reduction efforts (including floodplain modeling, mapping, and capital projects) that provide benefits to residents in more than one jurisdiction.

SECTION 8.0 CONCLUSION

The program and project recommendations described in this section are intended to address all significant flood control problems and issues along Myrtle Creek's major rivers. Given the limitations of revenues, new financing mechanisms would have to be established in order to support any significant expansion of efforts in Myrtle Creek.

Given the magnitude of the total identified need for new programs and projects, the development of new funding sources is likely to occur on an incremental basis, with funding remaining relatively close to current levels during the short-term. In accordance with the goals of this plan, the following general priorities are recommended for initial implementation of the programs and projects identified in the plan.

SECTION 8.1 PREVENT NEW, AT-RISK DEVELOPMENT

Assuming that increases in funding will occur incrementally, it will take many years to address even the highest priority capital needs. In the interim, it is essential that the inventory of problems and project needs does not expand. Therefore, a top priority for implementation should be recommendations designed to prevent new development and protect existing development in flood hazard areas. Specific recommendations include floodplain modeling and mapping and channel migration hazard studies.

SECTION 8.2 REDUCE THE LONG-TERM COST OF MAINTENANCE

Another high priority at the City wide level is to begin implementation of the maintenance recommendations in this plan, particularly converting facilities to new maintenance standards and developing a detailed river facility inventory. Although implementing this recommendation will require funding, it will allow for a more efficient use of public funds for maintenance in the long-term by reducing repetitive damages. Moreover, converting to new maintenance standards will also help to reduce the long-term environmental impacts of river facilities on the health and vitality of fisheries and other natural resources in river corridors. Finally, by identifying facilities that should be modified or abandoned, Myrtle Creek will be better prepared to direct federal and state assistance to these activities when the next flood disaster occurs.

SECTION 8.3 SEEK FUNDING FOR HIGH-PRIORITY CAPITAL PROJECTS

Funding to begin implementing high priority capital projects is a critical need. However, current levels of funding are not adequate to implement more than a handful of projects. Given comparable levels of funding in the future, the City's first priority should be preventing new

development in hazardous areas and meeting its commitments to maintain existing river facilities. However, this does not reduce the critical need for new capital projects. Myrtle Creek should continue to aggressively pursue federal and state grant assistance. Providing City funds to meet the local match requirements for grant funded projects should also be a high priority.

Policy direction will be needed from the City Council regarding the general priorities for expansion described above. In addition, direction from the Board will also be needed in determining whether flood hazard reduction efforts should be focused in particular basins.

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SECTION 8.4 FUTURE FUNDING COMMITMENT

This plan is a commitment to our future. Yet, as new information is learned and conditions change, it will be necessary to amend this plan. Consequently, this plan should be updated and amended at least annually or as conditions warrant.