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**EMERGENCY RESPONSE,  
FLOOD HAZARD MITIGATION, AND  
FLOOD HAZARD AWARENESS  
FOR RESIDENTS OF  
BUFFALO CREEK, COLORADO**



**Department of Natural Resources  
Colorado Water Conservation Board  
Flood Control and Floodplain Management Section  
1313 Sherman Street, Room 721  
Denver, Colorado 80203**

**January 1997**

# **EMERGENCY RESPONSE, FLOOD HAZARD MITIGATION, AND FLOOD HAZARD AWARENESS FOR RESIDENTS OF BUFFALO CREEK, COLORADO**

**Prepared by:  
Colorado Water Conservation Board**



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## **I. BACKGROUND**

### **A. INTRODUCTION**

On the night of July 12, 1996, a thunderstorm occurred in the area of the community of Buffalo Creek, Colorado. The storm produced heavy precipitation over a short period of time. A flash flood occurred along Buffalo Creek, Sand Draw, Spring Gulch, the North Fork of the South Platte River (North Fork) below its confluence with Buffalo Creek, and several other tributary streams in the area. Two lives were lost as a direct result of the flooding. Roads, bridges, water lines, and other utility lines were damaged or destroyed. Numerous homes, outbuildings, and vehicles were damaged or destroyed as well. A large quantity of sediment and debris was carried from the watershed and deposited along the affected stream reaches. Although the geographic area affected was smaller than in some other floods, the July 12 Buffalo Creek flood event was truly a disaster. Other smaller scale floods occurred in Buffalo Creek between June and September of 1996 as well.

In May of 1996, less than two months before the July 12 flood event, a wildland fire burned about 12,000 acres of forested area in the Buffalo Creek vicinity. The fire burned intensely and quickly, leaving behind charred timber and a barren landscape devoid of vegetation and ground cover. The burned soils exhibited hydrophobic (water repelling) properties, and the burned area's natural erosion control and runoff inhibiting characteristics were altered by the fire. Those conditions, in conjunction with a heavy rainstorm on July 12, were the recipe for disaster in Buffalo Creek.

### **B. PURPOSE AND SCOPE**

The purpose of this report is to provide residents of Buffalo Creek with a single document that contains an emergency response plan, information on flood hazard mitigation, and information on flood hazard awareness. This document is intended to be an informational guide with basic information that should be useful to Buffalo Creek residents. Family members and guests who plan on residing in or visiting the Buffalo Creek area during the months of May through September should familiarize themselves with the pertinent portions of this guide. Since the threat of flash flooding could exist for many years to come, it is highly recommended that residents review the emergency and safety information each spring before the flood season begins. History has shown that the lessons learned from the events of a flash flood are sometimes forgotten within a short amount of time. In addition, new residents and visitors to the area may have no appreciation or knowledge of the devastating power of a flash flood. Existing residents should try to assist any newcomers by sharing valuable information that could save lives and property.

### **C. ACKNOWLEDGMENTS**

The Colorado Water Conservation Board would like to thank the Jefferson County Sheriff's Department, the Jefferson County Emergency Management Department, and the North Fork Fire Department, for their dedication and assistance to the community of Buffalo Creek during and after the forest fire and flash flood events. The Emergency Response Plan presented in this report was obtained from the "Emergency Disaster Plan" that was originally prepared by Mr. Grant Macdonald of the Jefferson County Sheriff's department. That plan was edited by CWCB staff and is reprinted in this report for the benefit of the community's residents.

## **II. BUFFALO CREEK EMERGENCY RESPONSE PLAN**

### **A. PURPOSE**

This disaster plan was created by the Jefferson County Sheriff's Department, and is designed to establish initial response actions and responsibilities in the event of a flash flood in the Buffalo Creek area. This plan will primarily cover actions by the Sheriff's Department, the North Fork volunteer fire department, the Jefferson County Office of Emergency Management (OEM), and community citizens. This plan is intended for use if there is early warning of potential or imminent flooding. If a flash flood occurs without notice, then some of the emergency operations will most likely be altered.

### **B. INDIVIDUAL EMERGENCY PAGERS**

An emergency pager system has been established for the Buffalo Creek flood hazard area. Approximately 20 people who reside in the high hazard flood areas will have an individual pager. The pagers will operate on a group pager system. This system can only be activated by the Jefferson County Sheriff's Dispatch.

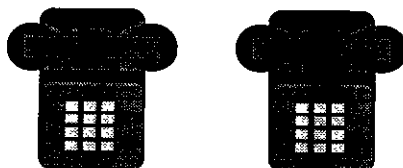
This system will be activated in the event of a Flash Flood Watch, Flash Flood Warning, or reports of flooding or water rising. Since these pagers display only numeric information, the emergency pages will display numeric messages as follows:

- a. 711 Flash Flood Watch or severe weather is predicted
- b. 811 Flash Flood Warning has been issued
- c. 911 Report(s) of flooding or water rising

These messages will be preceded by a telephone number. As an example, an actual page would have numerics that look like 271-5666-711. The phone number will be linked to an automated message that the dispatch center can update with current information about expected weather. A release of liability will be completed by all people receiving a pager.

### **C. TELEPHONE TREE**

A telephone tree for Buffalo Creek residents will be established as a measure to warn citizens of a flash flood warning or impending flooding. The telephone tree will be activated and utilized as described in the sections below. The phone tree will be activated by the Resident Deputy or the Jeffco Dispatch Center, with assistance from Jeffco OEM if needed. The Jeffco Sheriff's Department will distribute final copies of the phone tree to the dispatch center, and to the BPIA Crisis Committee. The Crisis Committee will be responsible for distributing copies of the phone list to the residents. The Committee will also be responsible for revising and updating the phone list as needed.



#### **D. FLASH FLOOD WATCH**

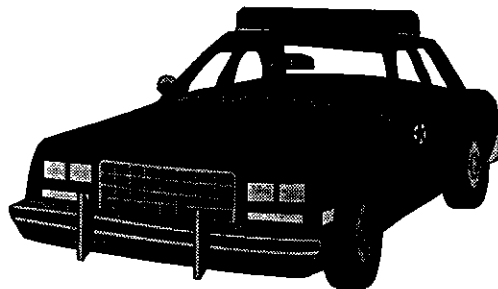
If the National Weather Service issues a Flash Flood Watch for the Buffalo Creek area, Jefferson County Sheriff's dispatch will notify the Resident Deputy, the North Fork Fire Department, Jeffco OEM, and the mountain area bus barn for R-1 Schools (if during normal school hours). The emergency pagers will be set off by the Sheriff's dispatch. If it is raining at a rate of less than 1/2 inch per half hour based on reports from the citizens who have National Weather Service (NWS) rain gages or based on reports from Jeffco, Forest Service, or North Fork Fire officials, then no further action needs to be taken. However, residents will need to be aware of changing weather conditions and should be prepared to take emergency measures if the need arises.

#### **E. FLASH FLOOD WARNING**

If the National Weather Service issues a Flash Flood Warning for the Buffalo Creek area, Jefferson County Sheriff's dispatch will notify the Resident Deputy, the North Fork Fire Department, Jeffco OEM, and mountain area bus barn for R-1 schools (if during normal school hours). The Sheriff's dispatch center or Jeffco OEM will activate the emergency phone tree system. The emergency pagers will also be set off by the Sheriff's Dispatch Center. If the Resident Deputy cannot be contacted, or if he requests, Jefferson County Sheriff's dispatch will activate the emergency phone tree system.

The Resident Deputy, the North Fork Fire Department personnel, and citizens in the flood hazard areas will update the National Weather service on actual weather conditions. Several NWS rain gages have been placed near homes in the Buffalo Creek vicinity, and those homeowners should inform the National Weather Service of rainfall amounts to the best of their ability.

The Resident Deputy and the North Fork Fire Department personnel, along with designated citizens, will notify as many people in the area as possible of the flash flood warning. This may be done by telephone, PA, or door to door if time permits.



The R-1 school bus personnel will also be advised of a flash flood warning. The bus drivers for the routes through Buffalo Creek and along the North Fork of the South Platte River will be advised of the warning by their dispatchers. If the bus drivers feel it is safe, they will drop the students off as normal, except for the students living on Buffalo Creek Road (FDR 543). Those students will be dropped off at Green's Store. Their parents will then be called and advised that the students are being held at the store until it is safe to bring them home. Several residents with four wheel drive vehicles, who are pre-authorized to take the children home, will take the

children home at a safe time. A list of the pre-authorized drivers has been distributed to the affected parents.

The Dome Rock bus will stage on Foxton Road, above the River Road. If possible, the bus driver will contact the bus dispatcher who will then contact the sheriff's dispatcher. The sheriff's dispatcher will advise the Resident Deputy who will, if possible, arrange for alternate transportation for the Dome Rock children.

#### **F. REPORTED FLOODING OR RISING WATER**

In the event of reported flooding or rising water, the Jefferson County Sheriff's dispatch will notify the Resident Deputy, the North Fork Fire Department personnel, Jeffco OEM, and the mountain area bus barn (if during normal school hours). Emergency personnel will check the area to confirm the reports of flooding or rising water.

If a flash flood warning has not been issued, and the flooding or rising water can be confirmed by a deputy, fire personnel, or multiple reports from citizens, the emergency phone tree will be activated by the Sheriff's Dispatch Center. The emergency pagers will also be set off by the Sheriff's Dispatch Center.

If it is confirmed that water is rising, the North Fork Fire Department will close County Road 126 at Spring Creek Road and at County Road 96 (The River Road). Jeffco OEM and Jeffco Road and Bridge will be advised of the closure by the Sheriff's Dispatch.

The Jefferson County Sheriff's Department will close access to the River Road at Foxton Road and will clear the North Fork River. They will also request Douglas County Sheriff's Department to close the River Road at Night Hawk. Jeffco OEM, Jeffco Road and Bridge, and Douglas County Road and Bridge will be advised of the closure.

The North Fork Fire Department will be responsible for warning or evacuating people from the community of Buffalo Creek. If they need assistance in performing the evacuations and warnings, they will request it from the Jeffco Sheriff's Department.

Because the roadway areas along Sand Draw and lower Buffalo Creek are very likely to wash away during a flood, rescue personnel will not be sent up into this area unless absolutely necessary. The Sheriff's Dispatch Center will contact a member of the BPIA Crisis Committee who will call all the residents along FDR 543 and advise them of rising water.

The R-1 school bus personnel will also be advised of a flash flood warning. The bus drivers for the routes through Buffalo Creek and along the North Fork of the South Platte River will be advised of the flooding or rising water by their dispatchers. Students will not be dropped off in the flood hazard areas. The Buffalo Creek bus will stage at Green's Store, and the Dome Rock bus will stage on Foxton Road, above the River Road. Once it is safe and conditions permit, the buses will be allowed to continue with their routes. If necessary, the pre-authorized residents may assist with getting the children home.

**G. SCHOOL BUS DRIVERS**

If at any time the bus drivers feel that it is too dangerous to let his or her passengers off the bus at a designated bus stop, he/she will not allow the children off the bus, and will follow the emergency protocol as described above.

**H. PARENTS OF CHILDREN ON R-1 BUSES**

The parents of students living along Buffalo Creek and in the Dome Rock area will complete a permission slip granting permission for their child or children to be let off the bus at an alternate location, and for their children to use alternative transportation if necessary. Any parents of children who would like for their child to be held at Green's Store will be allowed to participate in this program as well. Permission slips will be provided to and collected from affected parents by the Jeffco Sheriff's Department. The BPIA Crisis Committee should provide updated names and phone numbers for authorized drivers to transport children to their homes, or to a pre-designated location at the request of the parents. At the time of this publication, the authorized drivers are as follows:

<b>Name</b>	<b>Phone Number</b>
Pat Lang	838-4164
Grant Macdonald	838-6352 or 838-0106
Page Whitesides	838-8204
Jeffco OEM	271-8215 or 271-8526

**I. TRAINING FOR CITIZENS IN THE FLOOD HAZARD AREAS**

Assistance will be given to the Buffalo Creek citizens by Jeffco OEM, Jeffco Sheriff's Department, North Fork Fire Department, and the Buffalo Park Improvement Association. The following items will be discussed so that residents may better protect themselves:

1. Flood Mitigation
2. Explanation of the emergency response plan and other plans the Jeffco may implement
3. Review of the citizens roles in the event of a flash flood watch, warning, or actual flooding



### **III. FLOOD HAZARD MITIGATION**

#### **A. REHABILITATION OF PRIVATE LANDS**

The Colorado State Forest Service (CSFS) has been involved with rehabilitation of private lands in the Buffalo Creek vicinity. In particular, they have been working with land owners in the Sand Draw and Spring Gulch watersheds. As of October 1996, three Forest Stewardship plans have been completed that address rehabilitation on 197 acres in those areas.

As part of the effort, 250 linear feet of straw bale dams have been placed, 400 pounds of grass seed have been spread, 400 trees have been planted, and 600 trees have been purchased for Spring planting. The labor expended to date includes 300 hours of volunteer service, 30 hours of CSFS technical assistance, and 4 hours of CSFS environmental education.

Another project which is now pending includes the purchase of 500 or more tree seedlings by the Rocky Mountain News. Those trees will be planted next spring by CSFS personnel or by volunteers.

#### **B. STRUCTURAL MITIGATION**

Mitigation practices can involve temporary or permanent structural measures such as sandbags, floodwalls, levees, channel improvements, elevation of property, and floodproofing/retrofitting. The descriptions below are very brief and are intended to provide an awareness of the alternatives available. There are numerous mitigation documents available, and the CWCB can provide further information and assistance to interested parties. The Colorado Office of Emergency Management and the Federal Emergency Management Agency have information and expertise in these areas as well.

##### Temporary Measures

Sandbags have long been used as a temporary flood control measure. The basic supplies required for an emergency sandbag levee are:

- Sandbags (cloth or plastic)
- Source of Sand
- Polyethylene (Poly)
- Heavy Equipment
- Shovels, Wheelbarrows, and other hand tools
- People

Some general tips on how a sandbag levee should be created:

- The sandbag levee requires careful and well-planned placement.
- A properly filled sand bag is only half-full, and weighs about 40 pounds.
- The open end of a filled sandbag should be folded over, not stitched or tied.
- A key trench should be excavated to a depth of 4 to 6 inches and a width of 18 to 24 inches prior to placing any sandbags.

- Poly should be placed in the trench and anchored with several sandbags. A sufficient width of the poly is placed on the water side of the levee.
- Sandbags should be stacked in alternating rows, similar to the alternating joints of a brick wall.
- Sandbags should be stacked in a pyramidal structure using a 3 to 1 ratio of the base width to the height.
- The elevation of the levee should be maintained to the desired level of protection.
- The poly sheeting will provide a water proof cap, once the levee has been built.
- Sandbags are placed to secure the poly on top of the levee.
- Levees should be kept at least 6 feet from foundation or basement walls.

Figure 1 depicts a typical cross-section of a properly constructed sandbag levee.

Straw bale dams can be constructed in streams and along properties for flood and sediment control purposes. The straw bales are used to slow the velocity of water moving downslope, reduce amount of runoff by allowing infiltration, and reduce amount of sediment moving downslope. The straw bale placement will be accomplished by hand crews. Figure 2 presents an installation guide for straw bales.

### Flood Proofing

Flood proofing is defined as “any combination of structural or non-structural changes or adjustments incorporated in the design, construction, or alteration of individual buildings or properties that will reduce flood damages.” Simply stated, flood proofing includes any effort property owners may take to reduce flood damage to buildings and their contents. Floodproofing can benefit the property owner by reducing future flood damages and the inconveniences due to cleanup and repair. Other benefits may include less time off work, improved health and safety, and other intangible benefits. There are three general classifications of floodproofed structures: 1) Permanent floodproofing which does not require human action to initiate, 2) Contingent floodproofing which requires human action at the time of flood warning, and 3) Emergency measures used and initiated at the time of flooding. Some of the most common types of floodproofing practices are described below.

### Elevation

Elevation involves raising a building in place so that the lowest floor is above the flood level for which protection is being provided. Buildings can be elevated on several different types of foundations including raised foundation walls or an open foundation on piers, posts, or piles. Buildings may also be elevated by filling the property to raise the ground elevation on which the structure sits.

# Flood Control Procedures

## Use Poly with Sandbags for best protection!

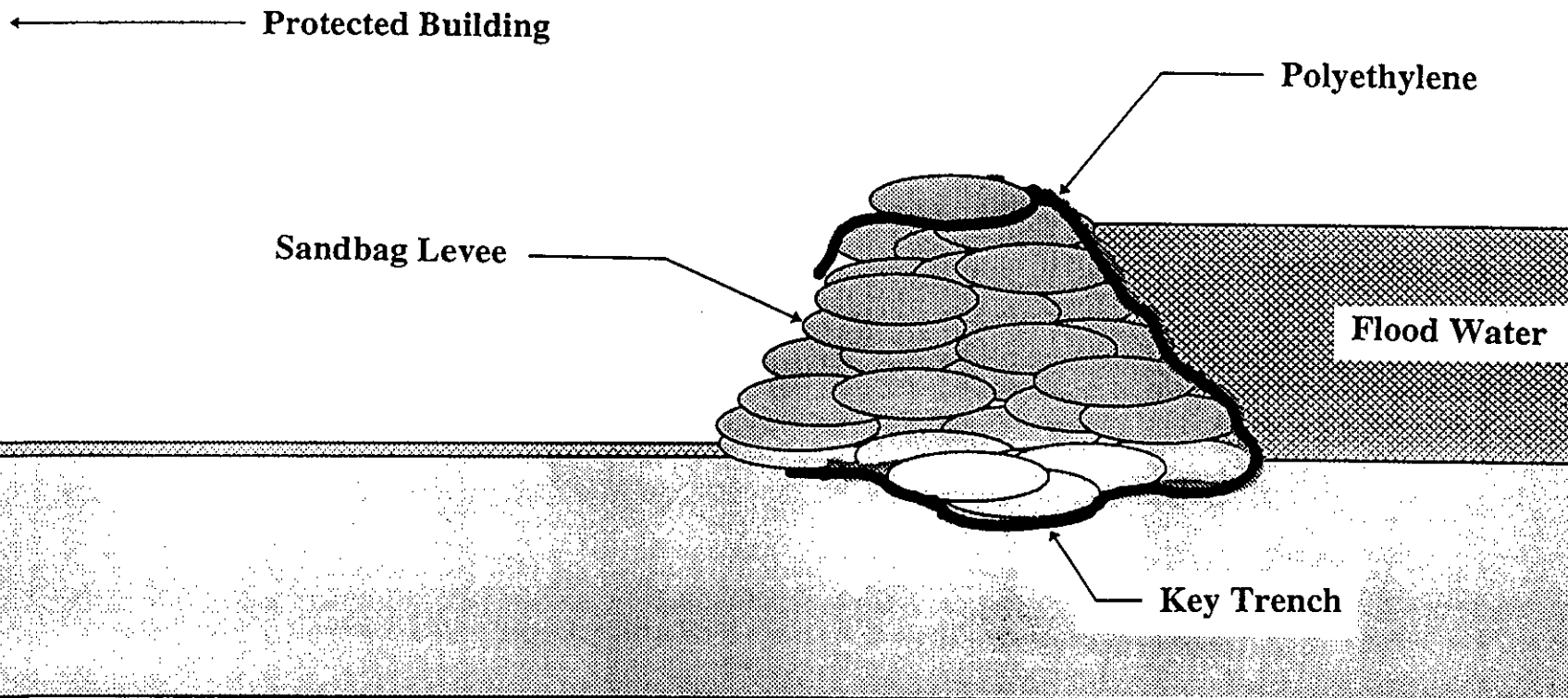
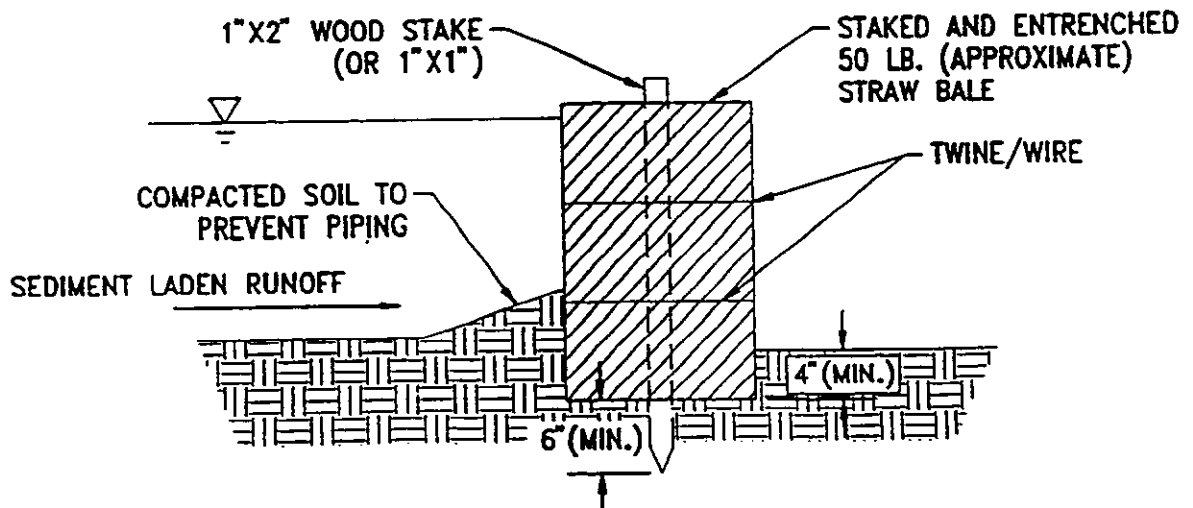
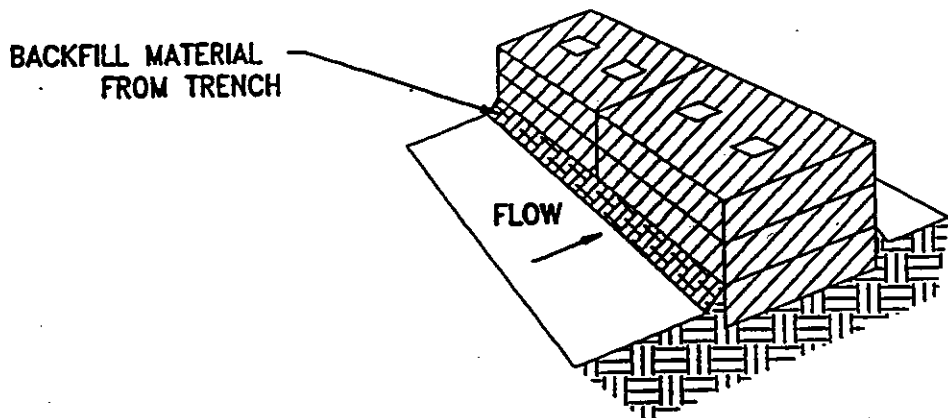
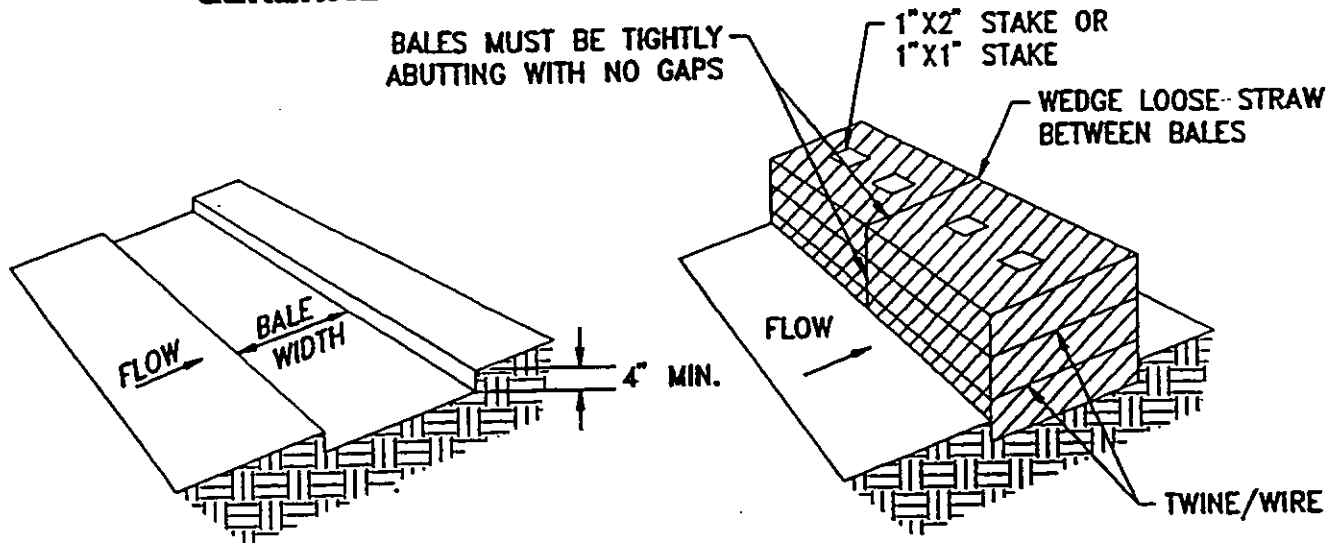


Figure 1

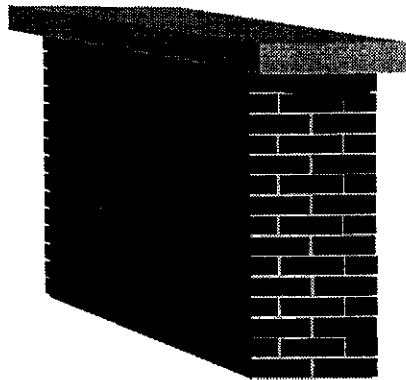
## GENERAL INSTALLATION OF STRAW BALES



CROSS-SECTION OF A PROPERLY INSTALLED STRAW BALE

### Floodwalls and Levees

Floodwalls and levees are free standing structures that prevent floodwaters from encroaching into the protected buildings. They may completely surround the building or protect only the low side of the property. Construction of floodwalls and levees may require local, state, and/or federal permits in order to protect other properties from adverse impacts, to avoid filling in wetlands, and to maintain regulatory floodways. The desired aesthetics of the neighborhood should also be taken into account when considering a floodwall or levee. The most important consideration is that property owners who have constructed a floodwall or levee should not have a false sense of security about their property protection. The protected area should always be evacuated prior to flooding.



### Dry Flood Proofing

This technique involves sealing building walls with waterproofing compounds, impermeable sheeting, or other materials and using shields for covering and protecting openings from floodwaters. Dry flood proofing works best on structures in the flood fringe where the flows are shallow with low velocities. It is not generally recommended for buildings with a basement or a crawl space due to underseepage problems that can occur. Building walls can be protected to a height of about three feet, depending on building construction.

## **C. NON-STRUCTURAL MITIGATION**

Mitigation can and should also include equally effective non-structural measures such as flood insurance, emergency preparedness, public education and awareness, and acquisition and relocation of structures. These measures are briefly described below. There are numerous mitigation documents available, and the CWCBC can provide further information and assistance to interested parties. The Colorado Office of Emergency Management and the Federal Emergency Management Agency have information and expertise in these areas as well.

### Flood Insurance

The National Flood Insurance Program (NFIP) is a federally subsidized program that is available to any property owner whether or not the building is in a floodplain. Insurance is sold through a private insurance agent who wants to sell it in a community who has joined the program. As of August 5, 1986, Jefferson County has been participating in this program. The NFIP is based on an agreement between local communities and the federal government which states that if a community will implement measures to reduce future flood risks to new construction or substantial reconstruction, the federal government will make flood insurance available within the community as

financial protection against flood losses which do occur. **It is very important to know that most homeowner's insurance policies do not cover losses from flooding. The only way to get federally-backed flood coverage is through the NFIP.** It is interesting to note that about one third of all flood insurance claims come from outside of the mapped regulatory floodplain areas (100-year floodplains). Homeowners may check with their local insurance agent to find out more about flood insurance coverages and costs.

#### Emergency Preparedness

Sometimes there is no substitute for the motto "Be Prepared." By taking some simple and low-cost precautionary measures at home, individuals and families can help to minimize the devastation caused by a flood event, and they may even save their own lives. Section IV presents tips to minimize loss of life and property in the event of a flood. These tips should be studied and discussed by family members before a flood event occurs.

#### Public Education and Awareness

Residents of the community, emergency personnel, hikers, campers, roadway users, and anyone else who visits Buffalo Creek needs to be made aware or reminded of the flash-flood hazards in the area. Community members, the volunteer fire department, the Jefferson County Sheriff's Department, and the Jefferson County emergency management personnel will need to serve as the key players in public education and awareness.

## **IV. FLOOD HAZARD AWARENESS**

### **A. STORM EVENTS**

The summer storm that produced flash flooding in the Buffalo Creek area was a typical convective type cloudburst event. This type of event is not uncommon along the foothills and plains in eastern Colorado. Storms like this form quickly and can produce large amounts of rainfall, hail, and severe weather conditions within a short amount of time.

At this time, only preliminary information is available describing the particular storm over Buffalo Creek. The information is based on field analyses, rain gage information, and interviews with witnesses and local residents. The most intense rainfall amounts are estimated to be from 2 inches to 4 inches within 30 to 90 minutes. The storm may have covered an area between 10 and 30 square miles. To provide a point of reference, the 100-year, 1-hour precipitation depth for southern Jefferson County is reported to be about 2.1 inches according to the Jefferson County Storm Drainage Design and Criteria Manual.

It is important to note that the flood peaks on Sand Draw, Spring Gulch, Buffalo Creek, and other nearby tributaries occurred within less than one hour from the start of the heavy rainfall. Flow velocities in some streams were at least 15 to 20 feet per second. This situation, known as flash flooding, is extremely dangerous. Residents, recreationists, and visitors should be aware of and prepared for future flash flooding that could potentially occur in the area. Property damage and loss of life is always a possibility during flash flooding. The power of a flash flood event should not be underestimated!

### **B. WATERSHED RECOVERY**

The natural recovery of the burned areas in the Buffalo Creek vicinity could be a long process. Fortunately, with the aggressive reclamation actions by the U.S. Forest Service and the Colorado State Forest Service, the initial stages of the recovery should be enhanced and accelerated. The hydrologic response of the burned watersheds will depend on the level of vegetative and soil surface recovery. Following are some key phases to the recovery process:

- Break-up of hydrophobic (water repellent) soils
- Recovery of native grasses, forbs, and shrubs
- Recovery of native trees
- Recovery of humus layer (organic layer at soil surface)

The effects of an intense fire on the watershed's soil structure and hydrology can be significant. The following key points about the effects of fire on soil and hydrology were extracted from U.S. Forest Service publications.

- For arid areas of the U.S., vegetative regrowth after a severe burning can be very slow.
- Coarse textured soils are more likely to become highly water repellent than fine clay soils.
- Lodgepole and Ponderosa Pine forests have displayed high water repellency after burning.

- Soil formed from granitic parent material is sensitive to erosion. The erosion rate is a function of the burn intensity.
- For recently burned watersheds, peak streamflows have been reported to be 2 to 60 times greater than normal after a heavy rain.

Unfortunately, the Buffalo Creek area fits all of those categories. Strategic planning and mitigation can help to reduce the adverse affects caused by the fire. Previous research suggests that the natural break-up of the hydrophobic soils can occur as soon as 1 to 2 years after the fire. The return of certain grasses and forbs should occur fairly rapidly as well. It will take a much longer time for larger trees and shrubs to develop in the burned watershed. It is likely that flash flooding could be a high risk over the next several years, and could then be a moderate risk for many years thereafter. After the Black Tiger Run fire in Boulder County, the Bureau of Reclamation observed that sediment production and runoff were most significant immediately following the fire. By the next summer season, sediment production had decreased significantly.

### **C. PRE-FIRE MANAGEMENT**

In order to help prevent losses from future fires and floods, the following pre-fire mitigation techniques are suggested:

#### **Defensible Space**

The implementation of this measure is can dramatically improve the survival rate of a structure during a fire. It involves the reduction of fuel loading by thinning or eliminating certain types of vegetation adjacent to the building. The distance required for the defensible space around the perimeter of the building is dependent on several factors including topography and fuel type. The minimum defensible space is generally recommended to be 30 feet.

#### **Building Materials**

The type of materials used for the construction of a building can also have a significant effect on its survivability during a fire. A roof covering consisting of clay or concrete tile, composite shingle, or metal can help to protect the building from a fire. A roofing material such as cedar shake shingles will reduce the chance of the building's survival. Exterior finishes such as brick or stucco are more fire resistant than finishes such as wood siding or logs.

#### **Fuel Breaks**

Fuel breaks, as the name implies, provide a line of defense where a fire theoretically will not cross and continue to burn on the other side of the break. A roadway can be used as the basis for a fuel break, combined with forest thinning on one or both sides of the road. The required width of thinning depends on factors such as topography and fuel type. The minimum recommended width for a fuel break is 200 feet.

#### **Forest Wide Thinning**

The objectives of forest wide thinning are to reduce fuel loading, increase forest health, and improve aesthetics. In dense forests, fires quickly change from relatively harmless ground fires to



catastrophic crown fires because of the “fuel ladder” effect. In a thinned forest, the fire will likely stay a ground fire, and will probably do little damage.

#### **IV. TIPS TO MINIMIZE LOSS OF LIFE AND PROPERTY IN THE EVENT OF A FLOOD**

The following tips are from the Federal Emergency Management Agency’s National Flood Insurance Program and should be used as suggested guidelines for action before, during, and after a flood.

##### STEPS TO TAKE TODAY

- ⇒ **Make an itemized list of personal property**, including furnishings, clothing, and valuables. Photographs of your home - inside and out are helpful. These will assist an adjuster in settling claims and will help prove uninsured losses, which are tax deductible.
- ⇒ **Learn the safest route from your home or place of business** to high, safe ground if you should have to evacuate in a hurry.
- ⇒ **Keep a portable radio, emergency cooking equipment, and flashlights in working order.**
- ⇒ **Persons who live in frequently flooded areas should keep on hand materials** such as sandbags, plywood, plastic sheeting, and lumber which can be used to protect private property. (Remember, sandbags should not be stacked directly against the outer walls of a building, since, when wet, the bags may create added pressure on the foundation.)
- ⇒ **Buy flood insurance.** You should contact your property/casualty agent or broker about eligibility for flood insurance, which is offered through the National Flood Insurance Program. Generally, there is a five-day waiting period for this policy to become effective, so don’t wait until the last minute to apply.
- ⇒ **Keep your insurance policies and a list of personal property** in a safe place, such as a safe-deposit box.
- ⇒ **Know the name and location** of the agent(s) who issued the policies.

##### WHEN THE FLOOD COMES

**The safety of your family is the most important consideration. Since flood waters can rise very rapidly, you should be prepared to evacuate before the water level reaches your property.**

- ⇒ **Keep a battery-powered radio** tuned to a local station, and follow all emergency instructions.
  
- ⇒ **If you're caught in the house by sudden rising water**, move to the second floor and, if necessary, to the roof. Take warm clothing, a flashlight, and a portable radio with you. Then wait for help, don't try to swim to safety. Rescue teams will be looking for you.
- ⇒ **When outside the house, remember - floods are deceptive.** Try to avoid flooded areas, and don't attempt to walk through floodwaters that are more than knee deep.
  
- ⇒ **If, and only if, time permits . . .** there are several precautionary steps that can be taken.
  - ◆ Turn off all utilities at the main power switch and close the main gas valve if evacuation appears necessary . Do not touch any electrical equipment unless it is in a dry area and you are standing on a piece of dry wood while wearing rubber gloves and rubber soled boots or shoes.
  
  - ◆ Move valuable papers, furs, jewelry, clothing, and other contents to upper floors or higher elevations.
  
  - ◆ Fill bathtubs, sinks and jugs with clean water in case regular supplies are contaminated. You can sanitize these items by first rinsing with bleach.
  
  - ◆ Board up windows or protect them with storm shutters or tape to prevent flying glass.
  
  - ◆ Bring outdoor possessions inside the house or tie them down securely. This includes lawn furniture, garbage cans, tools, signs, and other movable objects that might be swept away or hurled about.
  
- ⇒ **If it is safe to evacuate by car**, you should consider doing the following:
  - ◆ Stock the car with non perishable foods (like canned goods), a plastic container of water, blankets, first aid kit, flashlights, dry clothing, and any special medication needed by your family.
  
  - ◆ Do not drive where water is over the roads. Parts of the roads may already be washed out.
  
  - ◆ If your car stalls out in a flooded area, abandon it as soon as possible. Floodwaters can rise rapidly and sweep a car (and its occupants) away. Many deaths have resulted from attempts to move stalled vehicles.

## AFTER THE FLOOD

- ⇒ **If your home, apartment or business has suffered flood damage**, immediately call the agent or broker who handles your flood insurance policy. The agent will then submit a loss form to the National Flood Insurance Program. An adjuster will be assigned to inspect your property as soon as possible.
- ⇒ **Prior to entering a building**, check for structural damage. Make sure it is not in danger of collapsing. Turn off any outside gas lines at the meter or tank, and let the house air for several minutes to remove foul odors or escaping gas.
- ⇒ **Upon entering the building**, do not use open flame as a source of light since gas may still be trapped inside; a battery-operated flashlight is ideal.
- ⇒ **Watch for electrical shorts or live wires** before making certain that the main power switch is turned off. Do not turn on any lights or appliances until an electrician has checked the system for short circuits.
- ⇒ **Cover broken windows and holes** in the roof or walls to prevent further weather damage.
- ⇒ **Proceed with immediate cleanup measures** to prevent any health hazards. Perishable items which pose a health problem should be listed and photographed before discarding. Throw out fresh food and previously opened medicines that have come in contact with flood waters.
- ⇒ **Water for drinking and food preparation** should be boiled vigorously for ten minutes (until the public water system has been declared safe.) Another method of disinfecting is to mix 1/2 teaspoon of liquid commercial bleach with 2-1/2 gallons of water . . . let stand for five minutes before using. The flat taste can be removed by pouring the water from one container to another or adding a pinch of salt. In an emergency, water may be obtained by draining a hot water tank or melting ice cubes.
- ⇒ **Refrigerators, sofas, and other hard goods** should be hosed off and kept for the adjuster's inspection. A good deodorizer when cleaning major kitchen appliances is to add one teaspoon of baking soda to a quart of water. Any partially damaged items should be dried and aired; the adjuster will make recommendations as to their repair or disposal. Take pictures of the damage done to your building and contents.
- ⇒ **Take all wooden furniture outdoors**, but keep it out of direct sunlight to prevent warping. A garage or carport is a good place for drying. Remove drawers and other moving parts as soon as possible, but do not pry open swollen drawers from the front. Instead, remove the backing and push the drawers out.

**Shovel out mud while it is still moist** to give walls and floors a chance to dry. Once plastered walls have dried, brush off loose dirt. Wash with a mild soap solution and rinse with clean water; always start at the bottom and work up. Ceilings are done last. Special

attention at this early stage should also be paid to cleaning out heating and plumbing systems.

- ⇒ **Mildew can be removed** from dry wood with a solution of 4 to 6 tablespoons of tri-sodium phosphate (TSP), 1 cup liquid chlorine bleach, and 1 gallon water.
- ⇒ **Clean metal at once** then wipe with a kerosene-soaked cloth. A light coat of oil will prevent iron from rusting. Scour all utensils, and, if necessary, use fine steel wool on unpolished surfaces. Aluminum may be brightened by scrubbing with a solution of vinegar, cream of tartar, and hot water.
- ⇒ **Flooded basements should be drained and cleaned as soon as possible.** However, structural damage can occur by pumping out the water too quickly. After the flood waters around your property have subsided, begin draining the basement in stages, about 1/3 of the water volume each day.

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