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13 SECTION

Disaster and Emergency Response

UTAH STATE WATER PLAN - WEBER RIVER BASIN PLAN

Natural disasters strike with little or no notice; and, in too many instances, result in significant property damage and loss of life. However, the extent of damage and personal injury can be minimized through adequate preparation.

13.1 Introduction

Natural disasters are random events that can occur at any point in time and location. As random events, major natural disasters are too often associated with the distant future. As a result, there can be a sense of false security between private individuals and some public agencies regarding the timing, location, and level of damage that may be generated from a major disaster.

Coordinated disaster response programs need to be established by local, state, and federal agencies that provide basic life supporting services in times of extreme emergencies. These programs should be constantly reviewed and upgraded to deal with the ever-changing potential of property damage and personal injury.

This section of the *Weber River Basin Plan* discusses the extent of existing emergency response programs including basic disaster related information and data pertinent to the Weber River Basin. Specific discussions include 1) most common, or probable, types of disasters associated with the construction and operation of water related facilities; 2) organizations and programs that provide public assistance in the event of major disasters; and, 3) measures that can be taken to lessen the extent of property damage and personal injury.

13.2 Background

The history of "water-related" natural disasters in the Weber River Basin includes a number of major flood and drought events. The floods of the early 1980's resulted in millions of dollars in property damage to homes, businesses and a number of public utilities. In recent memory, the drought year of 1977 resulted in record low water levels within a number of basin reservoirs; which subsequently threatened the implementation of restrictions on a number of domestic and commercial water use primarily in Weber and Davis counties.

Although the floods and droughts of the recent past have caused significant property damage, inconvenience and in some cases, personal suffering, future disasters of even greater magnitude and scope of destruction have a very real possibility of occurrence. The flood and drought events that have occurred in recent years have all been considered as roughly 100-year events. However, it is not statistically out of the question to expect disasters exceeding 100-year events within the immediate and foreseeable future. Most construction standards and design criteria require major dams with a high potential for property damage and loss of life to withstand natural catastrophic disasters. However, such high levels of protection for other flood control measures are often cost and/or environmentally prohibitive to build.

Although flood and drought are most commonly associated with major disasters within the intermountain area, perhaps the greatest potential for an extreme disaster is from the failure of one or more dams in the event of a severe earthquake. Northern Utah is home to a number of faults that have been relatively quiet for a number of years with the exception of the 1962 Cache Valley quake that resulted in more than $1.0 million in property damage. Although the Cache Valley event was significant in terms of property loss, it was not significant in terms

of intensity. The quake was measured at 5.2 on the Richter scale which is generally considered as below a level of intensity that may potentially cause extensive damage to large dams and other public works facilities.

The lack of significant seismic activity in the recent past cannot be considered as a sign of minimal or insignificant activity in the foreseeable future. Although no one can accurately predict seismic activity, it is commonly accepted that as time progresses with little or no activity, the likelihood of a major seismic event in the immediate future escalates. The occurrence of a major seismic event with the intensity sufficient to cause structural damage to basin dams is not beyond what can be expected given existing geologic conditions.

Most public agencies and private organizations have developed comprehensive emergency response and management plans that effectively incorporate the combined resources of local, state and federal agencies when major disasters strike. Where there are no plans, definitive action should be taken at the earliest point in time to develop them. The development of a natural disaster plan usually starts with aggressive public awareness campaigns designed to generate the support of all citizenry impacted by a potential natural disaster.

13.3 Organizations and Regulations

The Division of Comprehensive Emergency Management (CEM) is responsible for generating interest and developing emergency response and management plans. Under the direction of CEM, towns, cities and counties are to prepare emergency response and management plans that are comprehensive in scope but allow for effective and close cooperation with state and federal agencies in the event of a major disaster beyond local capabilities. CEM also works closely with other state and federal agencies to assure needed manpower, equipment, materials and funding reach areas seriously impacted by a major disaster.

The initial response to a natural disaster is the responsibility of local city and county agencies. Other agencies, including state and federal agencies, get involved after the initial response. These agencies are normally responsible for the long term management of a natural disaster and work within established procedural guidelines and organizational structures. State and federal support agencies include the Federal Emergency Management Agency (FEMA), the Governor's Office, and the heads of all state departments and divisions.

Of particular importance is the National Flood Insurance Program (NFIP) administered by FEMA. The NFIP facilitates the ability of private insurance companies to reconstruct damaged or destroyed personal property after major flooding events. Although the NFIP offers considerable benefits to local communities, participation in the program is not mandatory. Communities that do not participate in the NFIP make it difficult, if not impossible, for business entities and private individuals to secure federal flood insurance and loans on municipal and commercial developments.

Communities in the Weber River Basin currently participating in the National Flood Insurance Program (NFIP) include the cities of Bountiful, West Bountiful, Centerville, Clearfield, Farmington, Fruit Heights, Kaysville, Layton, North Salt Lake, Woods Cross, Morgan, Coalville, Kamas, Oakely, Park City, Ogden, North Ogden, Plain City, Pleasant View, Riverdale, Roy, South Ogden, and Uintah. In addition, all four of the counties actively participate in the NFIP.

Other individuals, agencies, public and private organizations that wish to be covered under the program should initiate the process by expressing their concerns to local public officials. To obtain flood insurance under the NFIP, counties or cities must pass FEMA approved flood plain ordinances. When these ordinances are in place, private insurance companies can sell flood insurance at lower rates.

13.3.1 Local

To provide an effective "first response" to a natural disaster, local governments have been directed by both state and federal disaster management agencies to:

- prepare an operations plan for the coordination of local and county emergency responses with appropriate federal and state agencies;
- provide the necessary resources (including special supplies and equipment) to support natural disaster emergency relief operations and list these resources, indicating the procedures to be followed for obtaining the assistance and/or use of resources in the emergency operations plans;
- assign and train personnel required to perform natural disaster relief functions;
- provide the State Disaster Coordinating Officer (SDCO) with copies of current emergency operations plans; and
- recommend changes to state and local government emergency disaster relief procedures and assigned functions whenever deemed necessary.

In the event of a disaster, assistance is first rendered by local agencies with additional assistance provided by state and federal agencies as needed. The first local response is directed by the assigned Local Disaster Coordinating Officer who is responsible for coordinating all efforts by local fire departments, police, emergency medical staff and utility agencies. The Local Disaster Coordinating Officer will establish a local operations center from which to direct all emergency and first response efforts and to report the status of all assistance and relief efforts to state and federal authorities.

13.3.2 State

As part of the Utah's overall disaster response plan, selected state agencies should develop individual plans compatible and consistent with their full-time assigned responsibilities. The plan should outline specific procedures offering assistance and aid to reconstruct or reestablish damaged facilities.

In the event property damage and personal injury exceed the capability of local agencies, the governor, at his discretion, can declare a "State of Emergency" and provide state assistance and request federal assistance. Once a "State of Emergency" is declared, the Governor's State Disaster Coordinating Officer (SDCO) assumes all responsibility over the process of distributing both state and federal assistance to local disaster victims. The SDCO will work with, and generally manage, the activities of local disaster coordinators so assistance and aid are properly distributed to disaster victims in an efficient and timely manner.

The SDCO also serves as the governor's primary point of contact for all disaster related correspondence and general information between the Federal Coordinating Officer and state and local government disaster management officials.

13.3.3 Federal

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to reduce the loss of life and property and rising disaster relief costs resulting from severe flooding events. The program was designed to achieve a number of objectives to lessen the impact of a major natural disaster. A more detailed discussion about the NFIP is offered in the State Water Plan.

When a state of emergency is declared by the governor, additional assistance can be requested at the federal level. At this point, the President can declare a "Federal Emergency" or "Major Disaster." This makes the impacted state eligible for federal emergency assistance through FEMA programs under Public Law (PL) 93-288. The assistance is generally distributed to individuals and public agencies in immediate need of help.

A "federal emergency" is limited to funding that may be required to save lives, protect property, restore essential public services that threaten public health, or reduce the threat of further loss of property and personal injury. A "Major Disaster" provides funding to restore both public and private damaged property and to change existing conditions, either manmade or natural, that would contribute to future disasters of the type and magnitude previously experienced.

Aid and assistance from these federal disaster programs must be distributed under the direction of the Federal Coordinating Officer in direct cooperation with both the Federal Emergency Management Agency (FEMA) and the State Disaster Coordinating Officer (SDCO). At the local level, administration and distribution of assistance will be the responsibility of state and federal personnel assigned to the disaster field offices.

13.4 Flooding

The most common natural disasters within the Weber River Basin are flooding events. Major flooding has occurred from its initial settlement to the most recent events of the mid-1980s. The Weber and Ogden rivers are prone to regular flooding ranging in magnitude from localized short duration and manageable flows to major out-of-bank events. Flooding has occurred throughout the basin in both the upper and lower drainages. Major flooding has resulted in substantial property damage in Morgan, Coalville, Snyderville Basin and Kamas within the upper Weber River drainage. The lower drainage is prone to major flooding events primarily within small and isolated drainages along the western foothills of the Wasatch Front.

13.4.1 Weber and Ogden River Systems

The completion of three major water reclamation projects in the Weber and Ogden rivers have effectively reduced the frequency of major flooding events in the lower portions of the drainage. However, isolated instances of flash flooding and high releases from local reservoirs have occurred during years with exceptionally high runoff. Property damage that can be associated with periodic high releases from basin reservoirs can be minimized through the passage of stricter zoning

ordinances and scheduled improvements to critical drainages with hydraulic deficiencies.

The reclamation projects completed within the Weber River Basin include multipurpose dams and reservoirs which provide flood control. The combined annual flood storage within the major basin reservoirs is in excess of 300,000 acre-feet which has had a significant impact on the magnitude of flooding in the lower Weber River system.

In general, flood maps and regulations dealing with the commercial and residential development of land within known flood plains are based on 100-year events. The 100-year flood event for the Weber River has been estimated by the Corps of Engineers at 8,300 cfs upstream of the Ogden River confluence and 8,500 cfs downstream of the confluence. Figure 13-1 shows the 100-year flood plain from the mouth of Weber Canyon to its intersection with U.S. Highway 89. More details are given in FEMA maps provided for the NFIP.

Although the construction of major water storage and flood control dams and reservoirs have reduced the potential for major flood events, the danger of significant property damage and personal injury still exists. As an example, flash floods in the low lying East Shore Area have occurred in recent years causing significant property damage. These storms are typically caused by intense, isolated rainfall events, or by the rapid melt of snow packs at moderate to low elevations within the upper watersheds of the basin. Flooding in these areas usually results in the spreading of flood flows over a relatively wide area. The exceptionally wet springs of 1983 and 1984 resulted in excess flood flows in both the Ogden and Weber rivers causing millions of dollars in property damage.

Before the completion of Pineview and Causey reservoirs in 1957 and 1964 respectively, periodic flooding on the Ogden River downstream of the mouth of Ogden Canyon generally ranged in magnitude from 1,000 to 3,000 cfs. Major flooding occurred on February 5, 1907 and April 24, 1936 with recorded peak flows at the mouth of Ogden Canyon near 3,300 and 3,700 cfs, respectively.

Flooding on the Ogden River occurs within Ogden Canyon and along its existing alignment through residential and commercial areas within Ogden City. Flooding within the canyon is generally confined within existing river banks and may encroach on several homes within existing flood sections of the river. Flooding within Ogden City may cause damage to homes, commercial businesses, and city operated parks adjacent to the river. A flood plain map of the Ogden River 100-year flood event is shown on Figure 13-2.

13.4.2 Great Salt Lake

Historically, the Great Salt Lake has reached elevations at or near the indicated record of 4211.6 over two extended time periods: a 10-year period from 1868 to 1878 and a brief two-year period from 1986 to 1987. The approximate one-hundred year period between the historic high water levels was marked by a considerable amount of agricultural, commercial and residential development along shore lines established by lake elevations considerably lower than the stated historic high water level. As a result, significant property damage occurred during the runoff years of 1986 and 1987. Some of the most severe damage occurred in western Weber County. Over $40 million property damage was documented at industrial plants owned and operated by Western Zirconium and Great Salt Lake Mineral companies.

13.5 Drought Problems

The Weber River Basin can be subjected to extended drought periods that potentially threaten basin water supplies to agricultural, municipal, commercial and industrial users. Extended droughts have occurred on a somewhat regular basis since the turn of the 19th century; the most severe of which occurred during the 1930s, early 1960s and mid 1970s. Primarily due to the carry-over storage capacities of the major reservoirs, rationing has never been required to meet domestic and commercial water demands in the basin.

In consideration of the current rate of growth in the state, and need for reliable sources of water in times of drought, the state has drafted a drought response plan to manage the impacts of an extended drought. The plan requires the cooperation of all state and local water-related agencies to achieve a number of common drought management objectives. More information regarding the various organizations involved with the plan, their individual responsibilities, and overall objectives can be obtained from either the Division of Water Resources or through the Department of Public Safety, Division of Comprehensive Emergency Management.

13.6 Earthquakes

Perhaps the most threatening natural disaster in the Weber River Basin is the possibility of a major earthquake. Not only would a major seismic event create a substantial loss of basic utility and transportation

Figure 13-1

LOWER WEBER RIVER 100-YEAR FLOOD PLAIN

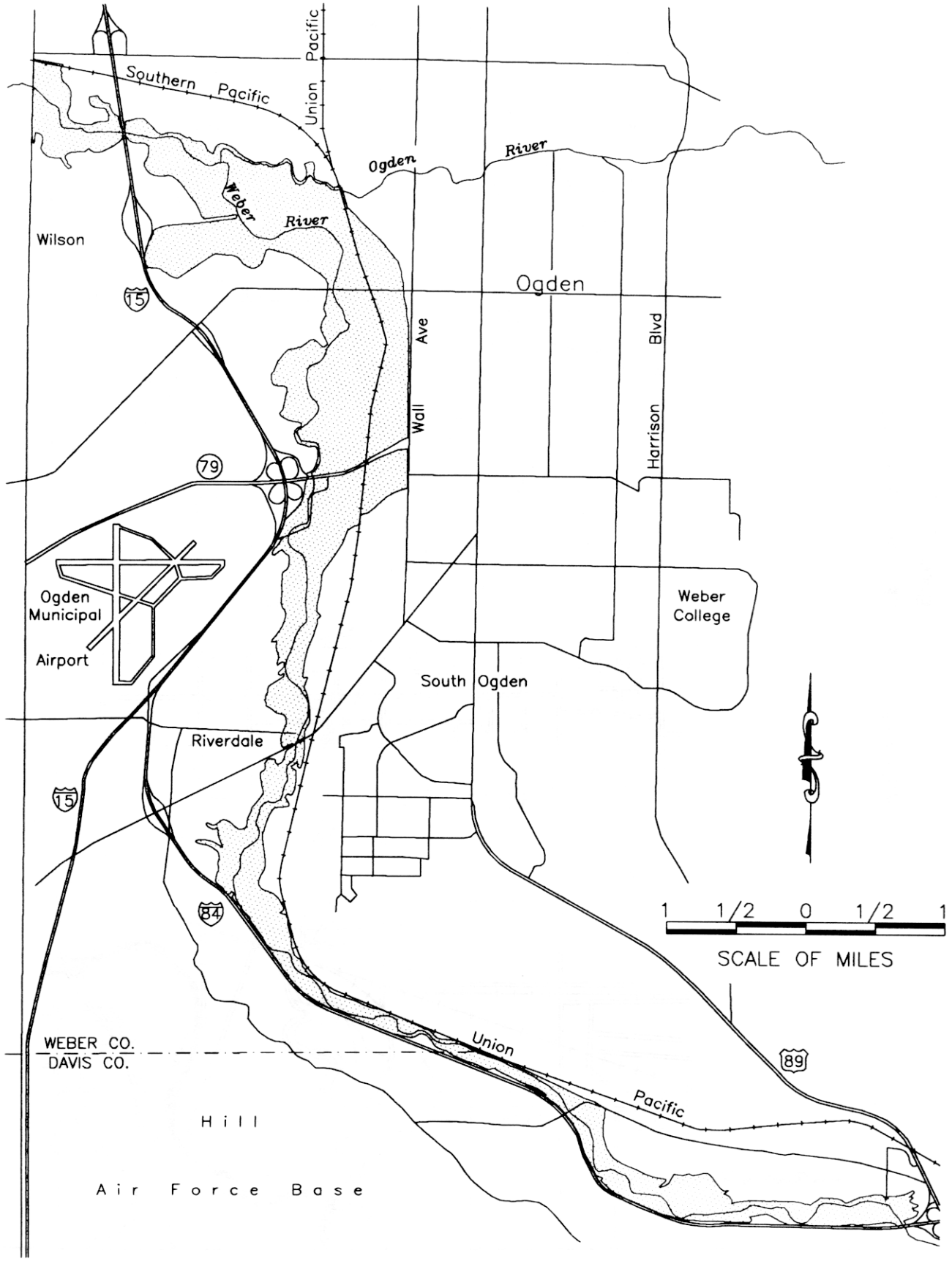
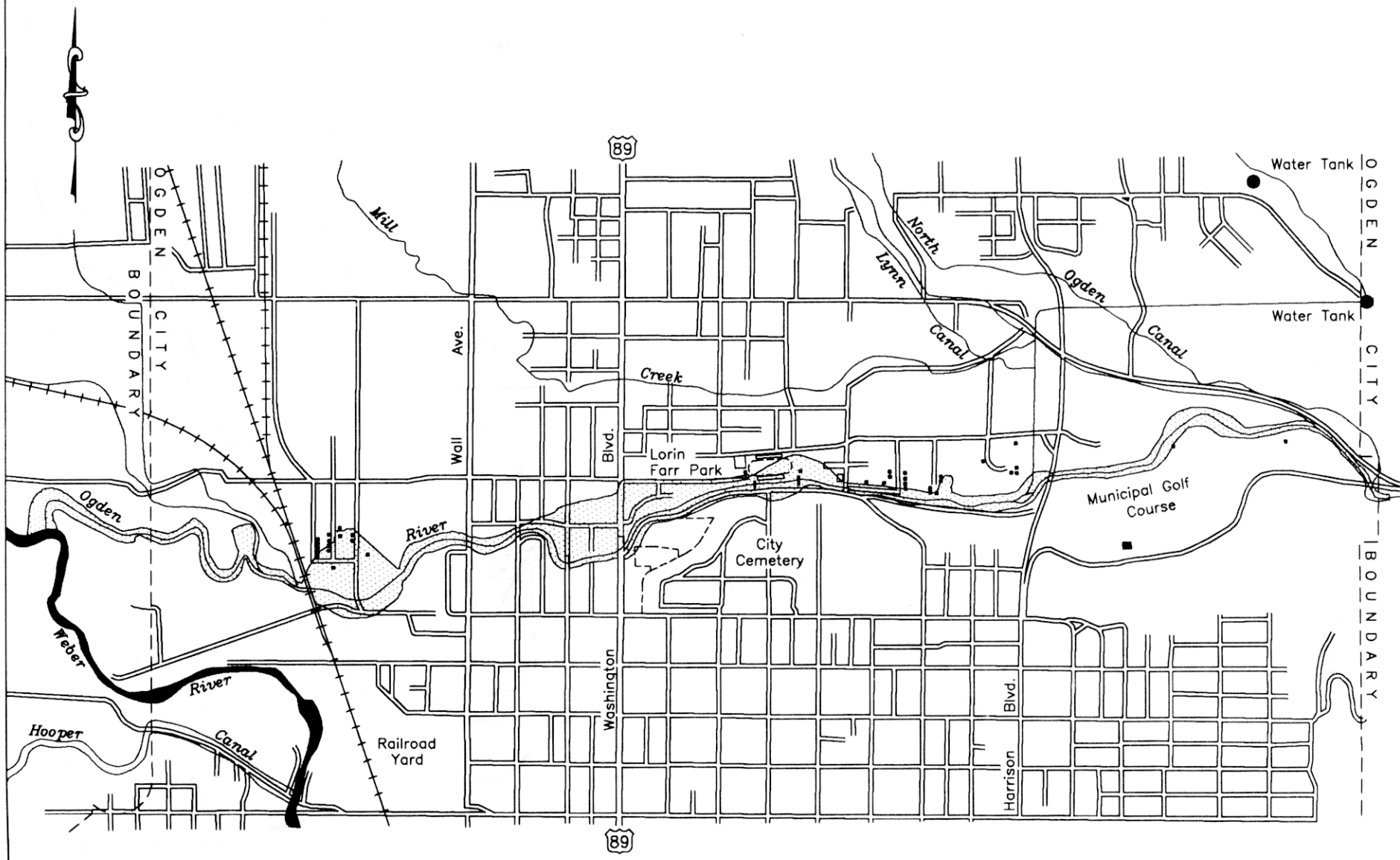


Figure 13-2

LOWER OGDEN RIVER 100-YEAR FLOOD PLAIN



service, but more significantly, it would possibly threaten the structural integrity of a significant number of local dams. With the exception of Smith & Morehouse Dam, the initial design of all existing dams on the Weber and Ogden rivers did not take into consideration failure by extreme seismic activity. Recent studies have shown the loss of one dam on either the Weber or Ogden River system would cause deaths in the range of 5,000 to 10,000 people with little or no warning.

To address the issue of seismic-related dam failures, the Bureau of Reclamation is currently re-evaluating the structural integrity of all federal dams within the basin against possible failure by extreme seismic events. These investigations have resulted in both recommendations for structural improvements and actual modifications to existing dam facilities. The most recent structural modification occurred at Pineview Dam in the Ogden Valley in 1992. Bureau investigations determined that additional fill was needed at the base of the existing dam to reduce the probability of failure by liquefaction.

Structural modifications may be required at other basin dams depending on the findings of the bureau's ongoing investigations. Major fault lines occur throughout the basin and within relative close proximity to most of the major dams. Figure 13-3 is a graphical representation of these fault lines and their relative locations to existing major dam sites.

13.7 Drought Damage Reduction Alternatives

Drought reduction alternatives generally fall in two categories: precipitation augmentation and water conservation in drought years. The former actively promotes programs to increase the amount of snow pack by cloud seeding. The later attempts to establish minimum carry-over storage goals or guidelines within existing reservoirs during extended drought periods.

It has been shown that effective cloud seeding programs increase the average annual snowpack within most watersheds by 10 to 15 percent. In the Weber River Basin, the stated increase can amount to tens-of-thousands of acre-feet of additional water supplies per water year. A more detailed discussion of cloud seeding in terms of individualized programs and projected effectiveness can be found in Section 9 Water Planning and Development.

Water conservation should always be practiced regardless of the potential for drought. Until a method is devised to accurately predict drought, managers and planners of public water systems need to actively promote water conservation within their respective service areas. This promotional effort should address water use by industrial and commercial businesses in addition to typical conservation programs for residential developments. More information on water conservation including established programs aimed at conserving water for most domestic and commercial uses are given in Section 17 Water Conservation/Education.

13.8 Mitigation Alternatives

In order to minimize the loss of life and property damage associated with major natural disasters, emergency response teams must be totally informed regarding the scope and magnitude of all possible disasters that could potentially impact a given area and be prepared to effectively execute emergency response plans within very limited time frames.
As a minimum, emergency response teams should:

- work with local, state, and federal agencies to maintain an adequate level of knowledge regarding the scope and magnitude of potential water related disasters;
- actively recruit the involvement of local, state and federal agencies to formulate emergency response plans and to take an active role in implementing emergency response plans when the need arises;
- continually assess the need to incorporate new and more effective telecommunication, medical, evacuation and general survival equipment and/or hardware with the overall execution of response plans; and
- actively promote education programs designed to inform private citizens on how to prepare for and survive during a major disaster.

13.9 Issues and Recommendations

The main issue associated with natural disasters and the execution of related emergency response plans is generally associated with the level of preparedness and/or training of emergency response personnel. Of primary importance is the development and execution of flood management plans design to mitigate excessive property damage and personal injury.

13.9.1 Flood Plain Management

Issue-Local governments need to become aware of their responsibilities as it relates to flood plain management.

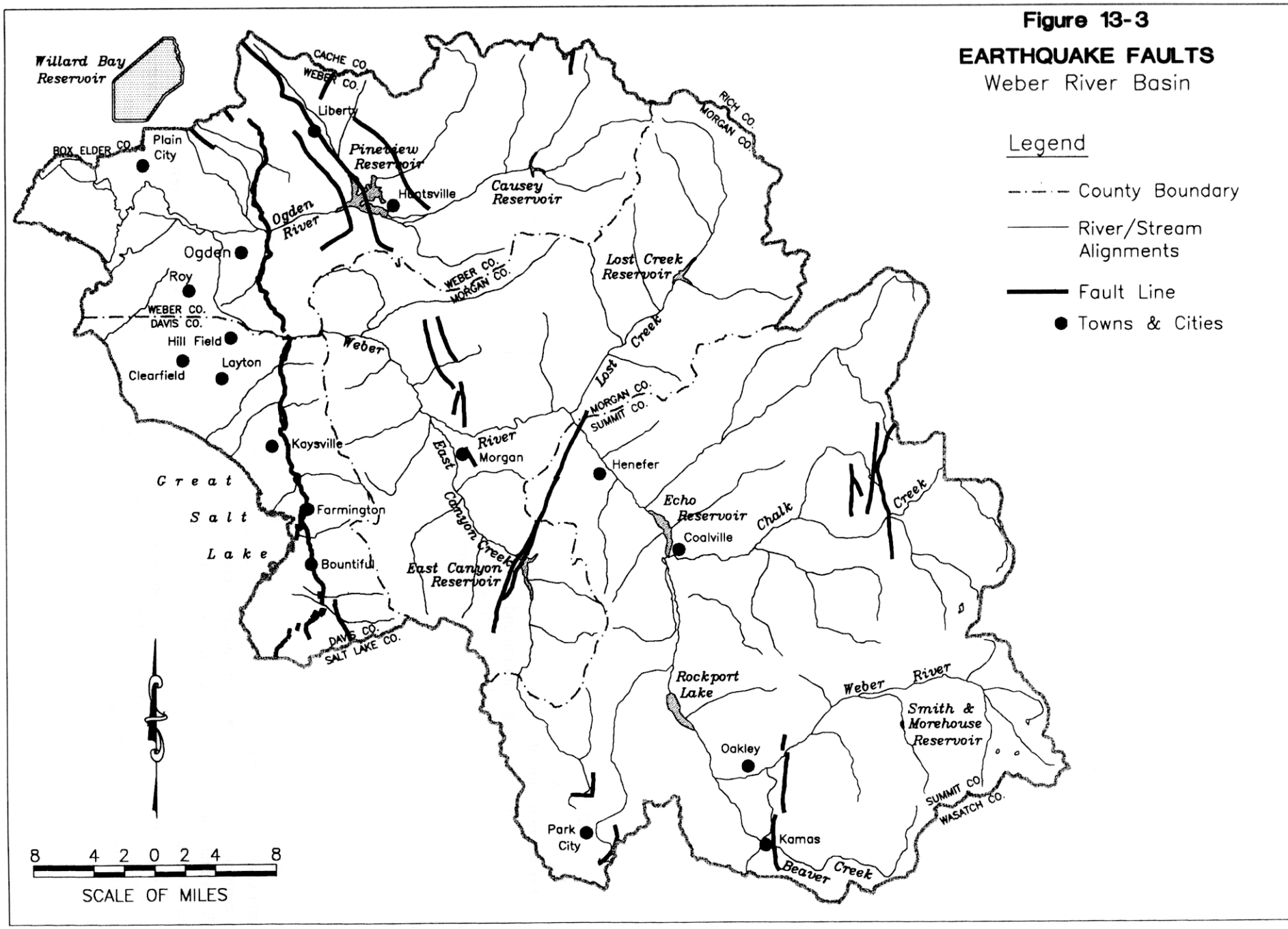


Figure 13-3

EARTHQUAKE FAULTS

Weber River Basin

Discussion-The National Flood Insurance Program (NFIP) was established by Congress in 1968 as a result of large federal outlays for structural regulations within established flood plains and disaster relief. Its purpose is to reduce flood loses; prevent unwise development in flood plains; and provide affordable flood insurance to the public. Local entities should conduct educational programs on flood hazard awareness and the benefits of participation in the NFIP.

In the event a community agrees to enact and enforce minimum floodplain management requirements as stated in the Code of Federal Regulation (CFR) Part 60.3, NFIP flood insurance is made available to private citizens to offset costs associated with a major flood.

State and federal agencies have been assigned the responsibility of assisting local communities to develop and implement comprehensive flood insurance programs. The Division of Comprehensive Emergency Management is the State Coordinating Agency for the NFIP. In this capacity, the division can assist local participating communities in the implementation of the floodplain management objectives defined by the NFIP. In addition, the Corps of Engineers, through its Flood Plain Management Program, can develop or update flood plain boundary maps at no cost for those communities in need.

Recommendation-Non-participating local entities should become qualified to participate in the National Flood Insurance Program. The Division of Comprehensive Emergency Management and Corps of Engineers can assist communities to obtain these objectives.

13.9.2 Disaster Response Plans

Issue-All communities should have a disaster response plan.

Discussion-Local governments need to increase their ability to respond to natural disasters and emergencies. Emergency Operations Plans (EOPs), also referred to as Disaster Response Plans, address disaster response and recovery activities. These plans should be prepared ahead of time allowing counties, cities and towns to coordinate efforts and define responsibilities. Decisions should be made on leadership positions and activation of response activities. Emergency Action Plans (EAPs) have also been developed, or are in the process of being developed, for all dams in the state. The Division of Comprehensive Emergency Management reviews the private dam EAPs to ensure an adequate call down list is incorporated. This review is done in cooperation with the Office of the State Engineer, Dam Safety Section.

The Division of Comprehensive Emergency Management has the statewide responsibility of planning for, responding to, recovering from and mitigating emergencies. They have developed statewide plans for disaster response. This agency can assist local entities prepare response plans for emergency situations.

Recommendation- Local communities should develop disaster response plans with the assistance of the Division of Comprehensive Emergency Management. ❖