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## Interagency Hazard Mitigation: 90-Day Post Flood Recovery Progress Report

Hazard Mitigation Team (Utah)

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# INTERAGENCY HAZARD MITIGATION

90 - DAY POST FLOOD

RECOVERY PROGRESS REPORT

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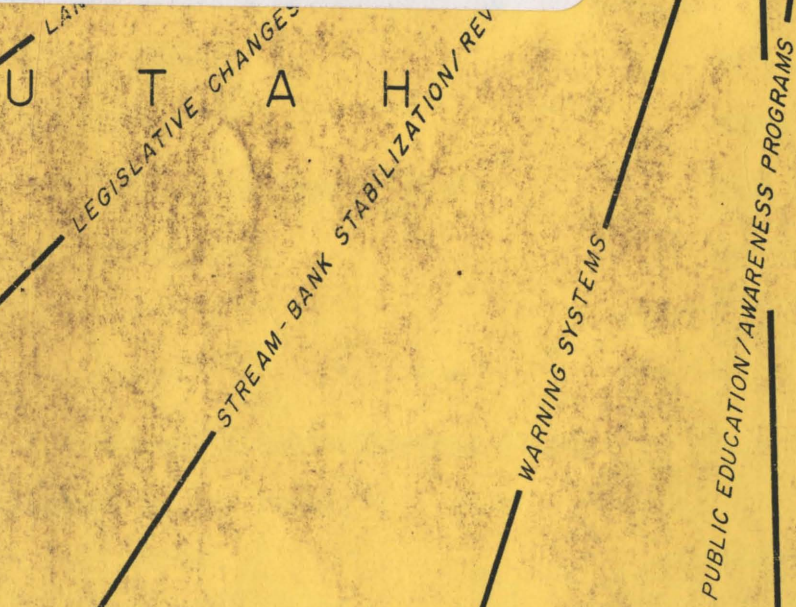


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EXECUTIVE SUMMARY

Purpose of the Report

The Hazard Mitigation Report and recommendations of the Interagency Hazard Mitigation Team are intended to provide the framework for flood hazard mitigation during the reconstruction process to reduce the potential for future flood losses. This document outlines the status and impact of the recommendations in compliance with the requirement that FEMA prepare a progress report within 90 days of the date of the Interagency Hazard Mitigation Report. FEMA will also be preparing a 180-day progress report.

ACKNOWLEDGMENTS

Description of the Disaster

The following individuals and the government entities they represent are recognized for their contributions in the preparation of the Hazard Mitigation Report, this 90-day Progress Report, and for their participation on the Hazard Mitigation Team.

Utah Division of Comprehensive Emergency Management (CEM)  
Disaster Recovery Manager Robert Kistner

Utah Geological and Mineral Survey (UGMS) Don Mabey

Department of the Army  
Corps of Engineers (USACE) Allen Chin

Department of Interior  
U.S. Geological Survey (USGS) Bill Brown

Environmental Protection Agency (EPA) Nancy McTigue

Department of Housing and Urban Development (DHUD) Walt Kelm

Department of Agriculture (USDA/ASCS) Don Warden  
Forest Service (FS) Arch Wirth  
Curtis Johnson

Department of Commerce  
National Oceanic & Atmospheric Administration (NOAA) Thomas Bowers

Federal Emergency Management Agency (FEMA)  
Hazard Mitigation Team Leader Robert Ives, Jr.

Disaster Assistance Programs Division R.H. Philipsborn  
W.G. Callahan

Natural and Technological Hazards Division Fred Metzler

## EXECUTIVE SUMMARY

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### Description of the Disaster

As a result of an extended period of abnormally high precipitation, prolonged snowmelt, and subsequent high water tables, Utahns in 1983 suffered from landslides, debris flows, flooding, and a dam failure. More than 130 communities and 4500 individuals were affected. Estimates of damages are near 250 million dollars. On April 27, 1983, the Governor of Utah requested a Major Disaster Declaration for the Spanish Fork River slide-dam and Thistle flood covering Utah, Carbon, and Emery Counties. On April 30, 1983, the President determined that the flooding was of sufficient severity and magnitude, and a Major Disaster Declaration was made under Public Law 93-288. The incidence period was not closed until July 1, 1983. By the time all flooding had ceased, nineteen additional counties (over 75% of the State of Utah) had been included in the Declaration.

### Organization of the Report

Quite similar to the continuing nature of the disaster, is the continuing nature of the response, recovery and mitigation activities. A departure from previous 90-day formats is necessary as merely reporting on the status of the recommendations would ignore many additional innovative activities that are under consideration. Therefore, this report will address the following:

- Part I. The Spanish Fork River Slide-Dam and Thistle Flood
- Part II. Status of the Hazard Mitigation Team Recommendations
- Part III. Additional Mitigation Activities
- Part IV. Predictions and Preparedness for 1984 and Beyond

This report is the third Hazard Mitigation Report relating to the Utah disaster designated as FEMA-680-DR. The earlier Hazard Mitigation Reports, dated May 14 and August 1, 1983, should be read for information pertaining to the Hazard Mitigation Team, the team process, and background information describing the meteorological and geophysical conditions that caused this disaster.

### Status of the Recommendations

Many Federal agencies, the State of Utah, and local governments have provided an effective continuous impetus towards the implementation of the recommendations contained in the Hazard Mitigation Report, dated August 1, 1983. Not only have the majority of proposals been initiated, but the fervor and excitement of establishing safer, less hazard-prone communities has led to the development of innovative mitigation activities throughout the State. The funding and implementation of many of these activities can be attributed to many factors, but the efforts of the Utah CEM, and the State Disaster Recovery Manager, hired upon an earlier recommendation of the Hazard Mitigation Team, are particularly noteworthy.

## INTRODUCTION

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## INTRODUCTION

### THE SPANISH FORK SLIDE-DAM AND THISTLE FLOOD

The stench of decaying vegetation from the shores of the Great Salt Lake and the conduit construction along North Temple Street are but two of the many indications that the astute observer could recognize as signs of the continuing impact of this years' events. Though the sun now shines frequently over the State of Utah, and residents return to their normal behavior patterns, the effects from the floods and landslides of this spring and summer continue to manifest themselves. As Utahns, rightfully, take pride in their response and recovery efforts, continuing efforts are being made to prepare for next springs predicted floods and potential debris flows.

Since the release of the recommendations of the Hazard Mitigation Team, the level of recovery activity has been intense and diverse, in response to a myriad of expected and unexpected situations. There exists tremendous dedication, promoted by a sense of urgency on all levels of government, to not only recover from the previous events, but to mitigate the effects of possible and probable events. This truly is a progress report, as the final results of all the efforts will not be evident for some time. However, perhaps as early as next spring, if sliding, flooding, and ground saturation, occur again will the significance of all the mitigation initiatives undertaken be fully realized and appreciated.

As those already considered, and that the ramifications relating to the health, safety, and welfare of all those affected will be carefully considered. This deliberate approach is evidenced in the draining of the Lake. A simple, but highly technical, network of tunnels and shafts were constructed to create what is known as a lake-tap drain system. This system allows the out-flow of water to be monitored and regulated. Spanish Fork River, which carries the water to Utah Lake, was dredged to the canyon mouth by the U.S. Army Corps of Engineers to enhance the channel's carrying capacity. The slide itself is still being monitored for movement and water seepage. A warning system has been developed and is in operation which offers a degree of protection to the 10,000 downstream residents in the event of dam-failure. The National Weather Service and Utah Geological and Mineral Survey created an inundation map depicting expected flows and depths of water for three different failure modes. This map has been presented to the Utah County Emergency Management staff for distribution to homeowners at risk. The promotion and increased sale of flood insurance has been documented. Rail traffic has resumed to the coal mining areas and one highway is being rerouted and is near its scheduled completion date of December 1.

PART I  
THE SPANISH FORK SLIDE-DAM AND THISTLE FLOOD

STATUS OF THE HAZARD MITIGATION TEAM RECOMMENDATIONS

At Thistle, the lake that was created by the massive landslide that dammed two rivers and inundated a community, is being drained amidst a sea of controversy.

Is the dam safe? Should the lake be refilled? Who would own the recreation, flood control, irrigation, and power resources? Who would be liable in the event of failure? How would these decisions affect the residents of Thistle, who eagerly await the recovery of their property? Will the town be rebuilt? If the lake is refilled, will the controlling governmental entity purchase the re-flooded property from its owners? Where is the water being drained going?

On one hand, the natural dam prevented 48,000 acre-feet of water from making its way into an already over-bank Utah Lake. On the other hand, now that this water is resuming its natural course, Utah Lake, still over-bank, is not getting any lower. This in turn, flows down the constricted, sediment-laden, channel of the Jordan River to a record high, once-again rising, Great Salt Lake.

It is expected that these issues will be scrutinized and resolved with the same deliberate approach as those already considered, and that the ramifications relating to the health, safety, and welfare of all those affected will be carefully considered. This deliberate approach is evidenced in the draining of the Lake. A simple, but highly technical, network of tunnels and shafts were constructed to create what is known as a lake-tap drain system. This system allows the out-flow of water to be monitored and regulated. Spanish Fork River, which carries the water to Utah Lake, was dredged to the canyon mouth by the U.S. Army Corps of Engineers to enhance the channel's carrying capacity. The slide itself is still being monitored for movement and water seepage. A warning system has been developed and is in operation which offers a degree of protection to the 10,000 downstream residents in the event of dam-failure. The National Weather Service and Utah Geological and Mineral Survey created an inundation map depicting expected flows and depths of water for three different failure modes. This map has been presented to the Utah County Emergency Management staff for distribution to homeowners at risk. The promotion and increased sale of flood insurance has been documented. Rail traffic has resumed to the coal mining areas and one highway is being rerouted and is near its scheduled completion date of December 1.



A. State Hazard Mitigation Planning

PART II  
STATUS OF THE HAZARD MITIGATION TEAM RECOMMENDATIONS

The recommendations of the Hazard Mitigation Team were developed with the goal of reducing future Federal expenditures for recovery from floods. The recommendations were organized into the following categories:

- A. State Hazard Mitigation Planning;
- B. Regulatory;
- C. Risk Analysis;
- D. Watershed Management;
- E. Structural; and,
- F. Other Mitigation Activities.

The following section of this report provides a summary of actions taken regarding the recommendations.

1. Work Element: Apply hazard susceptibility mapping to land-use planning.

Schedule: Immediate and ongoing

Status: Pending

2. Work Element: Prepare an element of the State 406 Mitigation Plan which addresses siting, specifications, operation, and maintenance of critical facilities.

Schedule: 180 days

Status: Pending

A. State Hazard Mitigation Planning

These recommendations address areas that the Hazard Mitigation Team felt should be considered in the State 406 Mitigation Plan. The 406 Plan is a requirement of the State as a condition for receiving Federal disaster assistance. The Plan should be designed to reduce or eliminate the threat from all hazards in areas that Federal monies have been spent as part of the response and recovery effort. The Plan is expected to be completed by February 15, 1984. This date will coincide with the release of the Utah Multi-Hazards Project Report, and the 180-day Recovery Progress Report of the Hazard Mitigation Team.

Since the 406 Plan is still in the developmental stage, the implementation of the recommendations is pending. However, particular aspects have been initiated, and are being pursued as follows:

1. Work Element: Create and maintain a central data bank that integrates all appropriate information with respect to this disaster and Utah's other natural hazards.

Schedule: 180 days

Status: Initiated and on-going

Studies and reports are continually being developed and released concerning every conceivable aspect of the disaster; from sophisticated engineering reports to economic studies and mapping projects. This information is available through either Bob Kistner, Disaster Recovery Manager, State of Utah or Clancy Philipsborn, FEMA, Region VIII, Denver. This information will be used to help formulate the 406 Plan.

2. Work Element: Apply hazard susceptibility mapping to land-use planning.

Schedule: Immediate and ongoing

Status: Pending

Although no major mapping program has been developed to date, the pursual of disclosure legislation (requiring a prospective home-buyer to be notified of hazard susceptibility) is a fine example of how hazard-mapping can be used to shape more effective land-use programs. UGMS plans a series of maps that will identify, state-wide, 10 geologic hazards, as part of this proposed legislation (see Part III).

3. Work Element: Prepare an element of the State 406 Mitigation Plan which addresses siting, specifications, operation, and maintenance of critical facilities.

Schedule: 180 days

Status: Pending

The 406 Plan is due February 15, 1984. The State of Utah has been furnished with a copy of this recommendation.

4. Work Element: Develop a long-term comprehensive management plan for the Great Salt Lake.

Schedule: 180 days

Status: Pending

No action has been taken on this work element to date.

5. Work Element: Investigate the options that the Rural Abandoned Mine Program (Public Law 95-87 Section 406) and the Abandoned Mine Reclamation Fund (Public Law 95-87 Section 407 H) may offer the Town of Thistle.

Schedule: 180 days

Status: Initiated

Utah CEM is researching Thistle's integral relationship to the coal mining industry. If this relationship can be established, then it might be possible for the Department of Interior to participate in a relocation program.

6. Work Element: Develop a curriculum for local educational institutions that promotes hazard awareness, emergency preparedness, and mitigation techniques.

Schedule: 180 days

Status: Pending

This is a major aspect of the Utah Multi-Hazards Project which is scheduled for completion on February 15, 1984.

B. Regulatory

1. Work Element: Pursue mudslide/landslide mitigation potential available through assisting local communities in the adoption and implementation of land-use regulations.

Schedule: 180 days

Status: Initiated

Local governments in Davis County will discuss and consider the model mudflow ordinance November 15, 1983. Additional communities will be asked to consider adopting similar legislation.

2. Work Element: Propose legislation requiring private dam owners to obtain and maintain adequate liability insurance.

Schedule: January 1, 1984

Status: Initiated

Utah CEM has requested that the Natural Resources and Energy Committee of the State Legislature investigate this proposal.

3. Work Element: Determine the feasibility of legislation that would allow Federal land-holding agencies to be able to expand their land boundaries in certain instances following Presidentially declared disasters in order to facilitate mitigation opportunities.

Schedule: 90 days

Status: Pending

Although this element has not been completed, due to the nature of legislative changes, a Federal/local land-swap is being negotiated in Centerville (see Part III).

C. Risk Analysis

1. Work Element: Initiate a comprehensive coordinated mapping program.

Schedule: 1 year

Status: Pending

Interest has been generated among several agencies and there are several mapping projects planned and underway. NFIP restudies have been included in the FEMA Regional budget proposal. A response is due in April. UGMS is planning to develop a series of geologic hazards maps, with State-wide coverage, that will be closely tied to the proposed disclosure legislation. The national Mapping Office of USGS has expressed an interest in the expansion of the use of photoimagery data to include disasters. The Utah Multi-Hazards Project is approaching the end of its pilot year. These projects still need to be coordinated.

2. Work Element: Tabulate the extent of current or proposed Federal investments in those areas outlined by existing hazard maps for floods and debris flows.

Schedule: 90 days

Status: Completed

The only Federal projects currently underway or planned in designated hazard areas, are three flood damage mitigation water-diversion projects by the Soil Conservation Service. All three projects are on the Spanish Fork River. No Federal projects were identified in areas of high debris-flow/debris-flood hazards mapped by the USGS.

3. Work Element: Initiate the reseeding and revegetation of stream-banks and upstream disturbed areas.

Schedule: Short-term: 90 days  
Long-term: 3 to 5 years

Status: Initiated and ongoing

The Forest Service has acquired over 1 million dollars of Emergency Watershed Protection Funds (Section 403) to carry out this work. A chart showing the allocations and additional needs is included (see Attachment 1). These funds also cover needs addressed in Work Element D-2.

D. Watershed Management

1. Work Element: Implement a local cooperative flood/landslide warning system ALERT. (Automated Local Evaluation in Real Time)

Schedule: April 1, 1984

Status: Initiated

A warning workshop has been tentatively scheduled for January 11, 1984. At that time, communities facing identified risks will be presented with information on different types of warning systems; their accuracy, their cost (including yearly maintenance), the lead-time they provide and available funding.

2. Work Element: Utilize existing programs for upland watershed restoration, channel clearing, and debris removal on watersheds with situations identified as being a threat to life or property.

Schedule: Immediate and ongoing

Status: Initiated and ongoing

This proposal overlaps with Work Element C-3 and is being addressed with the same Watershed Protection Funds mentioned (Attachment 1 ). The desired dredging projects are being addressed by State and local governments and are discussed in Part III.

## E. Structural Measures

1. Work Element: Breach the Southern Pacific Railroad causeway on the Great Salt Lake.

Schedule: Immediately

Status: Pending

The State Legislature rejected this proposal twice before the Hazard Mitigation Team recommended it. Every legislator has been made aware of the Team's recommendation, in case the discussion is revived again. The Department of Natural Resources, which is the agency responsible for management of the Great Salt Lake, has also been made aware of this proposal. The Lake level dropped less than a foot this summer, and is now rising again. There are predictions that the level will be even higher in 1984 than the record-high level of 1983. Some believe the causeway may breach naturally. If not, Interstate 80 is one facility that may be inundated.

Note: The Forest Service has specifically requested that they not be associated with this work element.

2. Work Element: Evaluate the benefit of debris basins or other debris control measures at canyon mouths where high potential for debris flow or debris flood hazards exist.

Schedule: Immediate and ongoing

Status: Complete

Local governments and engineering firms have determined that this is a feasible protective measure. As many as twelve (12) sites for debris basins have been identified. State and local governments have worked diligently on several funding schemes. This is discussed in more detail in Part III. However, one debris basin, in Farmington on Rudd Creek, is underway and will be complete before spring.

F. Other Mitigation Activities

1. Work Element: The Hazard Mitigation Team recognizes that Farmington City officials wisely imposed a reconstruction moratorium on twelve dwellings inundated by mud and debris at the mouth of Rudd Creek. While recognizing growing pressure to resolve this situation, adequate time should be allowed local officials to determine the degree of the existing hazard and identify mitigation opportunities.

Status: Completed

The City of Farmington has retained the moratorium. The entire block (nine homes) at the canyon mouth was purchased in order to construct a debris basin (Attachment 2).

2. Work Element: The Federal, State, local, and private entities principally concerned with evaluation of and response to the disaster should plan a conference on preparing for the future using the lessons of 1983. The conference should be organized and held within 6-8 months while the elements of the disaster are still fresh in people's minds. Similar conferences in response to flooding/landsliding disasters in Southern California (1978-1980) and the San Francisco Bay Region (1982) have been very successful in bringing people together to focus on problems that affect virtually all levels of society simultaneously.

Status: Initiated

The Bureau of Reclamation and the Geological Survey, with support from the National Academy of Sciences, have taken responsibility for organizing this conference. Additional financing is being sought. The conference is tentatively scheduled for June, 1984.



G. A SUMMARY OF IMPLEMENTATION

<u>RECOMMENDATION</u>	<u>LEAD AGENCY</u>	<u>90-DAY STATUS</u>
<u>STATE HAZARD MITIGATION PLANNING</u>		
A1 Data Bank	UCEM	Initiated
A2 Hazard Susceptibility Mapping	UCEM	Pending 406
A3 Critical Facilities	UCEM	Pending 406
A4 Great Salt Lake Comprehensive Plan	UCEM/Nat. Resources	Pending
A5 Abandoned Mine Program	UCEM	Initiated
A6 Curriculum Development	UCEM	Pending multi-hazards project
<u>REGULATORY</u>		
B1 Landuse Regulations	FEMA/UCEM	Initiated
B2 Dam-owner Insurance	UCEM	Initiated
B3 Land-swap legislation	FEMA/DC	Pending
<u>RISK ANALYSIS</u>		
C1 Mapping Program	FEMA	Pending
C2 Tabulate Federal Investments	FEMA	Completed
C3 Revegetation	Forest Service	Initiated
<u>WATERSHED MANAGEMENT</u>		
D1 Warning System	FEMA/UCEM	Initiated
D2 Watershed Restoration	FS/UCEM	Initiated
<u>STRUCTURAL</u>		
E1 Breach Causeway	Utah Nat. Resources	Pending
E2 Evaluate Debris Basins	UCEM/COUNTY/Local	Completed
<u>OTHER</u>		
F1 Farmington Moratorium		Continuing
F2 Lessons-learned conference		Initiated

PART III  
ADDITIONAL MITIGATION INITIATIVES

Most unusual, and most welcome, is the role that local governments are playing through the coordination of the Utah CEM and the Disaster Recovery Manager. The complexity and diversity of mitigation projects under consideration, and the mechanisms to fund them, show the tremendous innovation of affected Utahns. Of utmost concern to communities across Utah is how to meet disaster-related needs that have been determined ineligible for traditional Federal funding. A pressing concern is the dredging of rivers whose channels have become constricted from the deposition of flood water sediments. Of equal concern is the construction of debris basins at canyon mouths, where the potential for debris-flows from identified detached-landmasses exists.

As of October 27, sixteen counties had prioritized non-funded dredging projects that would require 16 million dollars. At the same time, cities and counties identified other non-funded projects such as debris basins, drainage systems, bridge replacements, spring redevelopment, and diversion structures. These projects would require 14.3 million dollars for a total of 30.75 million dollars for recovery and mitigation projects.

The State of Utah has aggressively sought to fulfill this unmet need. The Utah State legislature designated 10 million dollars, under a general fund appropriation for recovery purposes, to be disbursed through a Disaster Relief Board (DRB). As of October 27, nearly 5 million dollars had been designated to supplement communities share of FEMA-funded recovery projects. An additional 3/4 million dollars were used to fund emergencies such as the Rudd Creek Debris Basin in Farmington. Only 4.4 million dollars remains to pay for 30 million dollars of identified needs.

The Disaster Relief Board was designed to facilitate funding for disaster recovery projects. The DRB is actually the Community Impact Board (CIB), an established entity of Utah State Government. This process was implemented for simplicity, since the CIB already had an established staff and mechanism for distribution of funds. The DRB makes its allocations based on the recommendations of the Governor's Advisory Committee for Community Affairs (GACCA). GACCA has commissioned a flood-mitigation subcommittee. It is through this subcommittee (Attachment 3) that local governments have access to DRB funds. At the last meeting of the subcommittee, recommendations to the DRB were made. Most importantly, was the plan to have communities match appropriated DRB funds on a 50-50 cost-share basis, thereby doubling the available money. Using this funding mechanism, it could be estimated that the DRB will need to seek an additional 11 million dollars from the legislature if they are to fund all identified projects.

The allocation of the remaining 4.8 million dollars should meet most of the costs of the stream dredging and construction of debris basins that have been identified as priorities. Dredging the Jordan River is Utah's number one flood control project for this winter. The Jordan, which carries water from Utah Lake to Great Salt Lake, also carries the waters from six tributaries, and is laden with sediment, sandbars, and debris. The Weber Basin Conservancy District is coordinating the dredging of the Weber River, in Weber and Morgan counties. The USACE has dredged

the canyon portion of the Spanish Fork River in Utah County and will dredge the surplus canal in Salt Lake County. If the Weather Service's prediction of precipitation for the current water-year (October 1983 - September 1984; see Attachment 4 ) rises from 120% of normal to 150%, the Corps of Engineers will be able to contribute in an expanded capacity.

As for debris basins, one is near completion. Three more have been authorized and funded, and as many as 16 potential basins have been discussed. To demonstrate the creativity that the State and local governments have developed, the method of funding for two of the basins (including property acquisition, debris removal, and construction) is as follows:

RUDD CREEK-FARMINGTON

200,000	-	redirected HUD CDBG funds (did not build planned fire station)
200,000	-	President's Jobs Bill
595,000	-	Disaster Relief Board
<u>20,000</u>	-	Davis County Flood Control
\$1,015,000	-	Total (This includes 495,000 for acquisition of damaged and undamaged structures and property)

WILLARD CREEK, WILLARD

75,000	-	HUD CDBG
25,000	-	Governor's Emergency Fund
60,000	-	Utah Dept. of Transportation
35,000	-	District Tax
12,000	-	City and County
35,000	-	Disaster Relief Board
<u>2,000</u>	-	Miscellaneous
\$247,000	-	Total

On Rudd Creek, above Farmington, the USGS has identified a partially detached landmass, estimated at 70,000 to 100,000 cubic meters of material. This information provided the impetus to construct the debris basin. In addition, through the combined efforts of the Mining Engineering Department of the University of Utah, UGMS, Utah CEM, the City of Farmington, the Davis County Planning Department, and the US Forest Service, a monitoring system that will detect slide movement has been developed and is being installed on the landmass. The instrument package will go into place this November, and provide indication of slippage and warning to the Davis County Sheriff's office and the University of Utah's monitoring station. It will be financed by redirected DRB funds, as the construction bids for the Rudd Creek - Farmington debris basin were lower than anticipated.

To fund additional mitigation projects, Davis County voters passed a special bond issue for a capital improvements program to repair and improve flood control and drainage systems. The voting took place October 4, 1983, and the 12 million dollar bond issue was approved by a narrow margin (Attachment 5 ).

A different innovative mitigation project is taking place in Centerville, where a land-swap is being negotiated between the community and the Forest Service. The Town of Centerville owns a large parcel of undeveloped land that is in the midst of the Wasatch National Forest. In return for that land, Centerville would receive a smaller parcel (due to higher dollar per acre value) at the mouth of Parrish Creek Canyon, on which they could construct a debris basin. Progress on the land-swap is proceeding favorably.

In South Ogden City, one property that has been flooded repetitively (to depths of 15 feet as many as seven times this summer alone) is being acquired under Section 1362 of PL 90-448 (National Flood Insurance Act). The structure has not been removed yet, but an easement has been granted the city allowing completion of work on three DSR's. The family is being housed by the FEMA Temporary Housing Program while waiting for final acquisition approval. When the property has been cleared, it will be deeded to the city with a covenant requiring that the parcel remain in open-space (or compatible floodplain use) for perpetuity.

In a different approach, conferences, meetings, and critiques have been held to examine what was experienced, perpetuate mitigation efforts, and improve Utah's preparedness.

FEMA and Utah CEM critiqued their roles in the response and recovery efforts, striving to improve coordination, as well as delivery systems for the assistance they jointly provide. A critique with representatives from all the military facilities in Utah was also conducted for similar reasons.

In addition, the Governor hosted a conference on geologic hazards that was well attended and received. More than 250 action items were developed from the workshop format. The proceedings from this conference will be published shortly.

One development from the Governor's conference, that is currently underway, is the pursuit of disclosure legislation by UGMS. Closely related to a sophisticated three-year geologic-hazard mapping project, this legislation is intended to alert the possible home-buyer of potential geologic hazards at that site. Since the maps are an integral part of this effort, this proposed legislation is looking, tentatively, towards 1987. Legal aspects will be discussed during a conference this month (sponsored by UGMS) on the legal ramifications of geologic hazards. In short, if a community government knows of an existing geologic hazard, and does nothing to maintain the safety of residents (or potential home-buyer), is that government liable if a hazardous event occurs?

Other mitigation developments have included coordinating and developing future remote sensing/aerial photography capabilities to enhance prediction and assessment capabilities, and professional speaking engagements, on FEMA's behalf, explaining and promoting the innovations and successes of this Utah experience.

PART IV  
PREDICTIONS AND PREPAREDNESS FOR 1984 AND BEYOND

What remains to be seen of course, is whether or not these mitigation efforts will work. Will they be effective in reducing future damages? Will these measures be tested, as is likely, within the next six months?

The State of Utah may be facing many problems similar to those of 1983, as soon as next year. Though seemingly unusual for this normally arid state, the danger of more flooding exists due to remaining problems.

The most obvious problem is the continued saturated soil conditions and subsequent high water tables. With the ground in this condition, and predicted precipitation to be 120% of normal, (Attachment 4 ), more flooding, sliding, and debris-flows are likely. The recent earthquakes along the Wasatch Range (4.6 at Salt Lake City, October 8 and 6.9 in Idaho, October 29), suggest that the threat of slides may even be greater. Additionally, the Great Salt Lake is rising again, and expected to reach a level higher than last year.

To prepare for these likely events, preparedness and response measures are already being implemented. The Utah CEM has been briefing county governments with new procedures concerning flood-fight capabilities, coordination with military facilities and damage assessment procedures. There is a stockpile of approximately 320,000 sandbags and county governments are inventorying the location and condition of pumps.

Finally, the Hazard Mitigation Team is impressed with what progress has been made since August, and is looking forward to being able to report even more significant progress on Utah's mitigation efforts in the next report, 90 days hence.

Summary of Watershed Rehabilitation Needs by National Forest (NF)  
Emergency Watershed Protection Funds - Sec. 403

Attachment 1

<u>Utah</u>	<u>Lake &amp; Reservoir Protection</u>	<u>Debris Jam Removed &amp; Channel Clearing</u>	<u>Upland Watershed Protection (e.g. seeding)</u>	<u>Willow Planting</u>	<u>Channel Measures (e.g. grade &amp; bank stabilization)</u>	<u>Total</u>
Ashley	70.0*	0	0	0	3.8	3.8
Fishlake	0	4.1	0	0	23.6	27.8
Manti-LaSal	0	349.0	7.8	122.9	280.0	759.7
Uinta	0	21.1	0	0	114.1	135.2
Wasatch	0	0	3.3	0	11.2	14.5
<b>SUBTOTAL 403</b>	<b>70.0</b>	<b>374.2</b>	<b>11.1</b>	<b>122.9</b>	<b>432.7</b>	<b>941.0</b>

\* 70.0 is protection of reservoirs belonging to Ashley Valley Reservoir Company (FS is 403 sponsor) is not included in the total of FS 403 needs.

Watershed Rehabilitation Needs not Covered Under Sec. 403

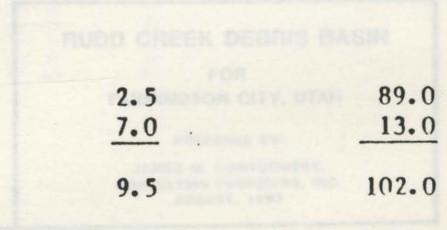
<u>Utah</u>						
Ashley	0	0	0	0	12.0	12.0
Fishlake	0	56.0	40.0	0	76.5	189.3*
Manti-LaSal	0	106.9	10.4	10.5	168.7	296.5
Uinta	3.0	84.9	12.5	229.5	667.0	996.9
Wasatch	0	50.8	0	0	42.5	93.3
<b>SUBTOTAL UTAH</b>	<b>3.0</b>	<b>298.6</b>	<b>62.9</b>	<b>240.0</b>	<b>996.7</b>	<b>1,588.0</b>

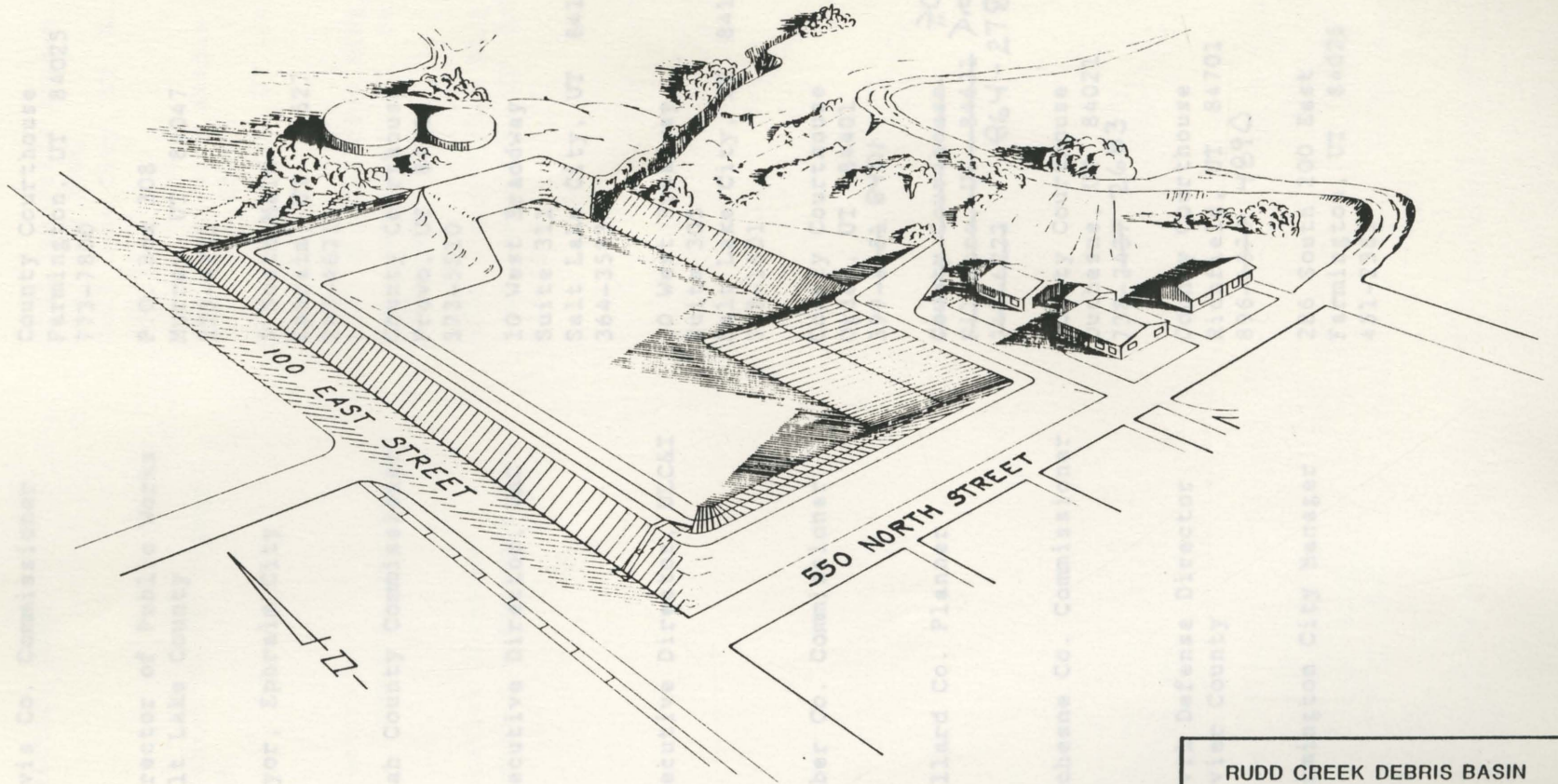
\*\* Includes \$16.8 m for repair of watershed structures.

<u>Nevada</u>						
Humboldt	0	0	86.5	0	2.5	89.0
Toiyabe	0	6.0	0	0	7.0	13.0
<b>SUBTOTAL NEVADA</b>	<b>0</b>	<b>6.0</b>	<b>86.5</b>	<b>0</b>	<b>9.5</b>	<b>102.0</b>

Idaho : Only the Sawtooth reported needs for flood damage repair: \$1.0 m for repair of a watershed structure.

<b>TOTAL ALL NON-403</b>	<b>3.0</b>	<b>306.6</b>	<b>149.4</b>	<b>240.0</b>	<b>976.2</b>	<b>1,691.0</b>
<b>GRAND TOTAL ALL WATERSHED REHABILITATION NEEDS</b>	<b>146.0</b>	<b>678.8</b>	<b>186.0</b>	<b>362.9</b>	<b>1,426.4</b>	<b>2,632.0</b>





DESIGNED BY ART MAXWELL, P.E.  
DRAWN BY MIKE CARTER

**RUDD CREEK DEBRIS BASIN**  
FOR  
FARMINGTON CITY, UTAH

PREPARED BY:  
JAMES M. MONTGOMERY,  
CONSULTING ENGINEERS, INC.  
AUGUST, 1983

## GACCA FLOOD MITIGATION SUB-COMMITTEE

<u>Name</u>	<u>Position</u>	<u>Address &amp; Phone</u>
Harold Tippets	Davis Co. Commissioner	County Courthouse Farmington, UT 84025 773-7800
Donald Spencer	Director of Public Works Salt Lake County	P.O. Box 308 Murray, UT 84047 255-4283
Halbert K. Jensen	Mayor, Ephraim City	5 South Main Ephraim, UT 84627 283-4631
Jeril B. Wilson	Utah County Commissioner	County Courthouse Provo, UT 84601 373-5510
John Tanner	Executive Director, UAC	10 West Braodway Suite 311 Salt Lake City, UT 84101 364-3583
Herschel Hester, III	Executive Director, ULC&T	10 West Broadway Suite 305 Salt Lake City, UT 84101 328-1601
Robert Hunter	Weber Co. Commissioner	County Courthouse Ogden, UT 84401 399- <del>2481</del> 8401
Robyn Pearson	Millard Co. Planner	<del>County Courthouse</del> <del>Fillmore, UT 84631</del> <del>743-6223</del> P.O. Box 854 Dr/HK, UT 84624 864-2788
Alton Moon	Duchesne Co. Commissioner	County Courthouse Duchesne, UT 84021 738- <del>2437</del> 2683
James Porter	Civil Defense Director Sevier County	County Courthouse Richfield, UT 84701 896- <del>4870</del> 4890
Max Forbush	Farmington City Manager	286 South 200 East Farmington, UT 84025 451-2383



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Office of Planning & Budget

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533-4264

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Robert Kistner

Disaster Relief Manager  
DCEM

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Div. Community Development

6233 State Office Bldg.  
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533-7515

Dale B. Carpenter

Executive Director  
Community & Economic Dev.

6290 State Office Bldg.  
Salt Lake City, UT 84114  
533-5396

SALT LAKE AIRPORT	45.73
HOLLADAY	70.25
UTAH STATE LOGAN	61.19
KEARNS	61.04
PROVO BYU	58.55
OGDEN PIONEER	67.74
SILVER LAKE BRIGHTON	103.02

...WINTER FORECAST...

CAREFULLY STUDYING THE EXPECTED WEATHER PATTERN UTAH FOR THE 1986-87 FALL..WINTER AND SPRING RESULTED IN THE FOLLOWING METEOROLOGICAL FORECAST.

THE MIDDLE LATITUDES OF THE NORTHERN HEMISPHERE ARE CONTROLLED BY A STRONG BELT OF WINDS TERMED THE WESTERLIES. THESE WESTERLIES HAVE SHOWN NO REAL SIGN OF A STRONG BUCKLE SO FAR THIS FALL. THE SEA SURFACE TEMPERATURES IN THE PACIFIC OCEAN ARE COLDER THAN NORMAL NORTH OF 35 DEGREES NORTH LATITUDE AND WARMER THAN NORMAL FROM 35 DEGREES TO THE EQUATOR. BOTH THESE IDEAS SUPPORT A WESTEPLY FLOW THROUGH THE MAJORITY OF THE WINTER INTO THE SPRING WHICH PORTENDS A WET AND MILD WEATHER PATTERN FOR UTAH.

TEMPERATURES IN THE VALLEY COULD AVERAGE AS MUCH AS 3 TO 5 DEGREES WARMER THAN NORMAL AND PRECIPITATION STATEWIDE IN UTAH THROUGH MAY 110-130 PERCENT OF NORMAL. SNOWFALL IN THE WASATCH MOUNTAINS ARE EXPECTED TO AVERAGE ABOUT 120 PERCENT OF NORMAL. THE ALTA/SNOWY AREA ON THE AVERAGE RECEIVES ABOUT 500 INCHES OF SNOW FROM NOVEMBER THROUGH APRIL.

SATURATED SOILS ARE STILL A MAJOR CONCERN AND WINDFLOWS COULD UTAHNS AGAIN NEXT SPRING.

ZCZC .SLCPRESS  
 WOUSOO KSLR 041800  
 PRESS RELEASE  
 NATIONAL WEATHER SERVICE/COLORADO BASIN RFC SALT LAKE CITY UTAH  
 ISSUED 1130 AM TUE OCT 4 1983

...HOW WET WAS IT OR WHEN WILL IT EVER END...

A SOGGY 24 MONTHS OR TWO YEAR PERIOD HAS JUST ENDED WITH TWO WATER YEAR TOTALS THAT ARE UNPRECEDENTED IN PORTIONS OF NORTHERN UTAH.

IN TALLYING SOME OF THE TOTALS FOR THE TWO YEAR PERIOD SOME UNBELIEVABLE VALUES WERE CALCULATED WHICH ARE ABOUT 150 TO 170 PERCENT OF THE NORMAL AMOUNTS.....

WATER YEARS 1981-1983

SALT LAKE-AIRPORT	45.73
HOLLADAY	70.25
UTAH STATE LOGAN	61.19
KEARNS	61.04
PROVO BYU	58.55
OGDEN PIONEER	67.74
SILVER LAKE BRIGHTON	103.02

...WINTER FORECAST...

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THE MIDDLE LATITUDES OF THE NORTHERN HEMISPHERE ARE CONTROLLED BY A STRONG BELT OF WINDS TERMED THE WESTERLIES. THESE WESTERLIES HAVE SHOWN NO REAL SIGN OF A STRONG BUCKLE SO FAR THIS FALL. THE SEA SURFACE TEMPERATURES IN THE PACIFIC OCEAN ARE COLDER THAN NORMAL NORTH OF 35 DEGREES NORTH LATITUDE AND WARMER THAN NORMAL FROM 35 DEGREES TO THE EQUATOR. BOTH THESE IDEAS SUPPORT A WESTERLY FLOW THROUGH THE MAJORITY OF THE WINTER INTO THE SPRING WHICH PORTENDS A WET AND MILD WEATHER PATTERN FOR UTAH.

TEMPERATURES IN THE VALLEY COULD AVERAGE AS MUCH AS 3 TO 5 DEGREES WARMER THAN NORMAL AND PRECIPITATION STATEWIDE IN UTAH THROUGH APRIL 110-130 PERCENT OF NORMAL. SNOWFALL IN THE WASATCH MOUNTAINS ARE EXPECTED TO AVERAGE ABOUT 120 PERCENT OF NORMAL. THE ALTA/SNOWBIRD AREA ON THE AVERAGE RECEIVES ABOUT 500 INCHES OF SNOW FROM NOVEMBER THROUGH APRIL.

SATURATED SOILS ARE STILL A MAJOR CONCERN AND MUDFLOWS COULD PLAGUE UTAHNS AGAIN NEXT SPRING.

SCENARIO GREAT SALT LAKE AND UTAH LAKE...

THE HIGH LAKE LEVELS OF THE GREAT SALT LAKE AND UTAH LAKE CONTINUE TO REFLECT RECENT HYDROMETEOROLOGICAL CONDITIONS. TWO CONSECUTIVE WET YEARS.. THE HIGHEST ON RECORD.. ALONG WITH SATURATED SOIL CONDITIONS.. HEAVY SPRING SNOWPACKS.. A LATE SNOW MELT AND BELOW NORMAL EVAPORATION HAVE ALL CONTRIBUTED TO RECORD RISES TO THE GREAT SALT LAKE AND UTAH LAKE THIS YEAR. NORMALLY SNOWMELT RUNOFF PEAKS OCCURS IN LATE APRIL AND MAY. THIS YEAR THE SNOWPACK ACCUMULATED IN APRIL AND THE FIRST THREE WEEKS OF MAY. IN LATE MAY DAYTIME TEMPERATURES ROSE ABOUT THIRTY DEGREES FROM NEAR SIXTY TO THE UPPER EIGHTIES AND LOW NINETIES. THIS SITUATION CAUSED MOST STREAMS ALONG THE WASATCH FRONT TO PEAK AT ABOUT THE SAME TIME.

THE OCTOBER 1ST READING OF THE GREAT SALT LAKE WAS 4204.60 FEET MSL WHICH IS ONLY 0.05 FEET LOWER THAN THE SEPTEMBER 1ST LEVEL. THE LAKE HAS BEEN FAIRLY STEADY SINCE MID-AUGUST WHEN THE LEVEL WAS ALSO 4204.60 FEET. THE LAKE HAS DROPPED ONLY 0.40 FEET SINCE THE JULY 1ST PEAK OF 4205.00 FEET AND IS NOT EXPECTED TO DROP ANY FURTHER. NORMALLY INFLOW SURPASSES A DIMINISHING EVAPORATION AND THE LAKE BEGINS TO SLOWLY RISE AGAIN IN EARLY OCTOBER. THE SMALLEST DROP EVER RECORDED FOR THE GREAT SALT LAKE HAS BEEN 0.60 FEET IN 1965 AND 1884. THE AVERAGE YEARLY DROP OF THE GREAT SALT LAKE IS 1.70 FEET.

UNDER NORMAL HYDROMETEOROLOGICAL CONDITIONS THE GREAT SALT LAKE IS EXPECTED TO RISE TO A HIGHER LEVEL NEXT SPRING THAN OCCURRED THIS YEAR... BETWEEN 4206.00 AND 4207.00 FEET. WHEN THE LAKE SURPASSES 4205.10 FEET IT WILL BE THE HIGHEST THE LAKE HAS BEEN SINCE 1888. ?

THE OCTOBER 1ST UTAH LAKE READING WAS 2.58 FEET ABOVE COMPROMISE. THIS IS A DROP OF 0.59 FEET SINCE SEPTEMBER 1ST. OUTFLOW DURING SEPTEMBER WAS 84600 ACRE-FEET.. 251 PERCENT OF NORMAL. THE WATER-YEAR OUTFLOW WAS 942000 ACRE-FEET.. 334 PERCENT OF NORMAL. SEPTEMBER INFLOW TO UTAH LAKE WAS 60900 ACRE-FEET.. 222 PERCENT.. AND WATER-YEAR INFLOW WAS 1.5 MILLION ACRE-FEET.. 247 PERCENT. BOTH THE WATER-YEAR INFLOW AND OUTFLOW VALUES ARE THE HIGHEST ON RECORD. APRIL THROUGH JUNE EVAPORATION ON THE ENLARGED LAKE WAS ONLY 85 PERCENT OF NORMAL.

ON OCTOBER 1ST OFFICIALS BEGAN DRAINING THISTLE LAKE. INITIAL RELEASES WERE ABOUT 800 CFS AND IT IS ANTICIPATED THAT IT WILL TAKE ABOUT 30 DAYS TO DRAIN. THE NORMAL INCREASE IN THE UTAH LAKE STAGE IN OCTOBER IS 0.20 FEET AND UNDER NORMAL CONDITIONS THE RELEASES FROM THISTLE LAKE WOULD BE EXPECTED TO RAISE UTAH LAKE AN ADDITIONAL 0.50 FEET. HOWEVER.. MUCH ABOVE NORMAL OUTFLOWS ARE EXPECTED TO HOLD THE OCTOBER RISE TO ABOUT 0.25 TO 0.35 OF A FOOT.

UNDER NORMAL HYDROMETEOROLOGICAL CONDITIONS UTAH LAKE IS EXPECTED TO RISE TO A LEVEL OF BETWEEN 3.50 AND 4.50 FEET ABOVE COMPROMISE. ABOVE NORMAL PRECIPITATION THIS WINTER AND NEXT SPRING COULD PUSH THE UTAH LAKE TO A LEVEL THAT WOULD EQUAL OR EXCEED THIS YEARS RECORD PEAK OF 4.93 FEET ABOVE COMPROMISE. ✓

RALPH HATCH  
COLORADO BASIN RFC

WILLIAM ALDER  
NATIONAL WEATHER SERVICE

# Farmington News

October 1983

Serving Farmington City Residents

## \$12 MILLION BOND ELECTION

October 4, 1983 is the date set for a special bond election in Davis County. Polls will be open from 7 a.m. until 8 p.m. Farmington residents in voting districts 1, 2, and 5 will vote at the Farmington Elementary School, 200 West 200 South, and voting districts 3 and 4 will be at Knowlton Elementary, 801 Shephard Lane.

The \$12 million General Obligation Drainage and Flood Control Bond Election will have a great impact on Farmington City residents. In the EMA study of potential mud and water flooding areas, Farmington had 4 of 5 listed "high potential" mud and water flow areas.

"We have other channels that need work and the City has only enough funding to handle the Rudd Creek disaster," said Max Forbush, city manager.

The City Council is strongly in favor of the bond election and asks all residents to vote in the affirmative on the proposition.

### NEEDS CRITICAL

Farmington has 5 of the major flood control projects scheduled as top priority by Davis County officials to receive funds. Construction work will be needed by the Davis Creek Channel, the Farmington Creek Channel, the Rudd Creek Channel, the Shephard Creek Channel and the Teed Creek Channel.

### WHY BONDING?

The County Government is responsible for maintaining the primary drainage and flood control systems within the county. Since many Creek channels cross city boundaries, a systematic and well planned program is needed to meet today's and tomorrow's needs.

County residents face more extensive damage to the flood control system in the future if present drainage is not improved and expanded.

Bonding is the only legal way for the County to borrow money for construction of capital improvements. Bonding provides construction money NOW for improvements that are needed NOW. Paying for the identified improvements on a pay-as-you-go basis would not only allow inflation to increase the total project cost, but wouldn't provide for immediate construction to handle future flood control needs.

### COST

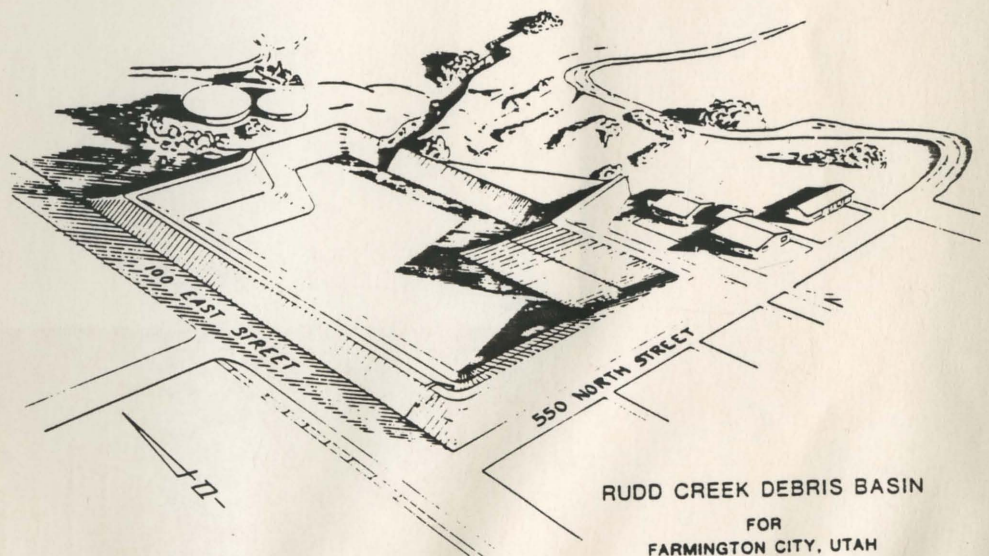
The mill levy increase will raise taxes. Presently Davis County levies 3 mills for flood control. Commission-

ers plan to add another 1 mill. The 4 mill total should be enough to retire present bonds and provide funds for on-going projects.

Each mill will cost the average homeowner about \$10 per year, depending on the appraised value; a more expensive home will pay slightly more. Likewise a less expensive home will pay less.

### WHO MAY VOTE?

There will be no special registration of voters for the bond election. The official register of voters constitutes the register for this election. If you are registered to vote in the municipal elections, you can vote in the bond election.



RUDD CREEK DEBRIS BASIN  
FOR  
FARMINGTON CITY, UTAH

DESIGNED BY ART MAXWELL, P.E.  
DRAWN BY MIKE CARTER

PREPARED BY:  
JAMES M. MONTGOMERY,  
CONSULTING ENGINEERS, INC.  
AUGUST, 1983

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