



# FLOOD HAZARD NEWS

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## URBAN DRAINAGE AND FLOOD CONTROL DISTRICT THE FIRST TEN YEARS

*EDITOR'S NOTE: On July 1, 1979, the Urban Drainage and Flood Control District celebrated its tenth anniversary. This seemed to be an appropriate time to look back at how the District came to be and how it has progressed. This special edition of "Flood Hazard News" traces the history of the District from the idea stage through its tenth anniversary. We hope you enjoy reading it as much as we enjoyed putting it together.*

### ORIGIN OF THE DISTRICT

The origin of the Urban Drainage and Flood Control District can be traced to the devastating flood on the South Platte River in June of 1965. The flood graphically demonstrated the disrespect of nature for developments in the flood plain as well as nature's disregard for jurisdictional boundaries. The flood also showed the need for multi-jurisdictional approaches to drainage and flood control problems.

In the aftermath of the 1965 flooding, the Five-County Engineer's Council started to seriously address the metropolitan area's drainage and flood control needs. The Five-County Engineer's Council consisted of engineers from Arapahoe County, Boulder County, Denver, Jefferson County, and Adams County. It was an unofficial, ad-hoc, voluntary group of concerned engineers that met on a periodic basis to try to coordinate metropolitan engineering problems. In addition to County representatives, engineers from Public Service Company, Mountain Bell, Denver Water Board, City of Littleton, City of Englewood, Portland Cement Association, and the Wheat Ridge Water and Sanitation District also were involved in the Five-County Engineer's Council.

Some time in 1967, Joe Shoemaker became involved with the Engineer's Council and joined in their discussions regarding drainage and flood control problems in the metropolitan area. Mr. Shoemaker's interest was kindled, and the group became more serious about providing a mechanism for addressing



The District was created to assist local governments with the solution of multi-jurisdictional drainage and flood control problems.

drainage problems from a regional standpoint. Mr. Shoemaker was a practicing attorney, a State Senator, and possessor of a degree in engineering. His combination of experiences, and the fact that he was a State Senator, gave the group the avenue needed to express their desires in the form of legislation.

In the 1967-68 period, the Five-County Engineers' Council became associated with the Denver Regional Council of Governments (DRCOG), and became known as the Metropolitan Urban Drainage Advisory Committee of DRCOG. The committee included the following members: Ted Dieffenderfer, Chairman, City of Boulder; Horace L. Smith, Vice Chairman, City and County of Denver; Calvin Ferguson, City of Aurora; Leroy Tobler, City of Arvada; Donald D. Gonzales, U.S. Geological Survey; Lewis Gaz, City of Lafayette; A. Joe Madonna, Boulder County; Stan Miller, Colorado Water Conservation Board; Arlen E. Patton, Public Service Company of Colorado; Del Roupp, Colorado Department of Highways; Robert L.

Sandquist, Adams County; David Sellers, Arapahoe County; Joe Shoemaker; Dennis Wacker, Jefferson County; Kells Waggoner, City of Englewood; Fred Woolley, Concrete Pipe Association; and Wayland Walker, DRCOG.

The interest in urban drainage was further intensified in late 1967 and early 1968 when DRCOG contracted with Wright-McLaughlin Engineers to prepare an *Urban Storm Drainage Criteria Manual*. Member governments of DRCOG each contributed funds for the preparation of the Criteria Manual with additional assistance provided by the U.S. Department of Housing and Urban Development. The Advisory Committee assisted DRCOG with policy questions which arose during preparation of the Criteria Manual. The policy decisions, and an article entitled, "An Engineering-Legal Solution to Urban Drainage Problems" published by Senator Shoemaker in the *Denver Law Journal* became the framework for the formation of the District.

Later in 1968, the Advisory Committee decided to go for legislation in 1969 that would create an Urban Drainage and Flood Control District in the Denver Metropolitan area. Senator Shoemaker and Bob Johnson, another attorney, put a legislative package together. The drainage advisory committee, in the meantime, met on a regular basis to provide engineering input such as the definition of boundaries and drainage policies.

All of the individuals involved persisted in their efforts and specific legislation was ready for introduction into the Colorado General Assembly in 1969. The bill was introduced in the Senate and sponsored by Senator Shoemaker as Senate Bill 202, *The Urban Drainage and Flood Control Act of 1969*.

Senator Shoemaker explained the need for the bill on the basis that as areas urbanized, drainage basins change, more water is cast downhill, and Mother Nature pays little attention to jurisdictional boundaries. The bill was not controversial in the Senate, and passed by vote of 26 Yes, 7 No, and 2 Absent.

Representative Ted Bryant, the sponsor of the bill in the House, was having a little more trouble. The bill was going nowhere, when in late May, on a Saturday, it started to rain. The rain continued through the weekend, and it appeared that it was not going to let up. Rep. Bryant, being an astute tactician, advised the Legislature that if they wanted the rain to stop, Senate Bill 202 should be passed. The House proceeded to pass the legislation on a final vote of 49 Yes, 14 No, and 2 Absent. Governor Love signed Senate Bill 202 in June, 1969, and the Urban Drainage and Flood Control District became a reality.

## EVOLUTION OF THE DISTRICT

The Urban Drainage and Flood Control District began its operations in 1969 with a staff of two, an Executive Director and a secretary. The first major activity of the District was to inventory drainage basins and sub-basins to determine the extent of problems and to develop a plan to attack those problems. A master planning program designed to develop flood control plans for multi-jurisdictional major drainageways was begun in 1971. The initial operation and planning expenses of the District were funded by a 1/10 mill levy.

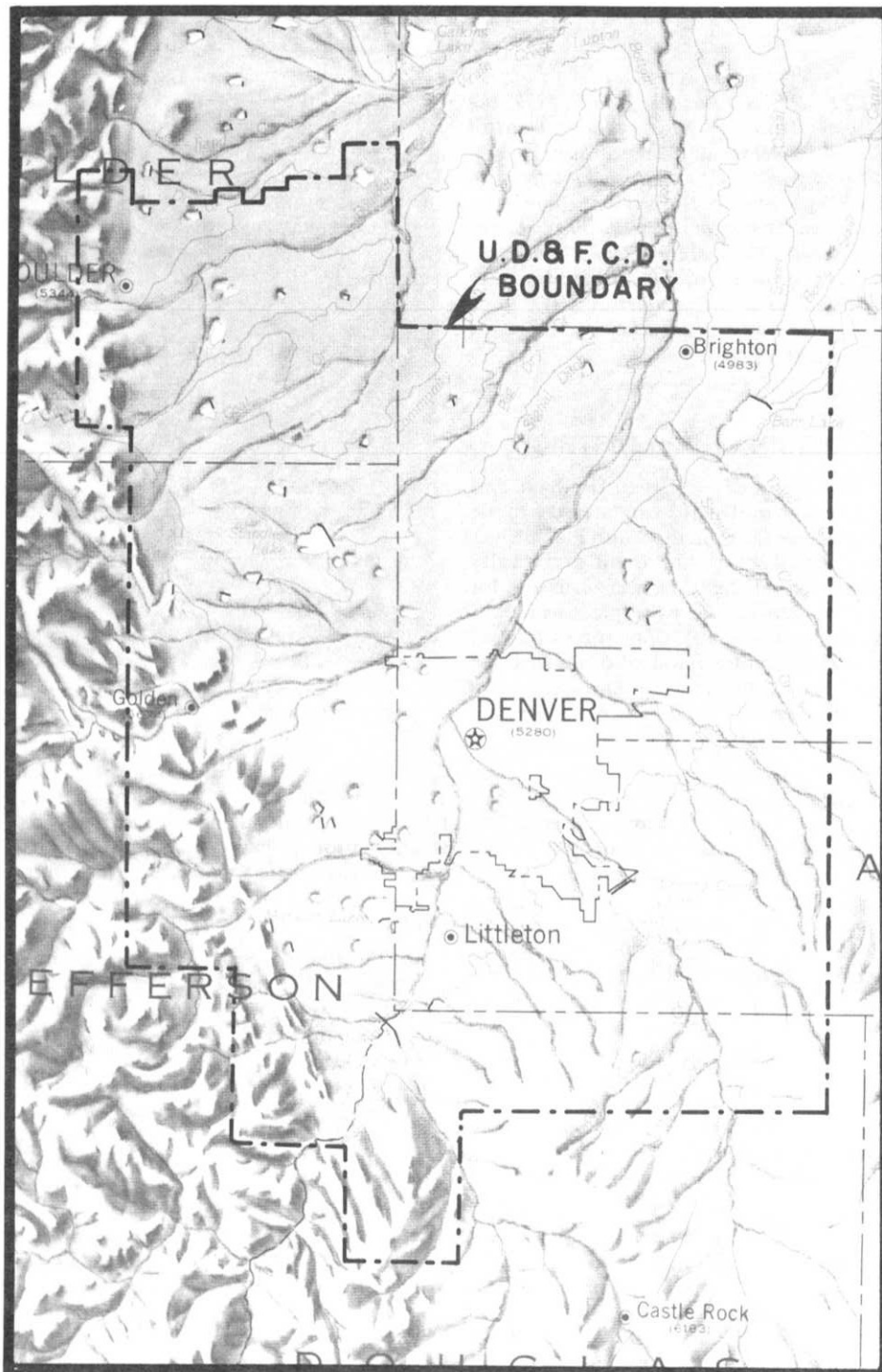
Beginning in 1974, the Colorado General Assembly authorized the District an additional 4/10 mill for a design and construction program. Also in 1974, a flood plain management program was established by the District's Board of Directors.

While the District had been assisting

local governments with the construction of flood control facilities since 1974, maintenance of those facilities remained a local responsibility until 1979. At that time the Board of Directors authorized a maintenance program to assist local governments with the maintenance of District funded facilities. Also in 1979, the Colorado General Assembly authorized another 4/10 mill for the maintenance and

preservation of all flood plains and floodways in the District for a three-year period beginning in 1981.

During its first ten years, the District's staff grew to a total of eight people including the Executive Director, a secretary, an administrative assistant, an accountant and four engineers. A more detailed history of the District's major programs follows.



The Urban Drainage and Flood Control District includes the City and County of Denver and portions of Adams, Arapahoe, Boulder, Douglas and Jefferson Counties.

## MASTER PLANNING PROGRAM

The Urban Drainage and Flood Control Act of 1969 authorized the Board of Directors to levy up to 1/10 of a mill for engineering and operations of the District. This authorization was adequate to fund the initial activities of the District.

The District recognized rather quickly that a definition of the drainage and flood control problems of the region, and some sort of blueprint as to how the District should proceed in addressing those problems, was vitally needed. This need was addressed through a \$300,000 project called "Renewing the Environment through Urban Systems Engineering" (REUSE). The project was funded by a \$200,000 Urban Systems Engineering Demonstration grant from the Department of Housing and Urban Development, and \$100,000 in local matching funds provided by the Denver Regional Council of Governments (DRCOG) and the District. Of the local share, the District provided \$60,000 and DRCOG \$40,000. Project REUSE was a dual program directed at metropolitan urban drainage and metropolitan solid waste disposal problems. The purposes of the project were to analyze the existing situation; to develop recommendations for immediate projects; to establish priorities for future planning; to prepare a 20-year planning and implementation program through 1990; and to relate solid waste management and urban drainage to other planning activities such as water, air pollution, transportation, housing, recreation, etc. Most importantly to the District, Project REUSE provided an opportunity to define drainage and flood control problems within the Denver region and identify strategies to address those problems.

One important product of Project REUSE was an inventory of the drainage basins within the District. The major drainage basins were defined and divided into sub-basins having tributary areas ranging from 1000 to 3000 acres. A numbering system for the basins and sub-basins was developed and a sub-basin description summary sheet was prepared for each sub-basin that included appropriate and pertinent basic data for the sub-basin. Thus, a system was developed that provided a means of identifying and cataloging drainage problems and solutions. Project REUSE was completed in 1972 and the work done regarding drainage basin descriptions is still standing in good stead.

Project REUSE clearly identified a need to develop both remedial and preventive planning strategies. The facts indicated that approximately 25% of the major drainageway miles within the District were developed, with the remaining 75% of the drainageway miles undeveloped and



Master planning often involves public participation. Pictured above is a public information open house which was held during the Cherry Creek master planning effort.

amenable to preventive approaches. The estimated 1972 cost for addressing all of the remedial needs was over \$113,000,000. It was logical that, if effective preventive measures could be taken on the 75% of the streams that were undeveloped, significant savings in future remedial needs could be realized. Because of this factor, the District made a commitment to preventive activities, and has developed a rather comprehensive flood plain management program, which is discussed elsewhere in this newsletter.

It was further determined that, in order to develop effective preventive and remedial programs, the District would have to develop comprehensive master plans for the majority of the 1,225 miles of major drainageways within the District. A master planning methodology was

developed during Project REUSE and was tested as a demonstration project on a major drainageway called Henry's Lake. Since the first master plan was completed in October, 1971, a total of 34 master plans have been completed or are in progress covering 374 miles.

Master planning has played an important role in developing the other programs of the District. For example, in 1973, the District requested from the legislature a 4/10 mill levy authorization for the purposes of construction. Because three years had been spent defining the problem and developing master plans, the District was in a good position to present a well-identified need for the construction mill levy. Facts were available, and the legislature was able to see the need and, as a result, provided the requested legislation.

### Master Planning Program KEY POLICY DECISIONS

1. Each master planning effort must be requested by the local governments and must be multi-jurisdictional.
2. Master plans are completed by consultants acceptable to all affected local governments and the District.
3. The District will provide necessary mapping and will pay 50% of the consulting costs. The local governments share the other 50% of the consulting costs.
4. The final master plan must be acceptable to all the affected local governments.



The District's approach to master planning has been to actively involve the local governments that are affected. This is accomplished by having local governments share in 50% of the engineering costs of a master planning study. The District provides the remaining 50% plus whatever mapping is required. The District has concentrated its efforts on multi-jurisdictional problems, thus all master plans to date have involved more than one local jurisdiction. The local governmental entities are full partners in the master planning study, thus the plans that result are the local governments' plans as well as Urban Drainage and Flood Control District plans.

Development of the master plans has provided the District a tool upon which to identify projects for construction. Each year the District updates its 5-Year Capital Improvement Program, and the information contained in the master plans provides valuable input.

To date the thrust for the District's master planning activity has been on major drainageways. This was done because the major drainageways provide the basic outlet for all basin flows. If the major

drainageways are not preserved or improved, they become inadequate to handle tributary flows as the basins develop. Also, the District felt its primary role was to address multi-jurisdictional problems. Most major drainageways are multi-jurisdictional in nature, and thus District involvement was needed to bring the local entities together.

While some work remains to be done on major drainageways, it appears that the thrust will shift from major drainageway planning to basin planning. The District's involvement will still be justified based on multi-jurisdictional needs, but District planning efforts will more and more involve the tributary systems to the major drainageways.

One important aspect of master planning in a rapidly developing area is that the future impacts of development can be addressed. All District master planning efforts are based on projected development. This is critical in the planning for facilities, or in identifying flood hazard areas. It makes no sense to define flood plains or plan for facilities that will become undersized and obsolete in the future.

The major point to emphasize is the importance of a sound planning program. The first District planning effort was broad-based in nature, and served to provide an inventory of the drainage and flood control system in the Denver region. Subsequent to the broad-based effort, a concentrated effort has been made on developing master plans for the major drainageways within the District. The development of these master plans has served as the basis in developing effective remedial construction programs and preventive efforts.

#### MASTER PLANNING PROGRAM FACTS AND FIGURES

(Through June 30, 1979)

- The District has 34 master plans completed or in progress.
- Total funds spent or committed are approximately \$1,840,000 (including local government contributions).
- A total of 374 miles of major drainageways have been or are being master planned.
- Twenty-five local governments have participated in at least one master plan.



Artist's conception of proposed channel improvements on Lena Gulch.

# DESIGN AND CONSTRUCTION PROGRAM

*The Urban Drainage and Flood Control Act of 1969* included a provision authorizing the construction of facilities by the District. The Act specifically stated that "The District, acting by and through the Board, may acquire, improve, equip, relocate, maintain, and operate the facilities, any project, or any part thereof, after the Board has made such preliminary studies and otherwise taken such action as it determines to be necessary or desirable as preliminaries thereto." The Legislature, however, did not include in the authorizing legislation the financial means to construct and/or maintain facilities.

Thus, in the initial years of the District following 1969, the District did not have a financial base upon which to participate in the construction of drainage and flood control facilities. In these initial years, the District concentrated on defining needs and developing drainage and flood control master plans.

The first master plan prepared by the District was for Weir and Sanderson Gulches and involved the City and County of Denver, the City of Lakewood, and Jefferson County. The project was initiated in the fall of 1971, and was the prototype of many planning efforts to follow. The engineering firm of Frasier and Gingery, Inc., now Gingery Associates, Inc., completed that first planning effort in August, 1972.

Both Lakewood and Denver had an interest in improving Sanderson Gulch. Because of their interest and the interest of the District, the State Legislature in 1972 appropriated \$350,000 for improvements to Sanderson Gulch. The District did not have any money to allocate to the project, so the District's strategy was to build upon the State contribution to raise the estimated \$1.4 million needed for the project. This was accomplished by obtaining a \$503,000 grant from the Department of Housing and Urban Development for Sanderson Gulch drainage improvements. Lakewood and Denver agreed to provide the additional funds needed and the first construction project involving the District was thereby launched.

The struggle to develop adequate funding for Sanderson Gulch prompted the Board to consider more dependable means of enabling the District to provide such funds. To solve the problem, the Legislature was requested in 1973 to authorize the District to levy 4/10 of a mill for capital construction. House Bill 1265, providing such authorization, was introduced into the House of Representatives in 1973 by Representative

Eaker from Lakewood. The bill was supported in the Senate by Senator Joe Shoemaker from Denver. House Bill 1265 was passed in April, 1973, and signed by the Governor on May 5, 1973.

The assessed valuation in 1973, to which the mill levy was applied, was about \$3.5 billion. Based on a 4/10 mill levy total revenue of about \$1,400,000 was generated in 1974. The availability of such funds on a dependable basis enabled the District to develop a truly viable construction program.

As soon as the additional mill levy for capital construction was authorized, the Board recognized the need to develop a policy for commitment of those funds. There are 34 units of local government located within the District including the City and County of Denver and parts of the five surrounding suburban counties. It was necessary to adopt a policy that would distribute the funds in such a way that local governments would not be fighting over the limited funds available. At a special meeting of the Board in May, 1973, the Board discussed criteria for the expenditure of construction funds. It was decided that counties would be the basic boundary upon which funds would be distributed. The Board directed that a resolution be prepared for consideration by the Board at the June meeting. At the June meeting, Resolution No. 11, Series of 1973, entitled "Capital Improvements Expenditure Policy" was adopted. The Resolution stated the Board's intent to develop a 5-year drainage and flood control capital improvement program that would be based on priorities determined in cooperation with local public bodies. The Resolution set forth the following criteria in establishing priorities:

1. The proposed improvement should be requested by local public bodies;
2. The proposed improvement has been master planned or preliminarily planned;

3. The local public bodies have indicated a willingness and readiness to share in one half of the total cost of improvement after subtracting any State, Federal, or other sources of funding, and
4. Local public bodies agree to enter into a maintenance agreement for the completed improvements.

The Resolution set forth the policy of the Board to allocate available funds for drainage and flood control improvements in such manner that the 5-year tax revenues received from counties within the District would be spent for improvements benefitting such counties. The Board directed the Executive Director to annually report the cumulative totals of revenues and expenditures raised from and spent within the counties of the District. The Board also expressed their intent to continue the practice of not building a public works department but to continue to work with the departments of local public bodies.

The adoption of Resolution No. 11 assured the Board members and representatives of local governments within the District that District monies would be spent on an equitable basis. This policy has been successfully implemented since that time.

It should be noted that the policy required a 50/50 sharing of project costs between the District and local entities involved. The Board felt that it was important that a cooperative or partnership approach to project development be pursued. They felt that if local governments participated financially in the project, it would be their project as well as the District's, thus assuring a cooperative approach. The Board felt that the District should contribute at least fifty percent of the project cost and that a 50/50 match would stretch the District funds as far as possible.

## Design and Construction Program KEY POLICY DECISIONS

1. Proposed improvements must be requested by local governments.
2. Proposed improvements must have been master planned.
3. District funds must be matched by local governments.
4. Local governments must agree to own completed facilities and must accept primary responsibility for maintenance.
5. District tax revenues received from each county will be spent for improvements benefiting that county over a period from 1974 to five years in the future.
6. The District will not develop a public works department but will rely on existing local government public works departments.

## DESIGN AND CONSTRUCTION PROGRAM FACTS AND FIGURES

(Through June 30, 1979)

- The District has participated in 36 separate design and/or construction projects.
- Total funds spent or committed on these projects total approximately \$20,621,000.
- The District's share of the costs totals approximately \$7,153,000.
- The District has participated with 18 local governments, two state agencies, two federal agencies and seven private parties in the design and construction of drainage and flood control facilities.

The Board first reviewed a proposed five-year capital improvement plan at their August, 1973, Board meeting. In October, 1973, the Board adopted a 1974 budget that included capital construction projects. Finally, in December, 1974, after considerable input from the local entities of the District, the Board adopted the first five-year capital improvement program for the years 1974 through 1978. The projected expenditures in each county at the end of 1978 were equivalent to the projected revenues from each county. This process has been continued and each year a new five-year capital improvements plan is adopted. The revenues and expenditures from 1974 through the end of each five-year planning period are balanced each year.

The Board authorized District participation in four projects in 1974. These included design and construction of Englewood and Holly Dams in Arapahoe County, design of Weir Gulch improvements in Denver and Lakewood, design and construction of lower Niver Creek Channel Improvements in Adams County, and design and construction of Viele Channel improvements in Boulder. The total 1974 District expenditure for these projects was \$799,900. The total District commitment to drainage and flood control improvements since 1974 is \$7,153,000.

The District's approach to construction is intended to minimize the need for a large staff. Generally the District coordinates final design that is prepared by a consulting engineer. The local entities are involved in the design process and all aspects of design are coordinated with them. The local entities generally acquire the necessary right-of-way and serve as the construction contracting agency. The local entities agree to own and maintain the completed facility. All costs associated with design, right-of-way acquisition, and construction are shared on a 50/50 basis between the District and local entities involved.



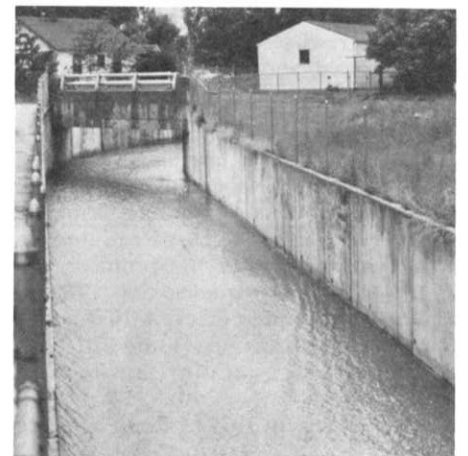
← An irrigated blue grass channel along Weir Gulch in Denver.

A grass lined channel and rip-rap drop structure on Lena Gulch in Wheat Ridge. →



← A baffle chute energy dissipator on Niver Creek in Adams County.

A rectangular concrete channel on Weir Gulch in Denver. →





## FLOOD PLAIN MANAGEMENT PROGRAM

The flood plain management program was established in 1974 in order to consolidate under one individual several activities which, up to that time, had received random attention on an available time basis. The major activities included in the program were:

1. The National Flood Insurance Program,
2. Flood plain regulation,
3. Flood hazard area delineation,
4. Flood warning,
5. Flood damage surveys,
6. Reviews of proposed developments in flood plains, and
7. Public information.

The District has worked with the Federal Emergency Management Agency (FEMA, formerly the Federal Insurance Administration) to insure the compatibility of FEMA's flood insurance maps and flood plains defined by the District. An immediate conflict arose because the District uses hydrology based on projected future development of the drainage basins to delineate 100-year flood plains, while FEMA uses present basin conditions. This conflict has yet to be fully resolved, although FEMA has used District delineated flood plains on many of their flood insurance maps. Efforts are continuing to finally resolve this conflict.

In 1974, the District began an effort to delineate 100-year flood plains in undeveloped areas in order to have flood hazard information available so that proposed developments could be planned with full knowledge of the flood hazard.

In 1975 and 1976 the District spent a significant amount of time working with all local governments having defined flood plains within their jurisdictions to insure that they had adequate flood plain regulations. This effort was quite successful in that all such local governments now have adequate regulations in effect.

In late 1976 the District became active in the area of flash flood warning. A pilot planning study of Boulder Creek was begun in 1976 and completed in 1977. Implementation of the selected alternative was begun in 1978 and is nearing completion. A second warning plan for Westerly Creek was completed in 1977. A planning project is underway for a third plan and others will be completed in the future. The District has also retained a private meteorological service to assist the National Weather Service (NWS) with area-wide flood warning and to provide support services in specific flash flood warning plans. The District has equipped

both the private service and the NWS with color radar receivers on which they can view the weather radar images from the NWS weather radar at Limon, Colorado and Cheyenne, Wyoming.

There have been no major floods in the District since the inception of the flood plain management program. However, the District has developed a procedure for documenting flood damage, and this procedure has been tested successfully on several small floods.

At the request of local governments the District will review proposed developments located in or near defined flood plains. To date, approximately 680 proposals have been reviewed.

In 1976 the Board of Directors decided to make a special effort to notify occupants of flood plains of the flood potential they faced. The result of this decision was a program to mail a brochure to each address located in or adjacent to each identified flood plain. In 1979, 19,000 brochures were mailed under this program.



### FLOOD PLAIN MANAGEMENT PROGRAM FACTS AND FIGURES

(Through June 30, 1979)

- The District has 18 flood hazard area delineation (FHAD) studies completed or underway.
- Total funds spent or committed on FHAD studies total approximately \$484,000 (including state and local government contributions).
- A total of 274 miles of flood plains have been or are being delineated by FHAD studies.
- A combined total of 648 miles of flood plains have been or are being delineated by FHAD or master planning studies.
- Eighteen local governments have had at least one FHAD study within their jurisdiction.
- Approximately \$41,000 has been spent or committed on flood warning planning (including local government contributions).
- Approximately \$200,000 has been spent or committed on the implementation of flood warning systems.

The picture to the left shows a remote rain gage which has been installed in the Boulder Creek drainage basin as a part of the Boulder Creek Flood Warning Plan.

### Flood Plain Management Program KEY POLICY DECISIONS

1. **The District should actively support the National Flood Insurance Program and should work with the Federal Emergency Management Agency (formerly Federal Insurance Administration) to insure compatibility of flood plain maps.**
2. **The District will not implement its flood plain regulation except in cases where the local governments fail to enact their own regulations.**
3. **The District will annually notify by mail all occupants of defined flood plains of the flood hazard and suggested actions they can take to mitigate the flood hazard.**

## Maintenance Program

When the District first became involved in the funding of flood control facilities, the Board of Directors recognized the need for maintenance of completed facilities. Therefore, as a condition for receiving District construction funds, local governments were required to enter into maintenance agreements for the completed facilities. These agreements gave the full responsibility of maintaining the improvements to the local governments. Maintenance continued to be a concern of the District, and, in 1976, the Board of Directors decided to ask the 1977 session of the Colorado General Assembly to authorize the District to levy an additional 4/10 mill for the maintenance and preservation of all the flood plains and floodways within the District. The bill containing that authorization died in a Senate Committee. The District, therefore, continued its policy of requiring local governments to maintain facilities completed with District funds.

In 1978, it became evident that local governments did not have the resources to provide adequate maintenance. Therefore, the Board of Directors authorized \$186,000 from the 1979 Capital Improvements Budget to assist local governments with the maintenance of District-funded facilities. In authorizing these funds the Board set up several broad guidelines and objectives to be used in implementing the maintenance program. The most critical of these objectives is that the District must strive to achieve the best maintenance services at the most economical cost. The Board authorized the District to contract directly for the necessary maintenance services and did not require the District to contract with any particular party. Therefore, the District can contract with local public bodies or private contractors to perform the required maintenance. The Board also established a policy that the funds for the maintenance of capital improvements shall be spent in the same manner as the funds for capital improvements; that is, tax revenues received from each county within the District will be spent for maintenance within that county. Again the Board emphasized its policy of not developing a public works department but of working with public works departments of local governments and the private engineering and contracting sectors.

The Board also decided to again request 4 10 mill levy increase for maintenance and preservation of flood plains and floodways from the 1979 Colorado General Assembly. This time, the legislation passed, although it was limited to a 3-year period from 1981 through 1983. Extension of the mill levy beyond 1983 will require



An example of the type of problems requiring maintenance

further authorization from the General Assembly.

After the Board authorized the expenditure of capital improvement funds for maintenance of District-funded projects, a maintenance engineer was added to the District's staff. It was his responsibility to develop and operate a maintenance program. Initial steps were to compile an inventory of facilities to be maintained as well as the standards and criteria for the maintenance activities. In addition to defining the problems and methods of solutions the District identified two major goals that should be achieved by the maintenance program. Firstly, a comprehensive cost accounting system is required in order to document individual maintenance activities as they relate to facility type. These costs can then be used with confidence in benefit/cost analyses as one of the decision making factors in the master planning process. Secondly, a complete record of inspection reports and maintenance activities must be maintained. These reports will give the District a better idea of how constructed facilities have actually functioned and will enable the District to more completely develop design criteria for flood control facilities.

The inventory identified two basic types of maintenance activities; routine and remedial. Routine maintenance includes such items as periodic mowing, trash removal, and minor erosion repair. Remedial actions include such items as the rehabilitation of damaged or vandalized facilities and major erosion repair.

Once the maintenance program was developed it was put into operation. Plans and specifications were developed for both the routine and the remedial activities. Maintenance agreements were executed with the local governments, and the District contracted for maintenance services. In some cases, the local governments actually performed the maintenance, while in other cases private firms were retained.

Once the General Assembly authorized the maintenance and preservation mill levy, the above-described activities were increased to include all flood plains and floodways within the District. As the District reached its tenth anniversary, the maintenance program directed toward District-funded facilities was in full swing and efforts were underway to prepare for the use of the additional funds which will be available beginning in 1981.

## Maintenance Program KEY POLICY DECISIONS

- 1. Maintenance of facilities funded by the District shall be the primary responsibility of the local governments.**
- 2. To the extent that funds are available, the District will assist local governments with maintenance of facilities funded by the District.**
- 3. Funds derived from the maintenance mill levy (to be received beginning in 1981) will be returned to each county in the same proportion as they are received.**
- 4. Local governments will not be required to match District funds.**



# THE BOARD OF DIRECTORS

If there is a single key to the success of the Urban Drainage and Flood Control District, it is the Board of Directors. The make-up of the fifteen member Board is unique, in that it is composed mainly of elected officials who are appointed to the Board. The Mayor of Denver is always a member of the Board. Three Denver City Councilmen are appointed to the Board by the Council President. The Boards of County Commissioners of Adams, Arapahoe, Boulder, Douglas and Jefferson Counties each appoint one of their members to the Board. The Governor of Colorado appoints four Mayors, one from each of Adams, Arapahoe, Boulder and Jefferson Counties, to the Board. These thirteen locally elected officials select two registered professional engineers to complete the Board membership. The following list contains the names of everyone who has served on the Board of Directors during the District's first 10 years.

- Hal Anderson (1973-Present)  
Commissioner, Jefferson County
- Jon Andren (1971)  
Mayor, City of Golden
- Gilbert Bean (1975)  
Mayor, City of Westminster
- Paul Beck (1970-1974)  
Mayor, City of Aurora
- Bob Briggs (1979-Present)  
Commissioner, Adams County
- John Buechner (1971)  
Mayor, City of Boulder
- Tom Carillo (1974)  
Mayor, City of Thornton
- Ruth Correll (1978-Present)  
Mayor, City of Boulder
- Jim Covey (1975-1978)  
Commissioner, Adams County
- David Cran (1972)  
Commissioner, Adams County
- David Curtis (1972-1976)  
Commissioner, Douglas County
- David Day (1978-Present)  
Engineer Member
- Carl DeTemple (1969-1970)  
Councilman, City and County of Denver
- W. G. Duncan (1977-Present)  
Commissioner, Douglas County
- Vaughn Gardinier (1975)  
Mayor, City of Littleton
- Kenneth Gorrell (1978-Present)  
Mayor, City of Arvada
- Charles Goudge (1969-1970)  
Mayor, City of Golden

- Jerry Grant (1973-1975),  
Chairman 1975,  
Commissioner, Adams County
- Fred Hood (1976-1978)  
Mayor, City of Aurora
- Irving Hook (1969-1974)  
Councilman, City of Denver
- Vi June (1976-1977)  
Mayor, City of Westminster
- John Kelly (1969-1970)  
Councilman, City and County of Denver
- Henry Kimbrough (1969-1970)  
Commissioner, Douglas County
- J. G. Kinghorn, Jr. (1969)  
Mayor, City of Littleton
- Robert Knecht (1969-1970)  
Mayor, City of Boulder
- Joe Lewis (1969-1972)  
Commissioner, Jefferson County
- Kenneth MacIntosh (1971-Present)  
Councilman, City and County of Denver
- Richard McLean (1972-1973)  
Mayor, City of Boulder
- William H McNichols (1969-Present)  
Mayor, City and County of Denver
- Kenneth Mitchell (1969-1973)  
Mayor, City of Brighton
- John Nicholl (1969-Present),  
Chairman 1969-1975  
Commissioner, Arapahoe County
- Sally Parsons (1978-Present)  
Mayor, City of Littleton
- Arlen Patton (1969-Present)  
Engineer Member
- Cathy Reynolds (1975-Present)  
Councilwoman, City and County of Denver
- James Richey (1972-1977),  
Chairman 1976-1978  
Mayor, City of Lakewood
- Anthony Richter (1978-Present)  
Mayor, City of Thornton
- Charles Robinson (1969-1977)  
Engineer Member
- J. Ivanhoe Rosenberg (1961-1974)  
Councilman, City and County of Denver
- Sam Sandos (1975-Present)  
Councilman, City and County of Denver
- Walt Spader (1976-1977)  
Mayor, City of Broomfield
- Penfield Tate (1974-1975)  
Mayor, City of Boulder
- Wally Toevs (1973-Present),  
Chairman 1978-Present  
Commissioner, Boulder County
- George Van Booven (1971)  
Commissioner, Boulder County
- Jim Van Buskirk (1972)  
Commissioner, Boulder County
- Ted Waymire (1969-1971)  
Commissioner, Adams County
- Carl Winkler (1971)  
Commissioner, Douglas County
- James Yeager (1969-1971)  
Commissioner, Boulder County



The Board of Directors touring the Sanderson Gulch project in Denver.

# The URBAN DRAINAGE & FLOOD CONTROL DISTRICT

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## BOARD OF DIRECTORS

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Flood Plain Management Program

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Master Planning Program

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Laurie Forsyth, Secretary

## FLOOD HAZARD NEWS

Bill DeGroot, Editor

THE URBAN DRAINAGE AND FLOOD CONTROL DISTRICT  
2480 West 26th Ave., #156-B  
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