



Urban Drainage and Flood Control District

ACTIVITY SUMMARY

March, 2013

Introduction

The purpose of this Activity Summary is to provide the reader with an overview of the organization, funding and programs of the Urban Drainage and Flood Control District. Readers are encouraged to contact the District for more detailed information about any item discussed in this summary.

The Urban Drainage and Flood Control District was established by the Colorado legislature in 1969, for the purpose of assisting local governments in the Denver metropolitan area with multi-jurisdictional drainage and flood control problems. The District covers an area of 1608 square miles and includes Denver, parts of the 6 surrounding counties, and all or parts of 32 incorporated cities and towns. There are about 1600 miles of "major drainageways" which are defined as draining at least 1000 acres. The population of the District is approximately 2.7 million people.

Governing Body

The District is an independent agency governed by a twenty-three member board of directors. The make-up of the board is unique, in that twenty-one members are locally elected officials (mayors, county commissioners, city council members) who are appointed to the board. These twenty-one members select two registered professional engineers to fill out the board.

Funding

District funds come from four different property tax mill levies. The mill levies are earmarked for specific programs that



Lena Gulch drop structure and pedestrian bridge

are detailed in the following sections. The total mill levy cannot exceed one mill.

Staff

The concept of the District is to keep the staff small and to utilize private consultants and contractors as much as possible. As a result the District operates a \$22 million annual program with only 24 full time employees, 3 part time, and 10 college student interns. The staff is responsible for management of all project funds; supervision of all work done by consulting engineers; and coordination of all planning, design, construction and floodplain management efforts with local governments.

Programs

The District operates four programs: Master Planning; Floodplain Management; Design, Construction and Maintenance; and Information Services and Flood Warning. A brief description of each program is given in the following sections.

Mission Statement

The Urban Drainage and Flood Control District works with local governments to address multi-jurisdictional drainage and flood control challenges in order to protect people, property, and the environment

Responsible Growth

The 1969 legislation which established the Urban Drainage and Flood Control District gave the District fairly broad powers but very little money to implement those powers. Initially, the District was authorized to levy 0.1 mill for planning and operations, which amounted to approximately \$400,000.

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. The initial study indicated that approximately 25% of the major drainageway miles within the District were developed, with the remaining 75% undeveloped and amenable to preventive approaches.

It was logical to consider that, if effective preventive measures could be undertaken on the undeveloped drainageways, significant savings in future remedial needs could be realized. The District Board therefore made a commitment to develop a comprehensive floodplain management program to prevent new problems from being created by new development.

The Board also realized that the South Platte River, the backbone for the drainage system for the entire Denver Metropolitan Area, was so large and had so many problems that it could absorb all of the District's time, effort and money. Therefore the Board decided initially to emphasize work on tributaries to the South Platte River.

District 2012 Assessed Valuation		
County	Assessed Valuation	Percent
Adams	\$4,368,844,820	12.0
Arapahoe	7,297,029,493	20.0
Boulder	4,088,317,358	11.2
Broomfield	937,544,145	2.7
Denver	10,082,782,062	27.7
Douglas	3,469,347,369	9.6
Jefferson	6,123,420,657	16.8
TOTAL	\$36,430,336,004	100.0

In 1973, following four years of problem identification and planning, the Board requested authority to levy an additional 0.4 mill for a design and construction program. The legislature granted the request, beginning in 1974. Also in 1974 the Board established the floodplain management program, to be funded out of the original 0.1 mill.

In 1979, the Board requested a 0.4 mill increase for maintenance and preservation of floodplains and floodways.

The legislature approved the request for a three-year trial period from 1980-83. In 1983 the levy authorization was extended indefinitely.

With several years of experience and many master plans and construction and maintenance projects completed or underway, the District turned to the South Platte River. A master planning study for the 40 miles of the river through the District was completed in late 1985. Using the master plan as a basis for its request, the Board sought an additional 0.1 mill authorization from the legislature (excluding Boulder County) for funds to be earmarked for the South Platte River, and that request was approved in 1986.

By 1986, the District had been authorized to levy up to 1.0 mill for the following purposes: General Fund (operations, Master Planning Program and Floodplain Management Program) - 0.1 mill, Design and Construction Program - 0.4 mill, Maintenance and Preservation Program - 0.4 mill and South Platte River Program -0.1 mill. In 1991, the Taxpayers Bill of Rights, or TABOR, was passed by the citizens of Colorado. As a result, the maximum mill levy the District can assess in Adams, Arapahoe, Denver, Douglas, and Jefferson Counties is 0.78 and 0.696 in Boulder and Broomfield Counties.

The District became involved in urban stormwater quality after Congress amended the Clean Water Act in 1986, requiring local governments to improve stormwater quality. The District has assisted local governments in preparing National Pollution Discharge Elimination System (NPDES) permits; and in planning, constructing and maintaining stormwater quality facilities. The District has also conducted stormwater quality research and developed best management practices, among other stormwater quality activities.

The District now has a comprehensive program addressing all aspects of flood management, a set of tried and proven policies and procedures, and a reasonable and reliable level of funding. Details of the individual District programs are provided in greater detail in the following sections.

Since 1969 the metro area has grown by almost two million people, and the urban area was extending beyond the District's boundaries. Denver International Airport spurred new development plans to the east of the District, and development was also expanding to the south. In 1989 the Board requested that the Legislature expand the District's boundaries to encompass these new growth areas, and the legislature granted that request, adding about 400 square miles to the District's area.

In 2012 the District levied 0.619 mill in Adams, Arapahoe, Denver, Douglas and Jefferson Counties; and 0.562 mill in Boulder and Broomfield Counties.

Master Planning Program

The Master Planning Program is funded out of the original 0.1 mill authorization for the District. The program is staffed by a manager, two senior project engineers, and two part-time student interns. The four core areas of work undertaken by the Master Planning Program include: 1) Watershed master planning, including major drainageway planning studies and outfall systems planning studies; 2) Development of drainage and stormwater quality criteria and related software for local governments, developers, and

UDFCD-sponsored projects; 3) Development and refinement of the regional hydrologic model, including annual hydrologic data

must be requested by the local governments and must have a multi-jurisdictional dimension; 2) Master plans are completed by consultants acceptable to all local project sponsors and the District; 3) The District will pay up to 50% of the study costs, with the local sponsors sharing the remaining costs; and 4) The completed plan must be acceptable to all the affected local governments.

Over 170 watershed master plans have been completed and thirteen are in progress. These represent in excess of \$5.6 billion in drainage infrastructure needs. For more information on the location and status of these master plans, visit the District's Activity Summary web page at www.udfcd.org.

Development of drainage and stormwater quality criteria and related software for local governments includes promulgation of criteria based on UDFCD research and experience as well as research done in other parts of the country. This is done, in part, by the development of software to aid in design and review and by offering continuing education regarding the criteria and software.

Development and refinement of the regional hydrologic model includes funding the operation and maintenance of rainfall and stream flow gauges for sixteen instrumented watersheds within the District's boundaries. The information gathered at these sites spans three decades and was used to calibrate the District's "Colorado Urban Hydrograph Procedure" which has become the standard acceptable method for regional floodplain delineation.

Special projects, including field testing of stormwater best management practices and other projects that contribute to the advancement of regional stormwater technology and support local governments in their municipal stormwater discharge permit efforts include detailed monitoring at six BMP sites. These monitored sites utilize various treatment processes and require a variety of maintenance practices. At each site, water quality and volume of both treated and untreated runoff is monitored.



District master plans provide recommended improvements

gathering and maintenance of long-term rainfall and runoff records for instrumented watersheds, and 4) Special projects, including field testing of stormwater best management practices and other projects that contribute to the advancement of regional stormwater technology and support local governments in their municipal stormwater discharge permit efforts.

Watershed master plans provide the benefit/cost analysis and engineering basis for the District's Five Year Capital Improvement Program. They identify necessary right-of-way acquisition and prioritize future construction. They additionally guide new land development projects toward consistency with regional drainage and water quality needs.

Key policy decisions which guide the development of watershed master plans are: 1) Each master planning effort



A rain harvesting facility, left, and a rain garden

This data is made available on the website by way of detailed reports, typically after a minimum of three years of data is collected and analyzed. The data is used to determine the event mean concentrations of various constituents that affect stormwater runoff and assess the long-term performance of each BMP.

Recently added BMP sites include a rain garden constructed through a partnership with the City of Lakewood and a rain water harvesting site constructed for a public school in Denver.

Floodplain Management Program

The Floodplain Management Program was established in 1974 to prevent new flood damage potential from being introduced into the 100-year floodplains, while encouraging the utilization of non-structural methods of flood damage mitigation. The major activities of the program are: (1) The National Flood Insurance Program (NFIP), (2) Floodplain regulation, (3) Flood hazard area delineation, (4) Development reviews, (5) Maintenance eligibility, (6) Master plan implementation and (7) Public information.

The NFIP was established to make affordable flood insurance available to everyone while encouraging sound floodplain management. The District works with local governments to assure that they remain in the program and keep flood insurance available for their citizens.

The District also works with FEMA, the agency which administers the NFIP, to assure consistency between District studies and Flood Insurance Rate Maps (FIRMs). Since mid-2001 the District has had a grant from FEMA to review requests for Letters of Map Change to the FIRMs at the local level. Also, the District has received several grants from FEMA to convert the FIRMs to Digital FIRMs (DFIRMs), and to update the DFIRMs.

The District has the authority to regulate floodplains but has chosen not to do so as long as the local governments implement their own regulations. The District assists the local governments with their floodplain regulations, including the requirements of the NFIP.

The flood hazard area delineation (FHAD) program continues to identify and publish 100-year floodplains. The floodplains form the basis for floodplain regulation when

development is proposed. For more information on the location and status of these FHAD studies, visit the District's Activity Summary web page at www.udfcd.org.

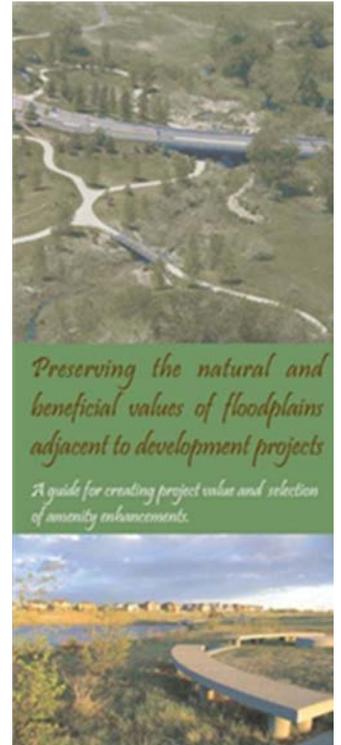
The District reviews and comments on proposed developments in or near floodplains at the request of local governments. This is where efforts are made to have developers follow or implement the appropriate portions of District master plans. Developers and local governments are encouraged to recognize the benefits to developments and the local government of leaving the floodplains in open space uses as amenities.

The maintenance eligibility program requires that drainage

and flood control facilities constructed by, or approved for construction by, local governments must be approved by the District in order for those facilities to be eligible for assistance from the District's Maintenance Program.

The District has a special notification program to notify occupants of floodplains of the flood potential they face. The District annually mails over 22,000 informational brochures to addresses in or adjacent to each District identified floodplain. Annual flood awareness press releases are also issued.

The program staff consists of a program manager, a senior project engineer, a project engineer and a part-time construction manager



This ASFPM award winning brochure illustrates the benefits of preservation of the floodplain to local governments and developers.



Floodplain preservation on Cherry Creek in Arapahoe County

Information Services and Flood Warning Program

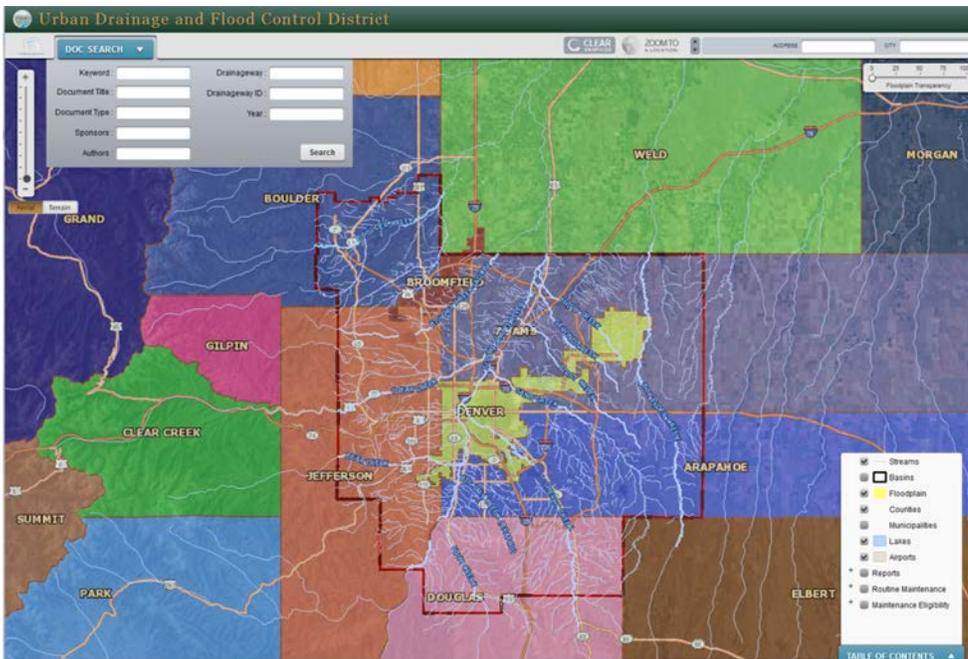
This program was established in January 2005, in order to consolidate and enhance the District's information services and flood warning capabilities. The flood warning program has served District local governments since 1979 and was previously an activity of the Floodplain Management Program.

The District assists local governments in developing flood warning plans and installing and maintaining automated flood detection networks. In addition, the District hires a private meteorological service to provide daily forecasts of flood potential and to notify District local governments when threatening conditions develop. The daily forecasts and real-time data from the flood detection networks are available from the District's website.

A major activity is the development, operation and maintenance of the District's Geographic Information System (GIS), which



Goldsmith Gulch at Liff Ave. in Denver, June 3, 2005



The District's Electronic Data Management GIS map-driven website can be used to retrieve documents, view floodplains and for other information services.

supports a variety of District activities including: Digital Flood Insurance Rate Map (DFIRM) production and maintenance; tracking projects for maintenance eligibility; design and construction projects; routine and restorative maintenance projects; flood threat recognition and warning decision support; data sharing; regional mapping initiatives; and other applications.

Another ongoing effort is to administer the District's website and continually improve Internet access to electronic information available from the District and affiliated organizations. The District is well positioned to meet these growing demands with initiatives like developing an electronic library to enable consultants, local governments and the public to retrieve District documents, photographs, videos and files.

The program staff consists of a manager, an information services engineer and an information systems technician.

Design, Construction and Maintenance Program

The Design, Construction, and Maintenance Program partners with local agencies to implement master planned improvements and maintain existing regional drainage facilities. The program is funded by three separate legislative authorizations; Design and Construction, Maintenance, and South Platte River, each of which are described in more detail below.

The program staff consists of one program manager, one assistant manager, four project engineers, five construction

managers and several part-time student interns. Design and Construction as well as the Maintenance funds are spent within the county they were collected in, therefore the organization of the program is county based.

Project engineers manage all the work within a county, with the assistance of construction managers and student interns. Since the South Platte River is its own funding source the program manager and assistant manager administer work along the river.

Design and Construction

In 1974, the State Legislature authorized the District to levy an additional 0.4 mill to fund the design and construction of drainage improvements. Funding for capital improvement projects is shared between local governments and the District on an equal basis. The District's Board of Directors set policies for equitable distribution of available funds such that local governments could be confident that one portion of the District would not be subsidizing construction in another.

The key policy decisions were as follows: (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 their maintenance; (5) District tax revenue received from each county will be spent for



Cherry Creek Drop Structure No. 27 in Denver

improvements benefiting that county over a period from 1974 to five years into the future; and (6) The District will not develop a public works department but will rely on the private sector to design and construct the work.

The District's approach is intended to minimize the need for a large staff.

Generally, the District manages the design process utilizing local consulting engineers. The local governments are involved in all aspects of the design and typically acquire the necessary rights-of-way (ROW), and assist in acquisition of required permits.

Each year the Board adopts a Five Year Capital Improvement Plan which lists projects and District participation by county from 1974 to five years into the future. This plan forms the basis for District participation in design and construction projects.

Since 1974, the Design and Construction fund has contributed \$205.3 million to drainage improvement projects. For more information on the location and status of major construction projects, visit the District's web page at www.udfcd.org.

District CIP Expenditures by County (1974 - 2012)	
County	Expenditures
Adams	\$22,652,600
Arapahoe	44,132,400
Boulder	20,629,200
Broomfield	1,628,200
Denver	64,165,400
Douglas	14,129,700
Jefferson	38,010,400
TOTAL	\$205,347,800

Maintenance

After seven years of building projects, an additional 0.4 mill was added in 1981 to support Maintenance activities. The Maintenance Fund has been used to assist local governments in the Denver area with their drainageway maintenance activities. Through 2012 a total of \$201.8 million of District funds has been spent on major drainageway maintenance.

Key operating policies for the use of Maintenance Funds include the following: (1) To the extent funds are available, the District will assist local governments with maintenance and preservation of floodplains and floodways; (2) Drainageways on which maintenance projects are constructed must be publicly owned or in a public easement; (3) The expenditure of District maintenance funds is prioritized first toward District-owned facilities and District-funded projects, then to projects funded by others, and finally to unimproved urban and unimproved rural drainageways; (4) Funds derived from the maintenance mill levy

categories: routine, and restoration. These activities are described in greater detail below.

Routine maintenance consists of mowing native vegetation, trash and debris cleanup, trash rack cleaning, tree thinning, and control of weeds and other noxious vegetation. Private contractors are hired each year to perform the routine maintenance activities on a unit price basis.

Restoration work is a broad category that can include many types of work. Smaller projects may include detention pond mucking, local erosion and bank protection repair, isolated structure repair, and local channel grading, stabilization and revegetation. Catching and repairing these smaller problems early often eliminates the need for more costly work later on.

Larger restoration projects are design and construction efforts which are intended to rebuild and reestablish existing



Before (left) and after views of a maintenance project on Coyote Gulch looking toward Bear Creek Lake in Lakewood

are allocated to each of the seven counties within the District on the basis of the tax revenues each county generates for the Maintenance Fund; (5) Local governments are not required to match District maintenance funds, but may participate in order to accelerate completion of a large project; and (6) The District will not create a public works department. All design and construction work is contracted to the private sector.

An annual maintenance work plan is developed for each county based on the funds available for that county and on a prioritized list of maintenance requests from each local government in that county. Maintenance work is divided into two

drainage facilities which have been damaged or neglected such that structural problems have developed. Examples include reconstructing or replacing drop structures; building low flow or trickle channels; establishing maintenance access into drainageways; and rebuilding or providing protection for existing channel improvements, box culverts, retaining walls, and other facilities.

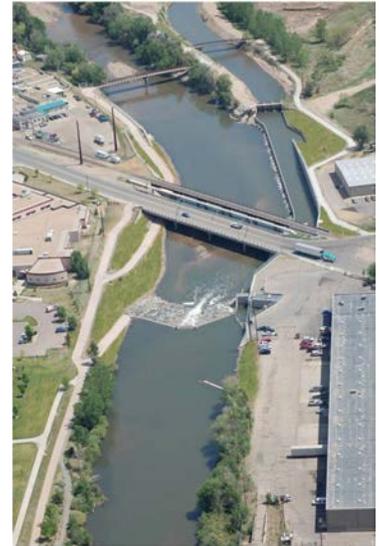
For more information on the District's maintenance activities, visit our web page at www.udfcd.org. There you will be able to access maps of all areas the District maintains and schedules of proposed activities.

South Platte River

The South Platte River Program was created in 1987 and is funded by a separate 0.1 mill levy authorization. It was established in order to provide special attention to the South Platte River, which is the receiving body of water for all the other drainageways in the District. The District Board annually allocates funds for capital projects and maintenance of the river. The District works with local governments to plan capital projects several years into the future, and will share in the cost of capital improvement projects on the basis of a minimum contribution of 25% from the participating local government. In addition to capital improvement projects, maintenance of the river corridor is a primary activity. The District generally contributes 100% of the cost of maintenance activities, which include mowing, weed control, debris removal, tree thinning, and maintenance access repairs.

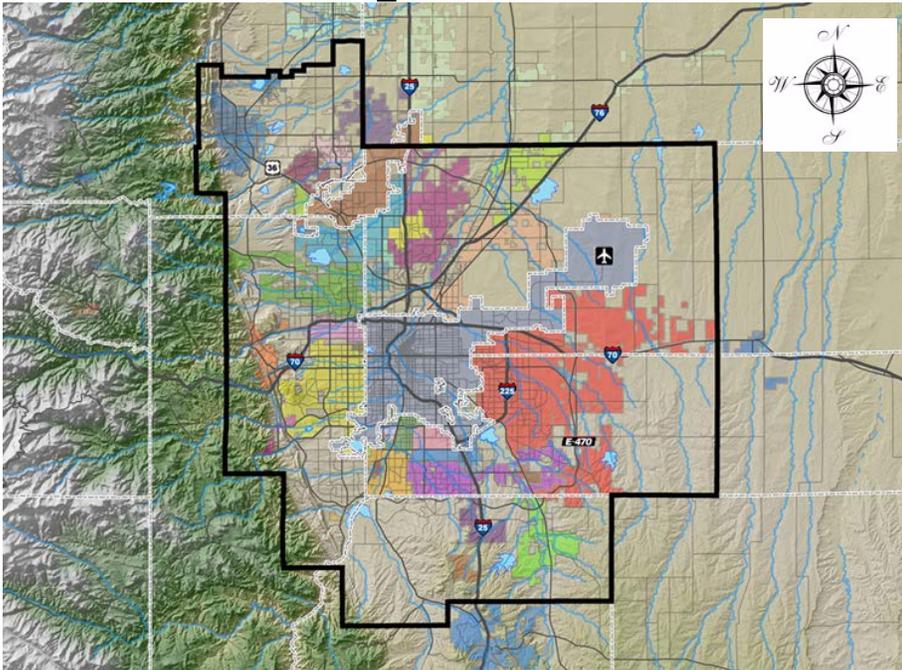
Other efforts include cooperative projects with property owners to stabilize river banks, assistance in acquisition of right-of-way for local governments, detailed inventories of facilities

and properties along the river, periodic surveys of the river to track and assess horizontal and vertical movement of the river channel, and cooperation with local governments in floodplain preservation acquisitions and recreation projects. For more information on the District's South Platte River activities, visit our web page at www.udfcd.org.



South Platte River in north Denver

District Map



Vision Statement:

Achieve a sustainable network of safe, efficient, and environmentally sensitive drainage and flood control facilities to best serve an urban community that is aware of its flood risks. Lead the region and the nation by implementing innovative thinking and technology and by promoting wise use of public and private lands, while providing unsurpassed service to the community.

How to Contact the District

Address: 2480 West 26th Ave., Suite 156-B, Denver, CO 80211

Phone: (303) 455-6277 **Fax:** (303) 455-7880 **E-Mail:** udfcd@udfcd.org

You can also visit our web page at www.udfcd.org for Board meeting information, including agendas and resolutions; links to floodplain maps, copies of all UDFCD publications, including the *Urban Storm Drainage Criteria Manual* and our annual newsletter *Flood Hazard News*; links to websites for all on-going master plans; information on the District's flood warning program; and real-time weather conditions, rainfall totals, and stream and reservoir water levels