



City of Aurora
November 11, 2013

City of Aurora

September 2013 Flood, Initial Report



Expo Park, Expo Park, Mexico & Laredo (Keown)

Executive Summary

Rarely, a weather event takes place that is so unprecedented the likelihood of it happening again will be one in 1,000 years. That very event took place in Aurora during the week of September 11, 2013. This document will outline much of the activity that took place during this event. Items herein include:

- Facts about the flood itself
- The emergency response
- Water department actions
- Recovery and aftermath

Much of the work recovery phase of this incident is in progress or complete. This is, however, a preliminary report and all information included are as accurate as can be assessed as of the date of publishing.

A more detailed report of the 2013 Flood will be provided once full recovery is complete.

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I-225 (Abilene & Alameda) (Scripps)

Contents

<i>September 2013 Flood, Initial Report</i>	<i>1</i>
<i>Executive Summary</i>	<i>2</i>
<i>Introduction</i>	<i>4</i>
<i>The Flood by the Numbers</i>	<i>5</i>
<i>City of Aurora Response</i>	<i>16</i>
<i>Aurora Water Response</i>	<i>27</i>
<i>City, County, State and Federal Embrace of Recovery</i>	<i>34</i>
<i>Conclusion</i>	<i>44</i>



Colfax and Moline (Keown)

Flood of the Millennium

Introduction

As summer began drawing toward fall this year, Mother Nature was not quite ready to release its grip. Between September 2nd and 8th, “Record to near record heat occurred across Northeast and North Central Colorado”(NWS 2013). On the morning of the 9th, “a cold front moved across Northeast Colorado...[along with advancing deep] subtropical moisture” (NWS 2013). The resulting upper level low pulled a consistent stream of subtropical moisture onto the Denver Front Range (NWS 2013).



Early morning September 10, sporadic rainfall began in the Aurora area. That rain intensified and continued at a near non-stop pace for the next six days. The result of this one in a thousand year flood brought much of the city to a standstill.

Responding to the unprecedented challenge were the men and women of the City of Aurora. Police, Fire, Public Works, Water, Parks, Recreation and Open Space (PROS), Public Safety Communications Department, and City Administration all came together to protect and assist the citizens of this city.

This document will provide a broad analysis of the many factors associated with the response to the 2013 Flood.

The Cold Wet Facts

The Flood by the Numbers

The weather event that locked onto the front range of Colorado and held on for nearly 7 days will be written into the history books as one of the most unprecedented on record.

During the middle of the storm, Aurora Water spokesman Greg Baker issued a statement to the Aurora Sentinel:

Baker said that the city had experienced a 500-year flood, or a flood that has a 0.2 percent chance of occurring in a year. The city was designed for a 100-year flood, or a flood that has a 1 percent chance of happening. Between Sept. 9 and Sept. 14, the city received 14.5 inches of rain; the city gets an average of 15 inches of precipitation annually, Baker said. To put this in another perspective, if this had come in the form of snow, *it would have been about 12 feet of snow in three days.* (Castellanos 2013)

Yet, the rain continued. When the sun finally broke through the clouds by the later afternoon and evening on Sunday, September 15 one rain gauge at approximately Mississippi and Peoria registered a total of 15.43 inches of rain over a 7 day period.



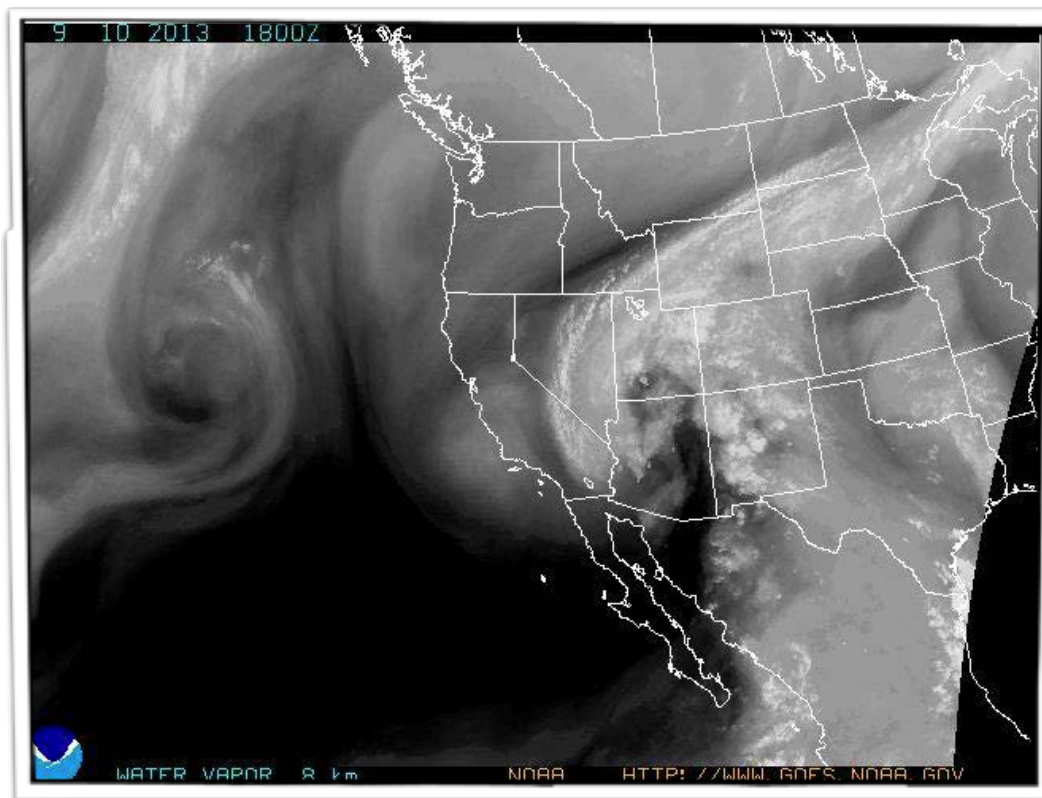
Alameda & Ironton (Keown)

This total places this storm easily in the realm of a once in a 1,000 year event! (NWS 2013)

An overview of each days rain events are as follows:

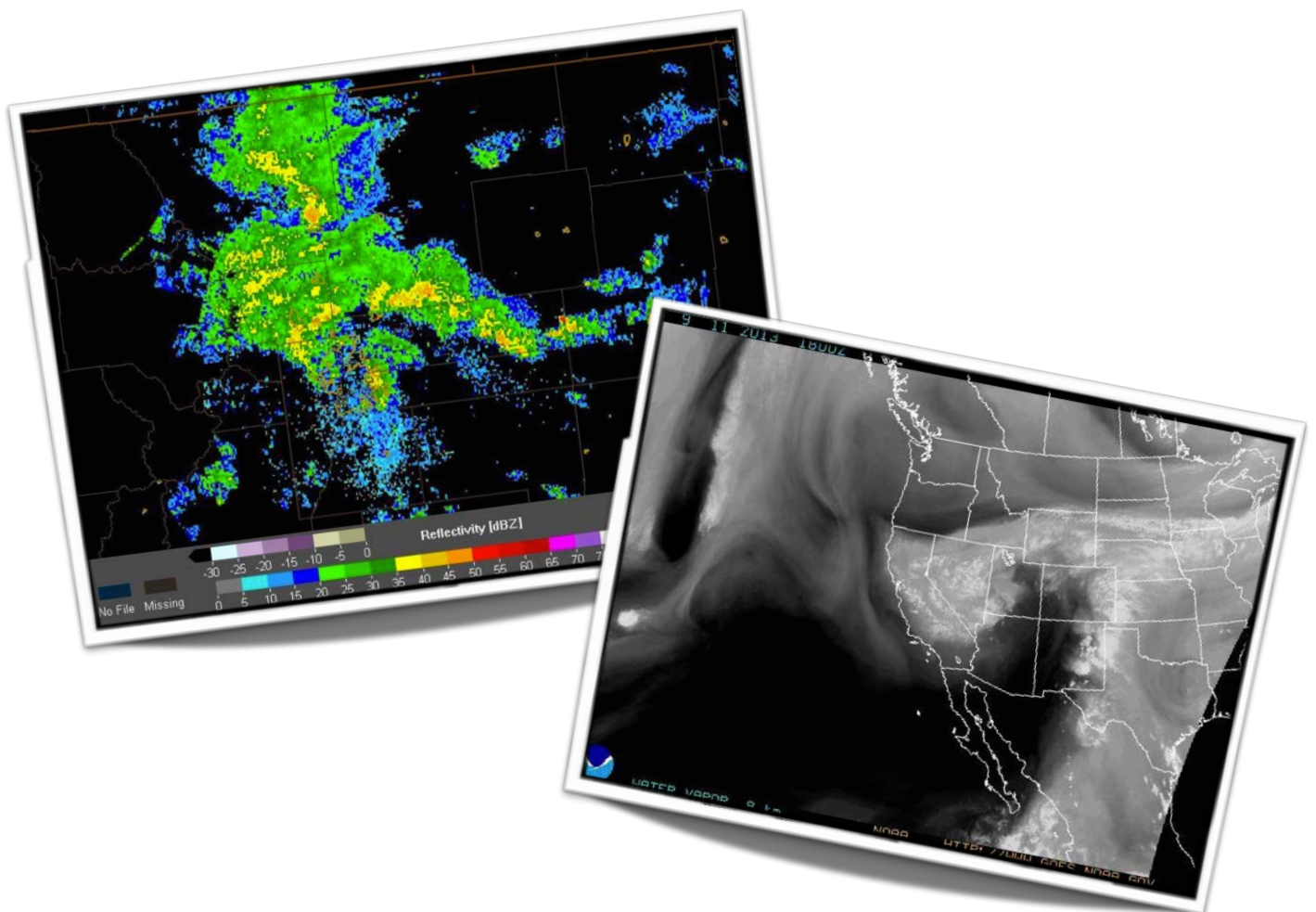
Tuesday September 10th:

“While showers and a few storms developed in a very moist environment, generally moderate rainfall amounts occurred along the Front Range with 0.25” to 1.25” amounts common. Nearly 2” of rain fell with the strongest storms over the southeastern sections of Denver, as well as near Boulder” (NWS 2013).



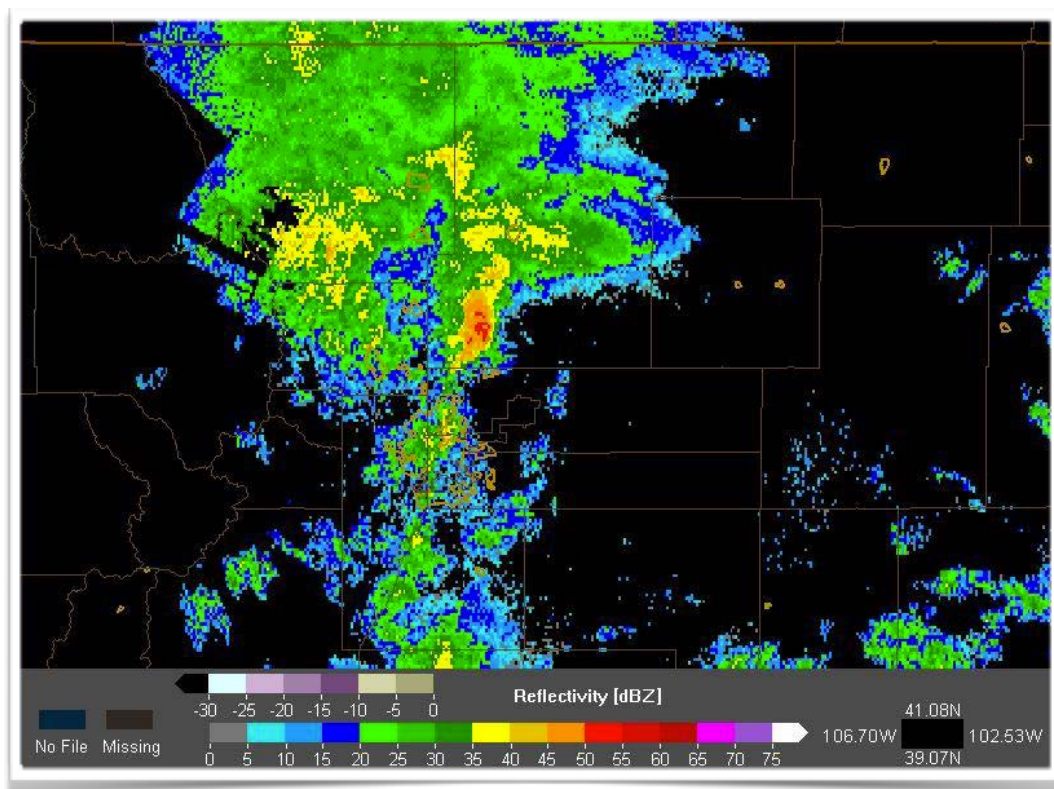
Wednesday, September 11th:

- The upper level low in the desert southwest drifted slowly northward, with deeper subtropical moisture shifting north & east across eastern Colorado.
- The atmosphere remained quite moist, with the 6 AM and 6 PM Denver soundings indicating precipitable water values near 33 mm (1.30 inches).
- By 9 PM, heavy rain was becoming more widespread, with rainfall rates near 2" per hour in the heaviest showers (NWS 2013)



Thursday, September 12th:

- Atypical for Colorado, the extremely heavy rain continued into the morning hours on Thursday. Now, torrential rain and flash flooding was developing in Aurora and northeast Denver.
- 24 Hour rain totals ending 7 AM, Thursday, September 12th
 - 3-6.5" Larimer/Boulder county foothills & northeastern Denver Metro area into southwest Weld county.
- Heavy rain and considerable flash flooding continued through the morning in the Aurora area, with generally lighter rainfall elsewhere.



- While flooding continued in many areas, the severity of flooding would only increase on the evening of September 12th. Heavy rain, while not as widespread as the previous day, had a greater impact on stream levels as streams were already elevated and the ground was completely saturated. Rainfall rates still approached 1.5" per hour in the heaviest cells. (NWS 2013)



Mexico and Laredo (Keown)

Friday, September 13th:

- Rain finally decreased during the early morning hours of Friday, September 13th but floodwaters were now rushing downstream from the foothills eastward onto the plains including Weld county.
- 24 Hour Rain totals ending 7 AM, Friday, September 13th
 - ~2-6" in/near foothills of Boulder/Larimer/Nrn Jefferson counties, & Aurora/ eastern Denver area



Peoria & Mexico (Keown)



Expo Park (Keown)

Saturday, September 14th:

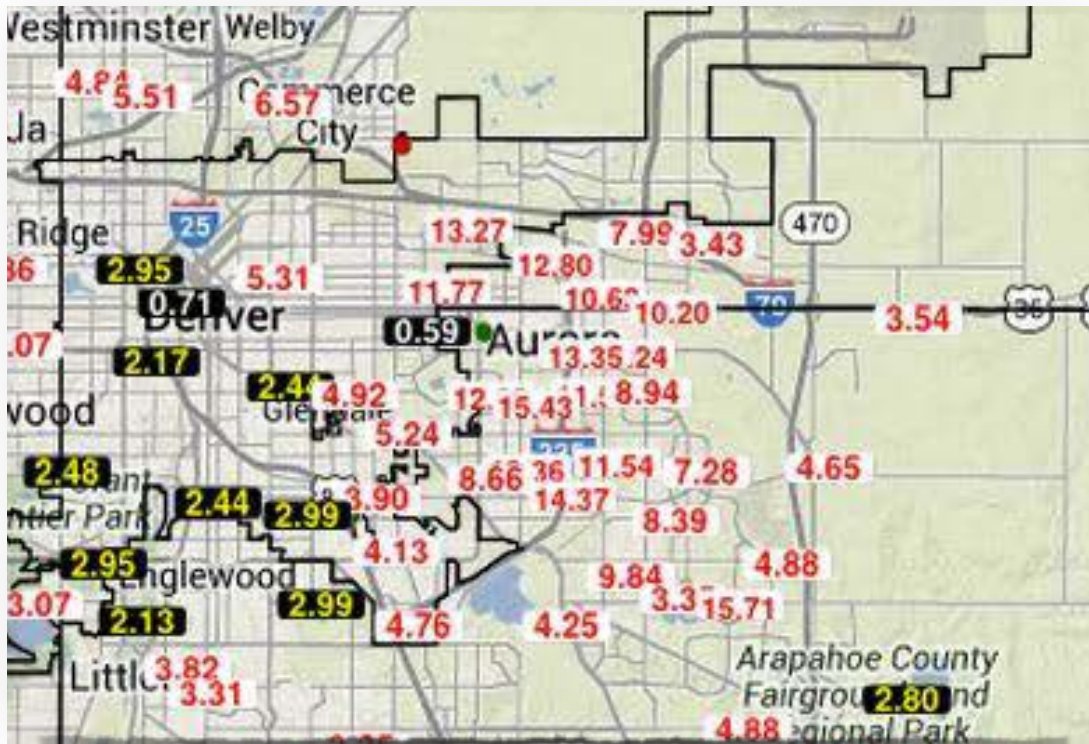
- The flash flood threat returned for Saturday. This time, storms with heavy rainfall occurred in Douglas County, but also extended northeast into the Aurora area once again. Up to 3" of rain fell in 1 hour. (NWS 2013)
- Primarily isolated to Aurora, this cell dropped a significant amount of hail, leaving the city blanketed in white.



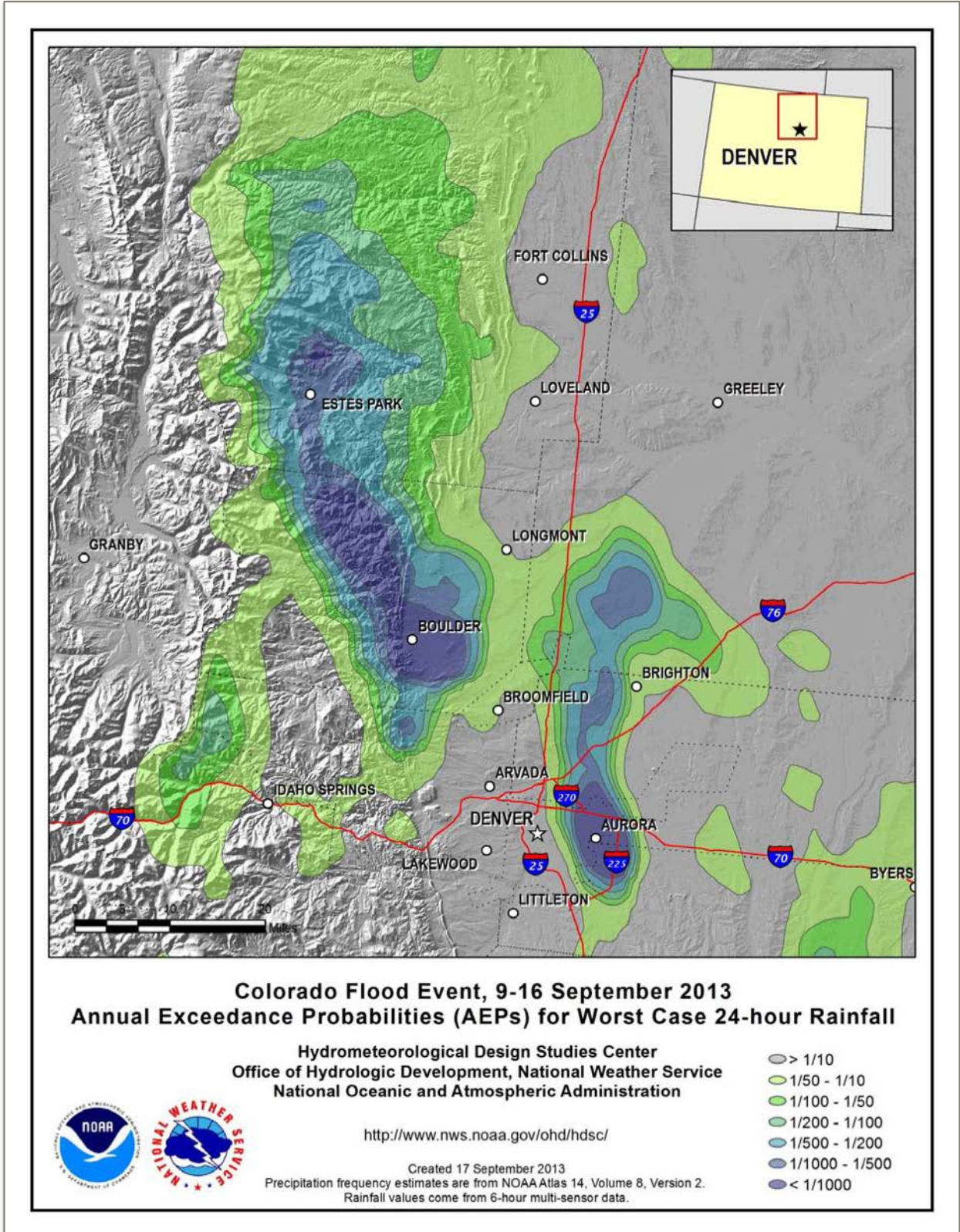
I-225 (Alameda & Abilene) (Scripps)

Sunday, September 15th:

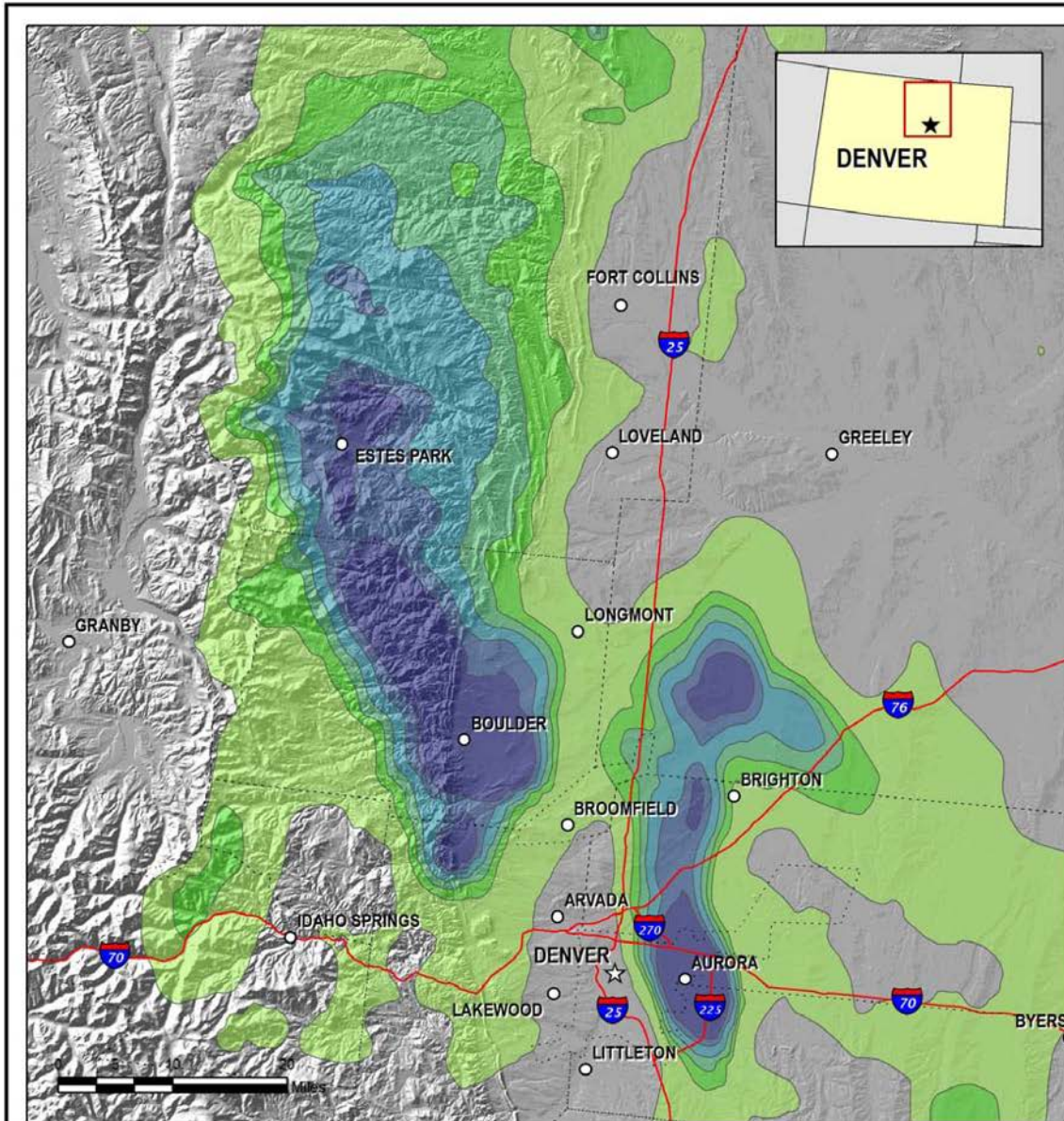
- The last day of this prolonged period of very heavy rainfall was on Sunday, September 15th. Another weak front had pushed through the area Saturday night, leaving the atmosphere unseasonably moist and unstable. Heavy rain developed by mid morning and then became more widespread and peaked in intensity by the noon hour. This time, flash flooding was most significant in the northern portions of the Denver metro area from Northglenn to around Broomfield. Rain finally tapered off during the late afternoon and evening.
- ▶ Rainfall total for 7 days as compiled by the National Weather Service (NWS 2013):



24 Hour Record Rainfall Amounts (Aurora 1:1000)



48 Hour Record Rainfall Amounts (Aurora 1:1000)



Colorado Flood Event, 9-16 September 2013 Annual Exceedance Probabilities (AEPs) for Worst Case 48-hour Rainfall

Hydrometeorological Design Studies Center
Office of Hydrologic Development, National Weather Service
National Oceanic and Atmospheric Administration

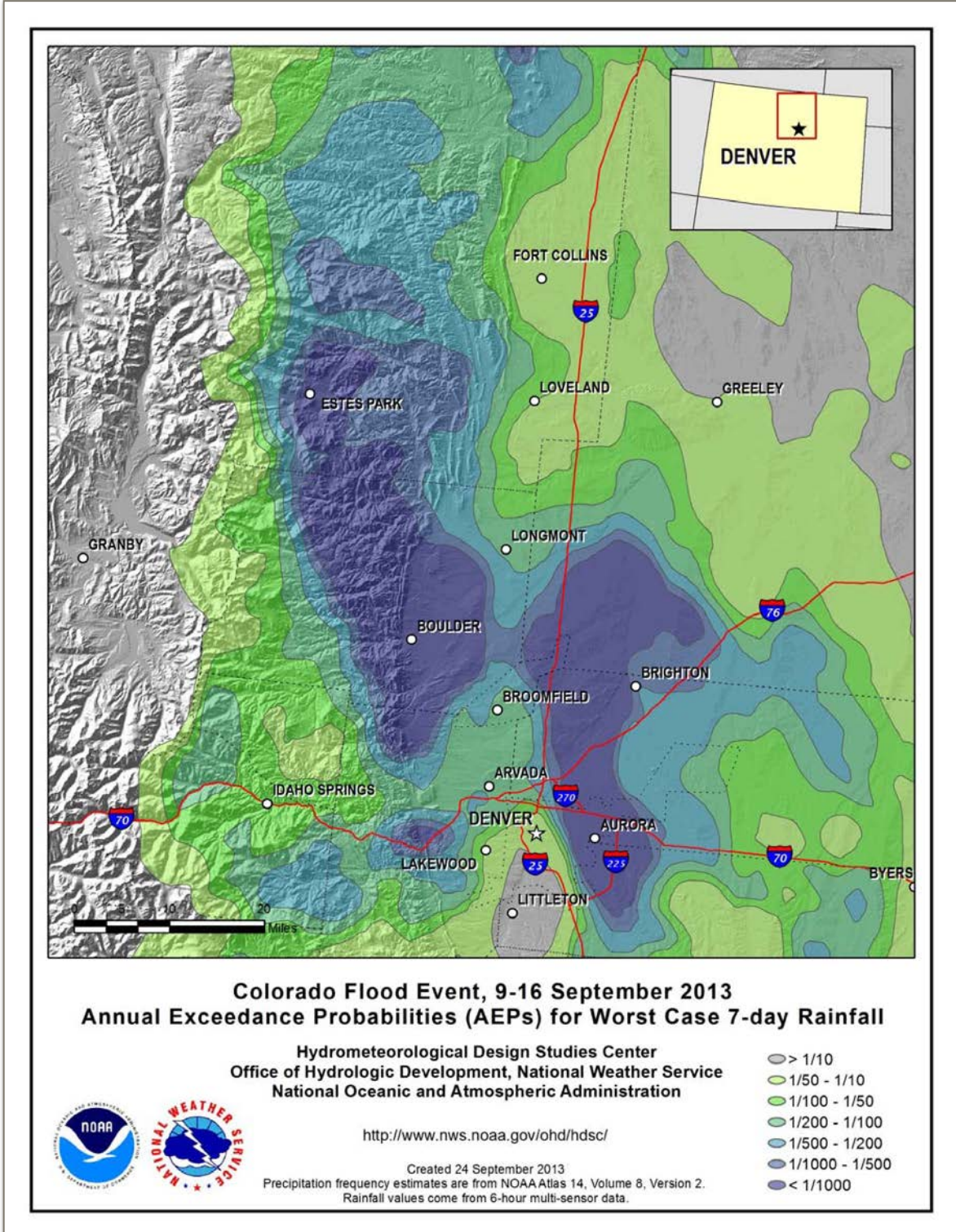


<http://www.nws.noaa.gov/ohd/hdsc/>

Created 17 September 2013
Precipitation frequency estimates are from NOAA Atlas 14, Volume 8, Version 2.
Rainfall values come from 6-hour multi-sensor data.

- > 1/10
- 1/50 - 1/10
- 1/100 - 1/50
- 1/200 - 1/100
- 1/500 - 1/200
- 1/1000 - 1/500
- < 1/1000

7 Day Rainfall Amounts (Aurora 1:1000)



Mobilizing for the Citizens

City of Aurora Response

While this storm was a prolonged event, the profound amount of water nonetheless caught many citizens in Aurora off guard. As has been noted by many of the photos above, water was so deep on many streets that many vehicles stalled out. In addition, rising waters and threats of flash floods necessitated the evacuation of many neighborhoods.

The Aurora Public Safety Communications Department received an additional 1,156 calls for assistance in the four day period between September 11-14th over the same period last year. Of that, 704 of those calls were to 911 for emergency service requests.

Aurora Fire Department

Firefighters with the Aurora Fire Department (AFD) were immediately inundated with 911 calls from stranded citizens in their vehicles once streets began to flood. On September 12th alone, AFD received nearly 209 requests for assistance by the public. Given the unprecedented volume, the executive staff of Aurora Fire made the following implementations:

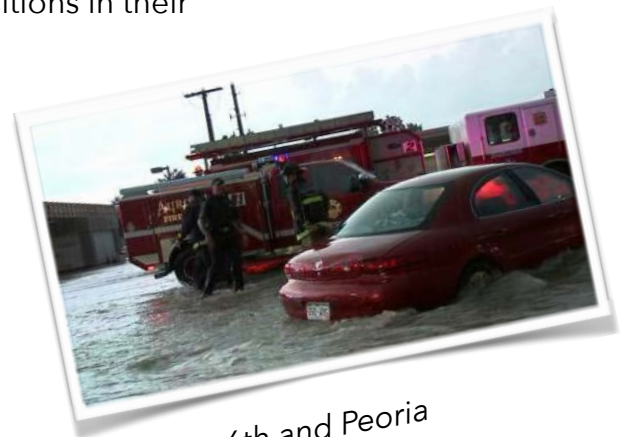
- The lead lieutenant for the training bureau responded to the Public Safety Communications Department and coordinated the modification of responses to insure that true emergencies were attended to first. (The significance of the call

volume necessitates that trapped citizens are pushed to the front of the response line while water in basements will be attended to once all life hazards have been alleviated)

- Deputy Chief of Special Services facilitated all unified command with the rest of the city from the office of emergency management.
- Deputy Chief of Emergency services assumed Chief of Operations for the incident.
- Battalion Chief 1 and 2 assumed tactical operations for their respective battalions.
- Both Battalion Chiefs assumed high ground positions in their respective jurisdictions and coordinated all of the response needs with their apparatus.



6th and Peoria



6th and Peoria

Specific Actions Taken:

The nature of composition for many of the Aurora Fire Department Engines and Trucks poses a problem when responding in high water: the relatively low exhaust and air intake for the units necessitates that they not be used in water much deeper than 12 inches. Consequently, multiple other vehicles were implemented for use in high water. These include:

- High Clearance, 4WD International Engine. This unit is held in reserve for snow storms and other events similar to this flood. Given its ability to travel in much more treacherous conditions, this unit was used to facilitate multiple rescues. Most

prominently, rescues were made from the Highline Community School. The water was so high at this point, it trapped numerous students and a large part of the faculty of the school.

- Medical Service Unit SUV's. These vehicles were used for their mobility and assisted in bringing many citizens to a dry and safe location.
- Battalion Chief Vehicles were also used when needed for rescues.
- Engine and truck crews also waded into the water to assist citizens from their stalled vehicles.

Mexico and Laredo (Keown)



6th and Billings (Scripps)



6th and Billings (Scripps)

Technical Rescue Deployment for AFD

At approximately 2:30 in the morning on the 12th of September, Aurora Fire Department Communications received a call from Boulder County asking for any resources that could assist with water search and rescue. Battalion Chief Scott Sare recounts the efforts of the 9 AFD Technical Rescue Team (TRT) Members on scene:

Once on scene in Boulder, the TRT team checked in with the Incident Commander (IC) and prepared their equipment for deployment. After sometime in the staging area, AFD's TRT was assigned to land based search and evacuation of parts of the Left Hand Canyon. The team was deployed to answer several 911 calls for help in a sparsely populated subdivision in the canyon. The team drove as far as they could, but soon had to stop due to impassable roads and cross a flooded out bridge by foot to begin their trek. The IC had given many addresses of 911 calls that had gone unanswered to this point in the operation and also gave instruction to evacuate residents from unstable houses to safer locations, mostly their more stable neighbors homes. The team walked several miles up and down the hills of the canyon checking on residents, providing guidance and assisting those who needed help getting to a safe location. The team had to navigate unstable terrain and be cognizant of potential mud/land-slides due to rapidly deteriorating conditions.

After completing the tasks requested of them in Boulder, the TRT returned to Aurora and began to assist with further rescue needs in the city proper.



Boulder



Alameda & Havana (Keown)

Aurora Police Department (APD)

As waters began to rise, Aurora Police Patrol officer's mobilized throughout the city to reduce the amount of people driving into dangerous situations. These actions proved an immeasurable asset. Each officers efforts helped to insure that many people's property remained undamaged and, more importantly, kept injuries to citizens quite low.

As the threat of property destruction to homes increased, APD administration activated their Emergency Response Team (ERT). The ERT is a specialized and highly trained group within APD. Per their



Colfax & Moline (Keown)

charter: "The Emergency Response Team (ERT) is specially trained to respond to planned events or emergency situations. These situations are the result of natural or man-made disasters, civil disturbances, or other occurrences, which threaten to or cause the loss of life or injury to citizens and/or severe damage to property, and require extraordinary measures to protect lives, meet human needs, and achieve recovery from the situation" (APD Directives Manual).

Sergeant Matthew Brukbacher , the Emergency Response Team Leader, recounts his teams efforts during the storm:

As soon as ERT took over operations for the flooding, we began to handle all flood-related calls in an attempt to relieve patrol. I really cannot estimate the number of calls that we handled, but I would say it was over 25 just in the first day that we were deployed. We also handled size-up concerns at local water storage areas (reservoirs,

canals, dam's, etc), roads and bridges. We managed numerous road closures and ensured authorized access to flood damaged zones. We handled a pre-evacuation notification for a neighborhood cut-off by the Peoria Street collapse. We also deployed 4-wheel drive vehicles to assist with rescue calls.

The duration of this incident virtually guaranteed that every on duty Aurora Police Officer was soaked to the bone throughout their time protecting the city. They should be commended in the utmost regard for their efforts.



Alameda & Ironton (Keown)

City of Aurora, Office of Emergency Management

The city of Aurora Office of Emergency Management is prepared for and plans for just such events in the City. As such, the City of Aurora Emergency Operations Plan was implemented and the Emergency Operation Center (EOC) activated quickly. The EOC was active for a total of 36 hours with intermittent activations as the weather continued to move through. The EOC was the hub for operations during the incident. Tasks implemented there included:

- Bringing together lead decision makers for each department in the city to coordinate an Area Command. (It should be noted, the EOC does not have the capacity for all parties to be together so the police department facilitated their own call center and EOC off site.)



Peoria & Center (Keown)

- This Area Command proved invaluable. For example, when the AFD Operations Chief received a request from one of his Battalion chiefs, he would communicate that request to the Deputy Chief of Special Services who would then work with the Public Works Department or Police to organize and facilitate those needs.
- Establish a Joint Information Center (JIC). This dedicated department took in information from all departments in the city and disseminated that information to the public via press release, Facebook, Twitter, etc.
- Fielded calls from citizens needing assistance with flood related issues.

- Coordinated with other private, government, and non-governmental agencies to insure that the citizens immediate and long term needs were being accounted for.
- Jim Brown, Senior Public Works Special Projects Manager, spent over 24 hours straight in the EOC and was instrumental in coordinating the response of Public works. He provides some of his insight and recommendations for the next time:
 - The initial phase of EOC implementation requires at least two key officials in attendance at the EOC to facilitate the needs of the city initially.
 - The interactive maps used during the incident were a profound asset. He was able to provide information to the ground crews to respond with much more information. He states that it would be beneficial to provide easier access to those online maps to other departments during the next incident.
 - Mr. Brown passes along great kudos to Deputy Fire Chief Tony Cito for "Insuring we were all fed, happy and ready for action!"

This incident highlighted the pivotal role the Office of Emergency Management plays in the City of Aurora.

Aurora Mall Parking Lot (Scripps)



Lansing and Dakota (Keown)

Public Works Department

Aurora Public Works proved to be a crucial actor in the response to the flood. During the Height of the flooding, Public works has approximately 40 Plow trucks on the road along with just about as many 4WD vehicles in the city all working on a 24 hour basis.

Chris Carnahan, Manager of Public Works operations recounts much of the activities they took on during the flood:

- Engaged all available staff to deploy every single barricade that public works owns in an effort to close down streets. Efforts were made to rent additional barricades which took some time to be delivered. (Jim Brown made a suggestion that Public works should purchase additional barricades to fulfill a capacity to close down at least 100 streets)
- While waiting for additional barricades to arrive, Public Works staff deployed throughout the city and used their trucks to insure that flooded streets and areas were closed off to motorists who had not already become trapped.
- Traffic light engineers dedicated hours to fixing the malfunctioning lights throughout the affected area
- Probably the most important facet of Public Works involvement was the fact that they cleaned up the damage throughout this city with unprecedented speed.



Alameda & Ironton (Keown)

Building Department:

A little known facet of any disaster is the immediate need to get out into the damage zone and assess the damage to buildings and infrastructure. Even more important is insuring that structures affected by flooding are deemed safe to occupy. That responsibility falls on the Aurora Building Division

In addition to providing a critical service to the citizens of Aurora, the Building Division deployed to help her fellow cities in the metro area as well. Scott Berg, Aurora's Chief Building Official provides this account:

Immediately after the flood, the City of Aurora Building Division received a request from Tom Pritchford, the ICC Colorado Chapter Disaster Assessment Coordinator, to assist with damage assessments in areas severely affected by the flood. A total of 5 Aurora building inspectors volunteered to assist the Chapter with damage assessment activities and were able to provide assistance with determining damage and structural integrity of residential structures. Our staff helped to assist the other volunteers to perform damage assessment in 3 counties, 7 cities in which over 3,000 structures were inspected, the majority of which were tagged "red" (i.e. unsafe to occupy/non-habitable). The entire Building Division inspection staff has received national certification from FEMA to perform this type of activity is part of a national registry which is used to coordinate trained volunteers in the event of a natural disasters.

The actions taken by the Aurora Building Division during this event exemplifies the partnership Aurora has with her surrounding community.

Peoria & Center (Keown)



Parks, Recreation, Open Space Department (PROS)

Tom Barrett, Director of PROS provides his insight. The PROS Department was actively involved in several aspects of the storm event during the actual event and is still actually dealing with various residual issues. Efforts and involvements occurred at the early stages of the storm with staff mobilizing to assist with water infiltration into several recreation center facilities. This engagement involved staff from operations and administration and included immediate cleanup, drying efforts and securing of high risk areas. Several classes and events were canceled early on as rising waters prevented safe and adequate passage into and out of the buildings. While high waters were collecting at Utah, Canterbury and Exposition Park sites, staff were assisting APD, AFD and Aurora Water with barricade installation, traffic control and overall monitoring of those park properties in particular. These park sites were deliberately designed to accommodate storm water events and they performed as intended and certainly minimized additional damage from occurring within the city. Staff furthered worked in conjunction with Denver Water while monitoring high water impacts along the Highline Canal corridor and assisted in installing barricades to prevent inappropriate access to that area of concern. Other creek corridors that also have developed trails were monitored for impacts and to ensure pedestrians, bicyclists and other users were out of harm's way.

Park Ranger's were activated to assist APD and AFD in providing flat bottom john boats to assist in rescues from flooded street intersections. These rangers also offered creek and trail patrolling services along multiple creek corridors.

After the storm subsided, intensive cleanup activities occurred at all park sites, golf courses, along road ways, within public facilities and at public properties grounds as well. Repairs at many park sites are still occurring with trails and pathways being replaced along with landscaping and overall site cleaning. Staff also worked in conjunction with Aurora Water to provide and manage roll off dumpsters at several park sites for several weeks to assist citizens with residential cleanup requirements.

Drainage

Aurora Water Response

While the Aurora Water Department is consistently awarded as producing some of the highest quality drinking water in Colorado, they have been on a mission to plan for, and respond to, significant flood events. “‘We came out of this very well, and I know it’s hard to believe with all the water,’ said Aurora Water spokesman Greg Baker. ‘But our system moved the water as fast and as best as it could, and did an excellent job of it’”(Castellanos 2013).



Westerly Creek

“Their two saving graces were Expo Park and Utah Park, which experienced severe overflow but still detained much of the water, Baker said. ‘That was water that wasn’t going into people’s homes,’ he said. ‘This points to the need for more detention areas,’” (Castellanos 2013)

Jonathan Villines an Engineer for Aurora Water provided this synopsis of the aftereffect of the storm: “we had numerous smaller issues with our stormwater drainage system, pipe blowouts etc. For the most part however the storm system functioned as it was designed, and most of the repair work that is being done is removal of the inevitable sediment and garbage that accumulate during such a flood.

Aurora Water Continued...

Marshal P. Brown, the Director of Aurora Water, could not be more proud of his department. He provides his account of the actions taken during the storm:

During and after the storm events Aurora Water was engaged in a coordinated response to the challenges being faced by the City. The Aurora Water Emergency Operations Center was activated at the Central Facilities location to coordinate with the City EOC and provide direction to field staff during the course of the storms. Significant efforts were carried out by personnel from the Water Operations and Maintenance Division with other divisions including Water Treatment, Source of Supply and Water Engineering providing resources to assist.

Specific Actions Taken:

- Provided requested traffic control at flooded locations
- Monitored critical flood control structures including Kelly Road Dam, Utah Park Dam and Expo Park Dam to track levels and ensure proper operation
- Monitored critical stormwater pumping facilities throughout the system
- Engaged in stormwater inlet cleaning wherever possible to help maintain proper drainage
- Responded to citizen calls concerning flooding
- Assessed reported basement flooding and stormwater intrusion into the sanitary sewer collection system



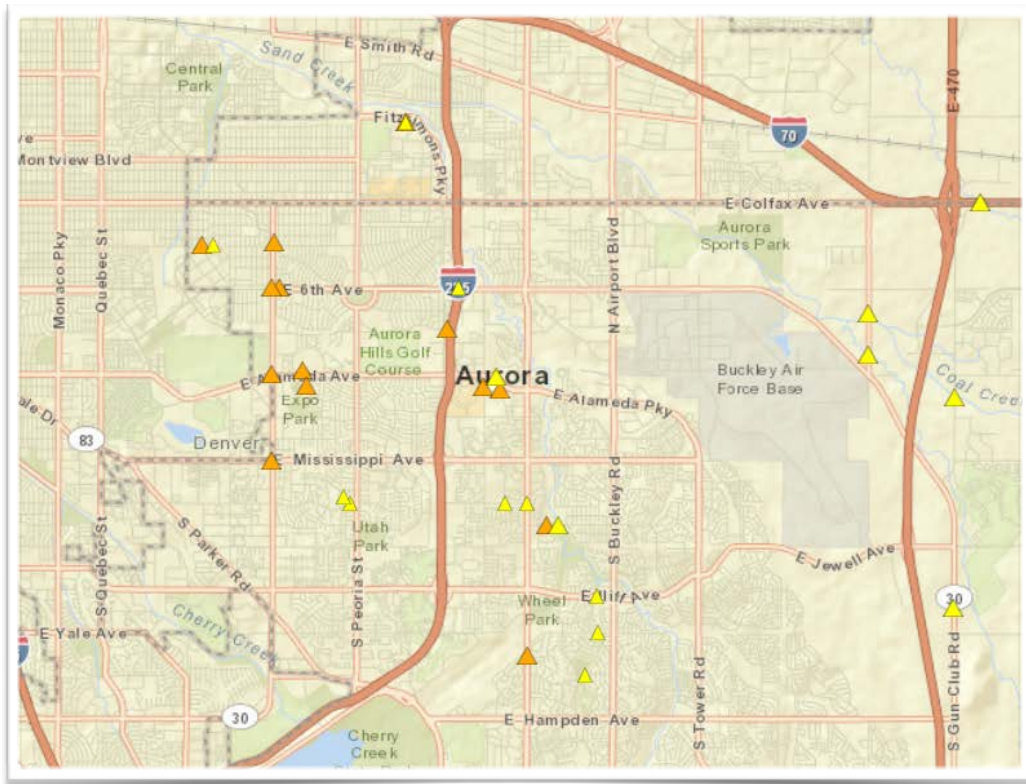
Mexico and Laredo (Keown)

Aurora Water Continued...

Post-storm Actions:

- Inspected drainage channels and drop structures throughout the City to assess damages
- Coordination of FEMA tours to view and assess damages
- Inspected street storm inlets in 110 quarter sections throughout the City and conducted clean-up as necessary
- Assisted Public Works with requested debris and sediment removal
- Staff provided photo documentation to identify impacts to City infrastructure
- Inspected Highline Canal breaches occurring in Aurora
- Assisted Aurora Water Public Information Office with providing roll-off dumpsters at several locations to assist residents with cleanup efforts

This 1,000 year storm caused damage to the Aurora Water system. Some of the more notable damage areas are listed below.



Flood damaged points within the city

Adams County:

Tollgate Creek near 17th Avenue presented some of the more extensive after the fact damage. Initial estimates for repair in Adams County for Aurora Water Control Facilities are: \$566,529

16 at Tollgate



Montview & Clinton

Arapahoe County:

Tollgate Creek from 6th Avenue to I225 experienced heavy flooding and swept away portions of the concrete and drainage infrastructure. Total repair cost for Arapahoe County for Aurora Water Control Facilities is: \$984,568



Highline Canal near Exposition



6th Avenue near I-225

Weld County

Weld County experienced some of the heaviest damage for Aurora Water—the primary culprit coming from the failure at Everist Reservoir.

Everist Reservoir is a multi-cell gravel pit water storage site being developed in phases as on-going mining is completed and the cells are reclaimed. Seven below-grade water storage cells are currently planned for the site. Everist Reservoir will be incorporated into the city's raw water system, where it will provide for storage of transferred water rights and excess water, subsequently to be used for augmentation and a substitute supply source for exchange or return-flow obligations.

Jonathan Villines notes: “we had a couple of levee breaches there which can be seen pretty clearly in the pictures. We have a designer and a contractor on board for repairs, and once the design is finished we will start work on reconstruction (probably January 2014).

The repair cost for Weld County for Aurora Water is \$1,508,038

Some before and after photos can be noted of the damage at Everist Reservoir below.



Everist Reservoir



Everist Reservoir (Before)



Everist Reservoir (After)



Everist Reservoir (Before)



Everist Reservoir (After)

Drying out

City, County, State and Federal Embrace of Recovery

The hardest hit portions of Aurora received just as much water as much of the Boulder and Estes Park areas. The lack of mountainous terrain in Aurora proved to be her saving grace: much of the water was nowhere near as destructive as it was in those areas. Still, the damage caused to Individual property and Public infrastructure was great.



Peoria & Center (Keown)

Governor Hickenlooper requested and received a disaster declaration from President Obama on September 14th. This ushered in the assistance of FEMA. Initially, Adams County was the only county in Aurora with disaster designation. This meant that individuals with damage north of Colfax were eligible for individual assistance but a neighbor one block to the south was not.

As a result, Office of Emergency Management Director Matthew Chapman Coordinated with Arapahoe County officials to present a case for Arapahoe County's inclusion into that designation. This laid the groundwork for much needed FEMA assistance throughout the city. FEMA Assistance came, and is still being provided, in two forms: Individual Assistance and Public Assistance.

FEMA Individual Assistance:

Soon after the declaration, FEMA representatives met with staff from the City of Aurora, Adams, Arapahoe and Weld Counties to set up an individual assistance center. The Aurora Central Library was immediately portioned off for this purpose. Here, Individuals affected by the flood could get “One-Stop-Shop” assistance with the following:

- All FEMA eligibility, claims, and recovery Assistance
- Loan information and initiation from the Small Business Administration
- Red Cross assistance
- Tri-County Health Department services

This assistance center was staffed for 30 days post event. In addition to this physical location, FEMA officials also canvassed the hard hit areas, going door to door, assisting citizens with flood related needs.

All in all, FEMA assisted 2,690 individual citizens in the city of Aurora during their activation and provide more than \$3.3 million in assistance. See detail following:



Expo Park (Keown)

FEMA Public Assistance:

The City of Aurora incurred significant damage related costs as a result of the storm. Much of the work has been completed or is in process. These activities have been primarily paid for by the City of Aurora, in partnership with the Counties of Adams, Arapahoe, and Weld.

The partnership between the counties is well coordinated and has started the process of acquiring reimbursement for these costs through FEMA. The intricacies of this process include:

- Submitting a request for assistance to the Colorado Department of Public Safety. (Complete)
- Setting a date for a Kickoff meeting with FEMA staff:
 - This meeting is where all of the facts of damages will be presented and culminated for submittal to the State. (Pending)
- Completion of the work required as a result of the storm. (Ongoing)
- Reimbursement from FEMA for approved projects (Pending: will take place as projects are completed and inspected)
 - The amount of reimbursement provided will likely be as follows:
 - FEMA will provide 85% of the cost for approved projects
 - State of Colorado will also Supplement 12.5% in addition
 - City and Counties will be responsible for the remaining 2.5%



Peoria & Center (Keown)

Recovery Plan:

While the recovery for the city infrastructure and citizens is progressing well, the process has been largely aided with the assistance of FEMA specialists. Many of the intricacies involved in recovery include the following:

- Individual assistance to Aurora Citizens
- Damage assessment teams (Rapid and efficient)
- Cleanup and infrastructure repair

For future incidents in the city, the transition from response to recovery is something that needs to be identified and implemented. The OEM will require participation from all departments to implement a better recovery plan based on the lessons learned as a result of the flood. These, and many other lessons learned will be identified in a future after action report.



Utah Park (Keown)

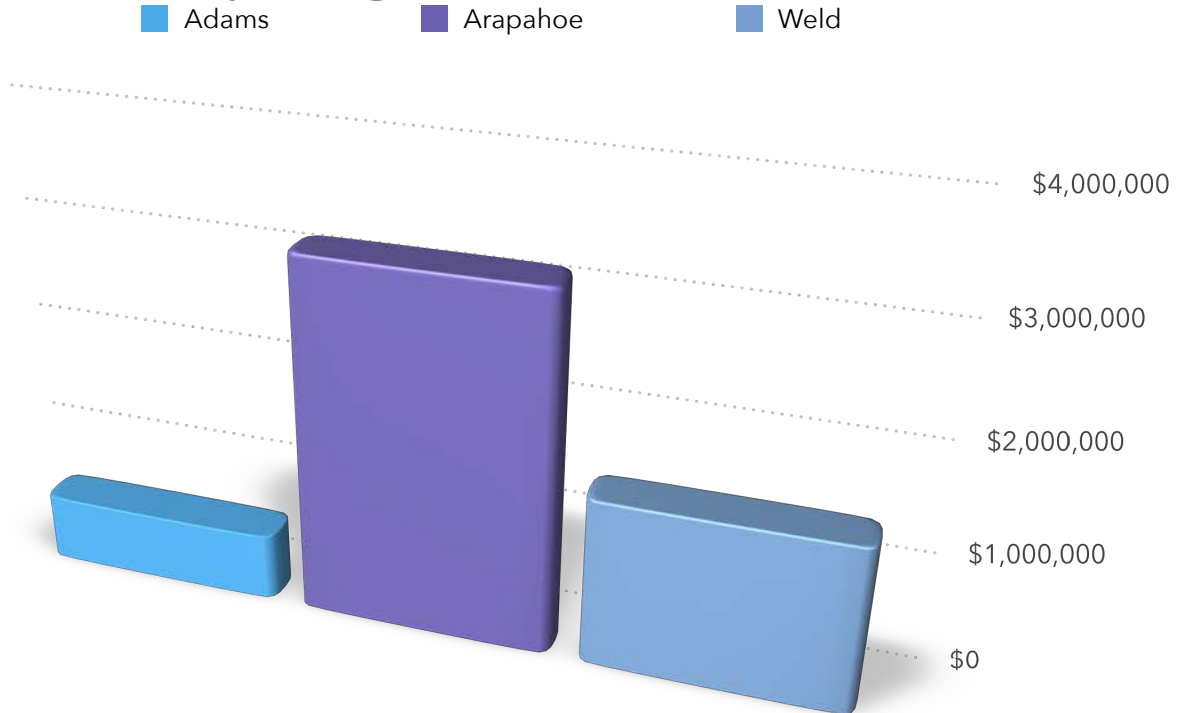
Full Damage Assessment Review

The City of Aurora, along with Adams, Arapahoe and Weld Counties have compiled a cost analysis for the storm related damage as of the printing of this report. A synopsis of the costs is listed below (NOTE: these costs include those noted above from Water Department damage):

Preliminary Damage Cost Estimate for All Public Entities in Aurora

Adams County	\$605,068.10
Arapahoe County	\$3,206,386.19
Weld County	\$1,508,038.80
All Counties	<u>\$5,319,493.09</u>

Preliminary Damage Cost Estimate \$5,319,493



Cost Breakdown (Detail):

Overtime Expenditures		
	Aurora Water	\$41,889.09
	Communications	\$1,968.12
	Fire	\$17,794.82
	Internal Services	\$863.78
	IT	\$473.09
	Neighborhood Services	\$1,320.95
	Police	\$70,086.77
	PROS	\$15,736.16
	PSCOMM	\$11,413.00
	Public Works	\$55,953.96
	Grand Total	\$217,499.74

Supplies and Equipment Repair/Replacement		
	Adams County	\$2,910.80
	Category E: Buildings and Equipment	\$2,734.00
	Category G: Parks, Recreational Facilities	\$176.80
	Arapahoe County	\$303,665.65
	Category B: Emergency Protective Measures	\$55,482.16
	Category E: Buildings and Equipment	\$105,552.97
	Category G: Parks, Recreational Facilities	\$142,630.52
	Grand Total	\$306,576.45

Permanent Work	(Capital Projects) for City	of Aurora Only
	Adams	\$602,157.30
	Category C: Roads and Bridges (COA)	\$35,000.00
	Category D: Water Control Facilities (COA)	\$566,529.00
	Category G: Parks, Recreational Facilities	\$628.30
	Arapahoe	\$1,681,587.58
	Category C: Roads and Bridges	\$620,951.15
	Category D: Water Control Facilities	\$984,568.00
	Category E: Buildings and Equipment	\$40,235.71
	Category G: Parks, Recreational Facilities	\$35,832.72
	Weld	\$1,508,038.80
	Category D: Water Control Facilities (COA)	\$1,508,038.80
	Grand Total	\$3,791,783.68
Other Public Organizations Damage Estimates		
	Arapahoe County	\$88,132.96
	Aurora Housing Authority	\$292,000.00
	Aurora Public Schools	\$300,000.00
	Cherry Creek School District	\$41,000.00
	Denver Water	\$500,000.00
	Grand Total	\$1,221,132.96
Preliminary Damage Cost Estimate	(City of Aurora Only)	
	Adams County	\$605,068.10
	Arapahoe County	\$1,985,253.23
	Weld County	\$1,508,038.80
	All Counties	\$4,098,360.13

Permanent Work (Capital Projects) for All Public Entities in Aurora		
	Adams	\$602,157.30
	Category C: Roads and Bridges (COA)	\$35,000.00
	Category D: Water Control Facilities (COA)	\$566,529.00
	Category G: Parks, Recreational Facilities	\$628.30
	Arapahoe	\$2,902,720.54
	Category C: Roads and Bridges (COA)	\$620,951.15
	Category D: Water Control Facilities (COA)	\$984,568.00
	Category D: Water Control Facilities (Denver Water)	\$500,000.00
	Category E: Buildings and Equipment (COA)	\$40,235.71
	Category E: Buildings and Equipment (APS)	\$300,000.00
	Category E: Buildings and Equipment (CCSD)	\$41,000.00
	Category E: Buildings and Equipment (AHA)	\$292,000.00
	Category C/E/G: Roads, Buildings and Parks (Arapahoe County Government)	\$88,132.96
	Category G: Parks, Recreational Facilities (COA)	\$35,832.72
	Weld	\$1,508,038.80
	Category D: Water Control Facilities (COA)	\$1,508,038.80
	Grand Total	\$5,012,916.64

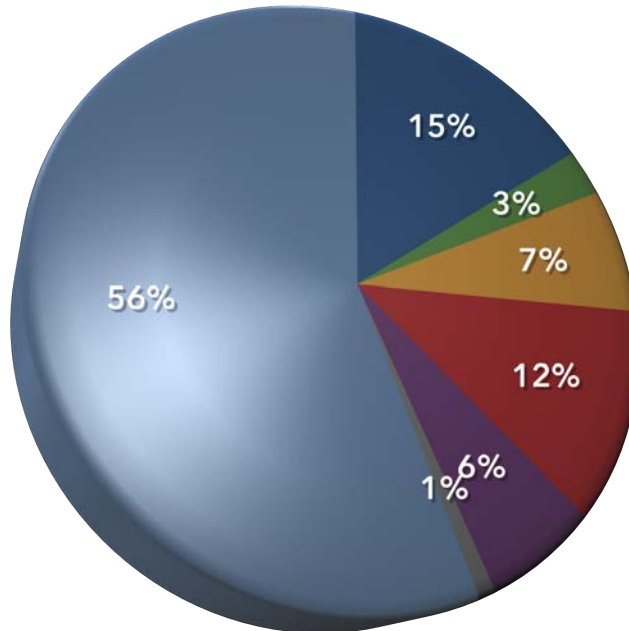
Total Cost by Ward:

A preliminary breakout of the cost to each City of Aurora Ward is as follows:

Ward 1:	\$608,962
Ward 2:	\$107,942
Ward 3:	\$289,104
Ward 4:	\$501,515
Ward 5:	\$259,263
Ward 6:	\$36,899
Citywide/Multiple Wards:	\$2,294,671
Total:	<u>\$4,098,359</u>

- Ward 1
- Ward 2
- Ward 3
- Ward 4
- Ward 5
- Ward 6
- At Large

Damage Estimate by Ward



Moving Forward

Conclusion

Over the past 18 months, The City of Aurora has defined the term resiliency. The challenges met in the face of the Century Shooting, Paris Street Bomb Scene, and media scrutiny, speak volumes about the character of every man and woman who have a vested interest in this City.

The record setting floods in September 2013 are yet another chapter in the book that defines Aurora. The dedicated response, passionate embrace of her citizens, and penchant for continuance to tomorrow, exemplify the Customer Service, Integrity, Professionalism, and Respect that is the Core of Aurora.



Expo Park (Keown)

Bibliography

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Photography Works Cited:

Marla R. Keown/Aurora Sentinel

Scripps Media 2013

Aurora Water