

# Fort Collins Floodplain Management Program

## Success Stories from the September 2013 Flood

*Marsha Hilmes-Robinson, Floodplain Administrator, City of Fort Collins Utilities*  
*Chris Lochra, Flood Warning Engineer, City of Fort Collins Utilities*

*Flood mitigation efforts such as regulations within floodplains, public education, preservation of open space, acquisition of at-risk structures, and projects such as levees and controlled spills help the City of Fort Collins mitigate effects of floods, such as the 2013 rainfall event.*

Floodplain management uses various tools to mitigate the impact floods have on our community. These tools include floodplain regulations, open space preservation, acquisition of at-risk structures, capital projects, public education and flood warning.

The City of Fort Collins has a comprehensive program that incorporates all of these strategies. The Fort Collins Floodplain Management Program is ranked as one of the top programs nationwide under the Federal Emergency Management Agency (FEMA) Community Rating System. This ranking results in flood insurance discounts of up to 30 percent for residents and businesses.

The 2013 Cache la Poudre River flood provided an opportunity to evaluate the effectiveness of Fort Collins' mitigation programs. Several successes are highlighted.

### **Floodplain Regulations – Minimizing Future Damage**

For the 2013 Flood, the minimal damages to structures and the reduced emergency response for life-safety issues resulted partially from strong floodplain regulations in

the Poudre River Basin, which protect new structures built in the floodplain from future floods.

### **Prohibition of Higher-Risk Land Uses**

Specific uses are regulated in the Poudre River floodplain. For example, no new residential structures or additions have been allowed in the 100-year floodplain since 2000. Since 1995, At-Risk Population, Essential Service, Government Service and Hazardous Materials critical facilities have been prohibited in the 100-year floodplain. At-Risk and Essential Service critical facilities are also prohibited in the 500-year floodplain. This helps reduce the risk to emergency responders during a flood and allows a community to recover more quickly when a flood does occur.

### **Elevation Above the 100-year Flood Level**

Another regulation that helped minimize damage is the requirement to elevate new structures and additions two feet above the 100-year floodplain. This is a higher standard than the FEMA requirement of only requiring elevation to the 100-year flood level, or the State of





*Poudre River flooding downstream of the Shields St. Bridge on September 13.  
Courtesy of City of Fort Collins Utilities*

Colorado's requirement of elevating one foot above the 100-year flood level. Structures that were elevated and protected from flood damage include the In-Situ building on Lincoln Avenue and the Neenan Building



*Figure 1. Aerial view of Seven Lakes Business Park looking east in the early afternoon of Sept. 13, 2013 showing floodwater against the Orthopedic Center of the Rockies (lower right) and the Neenan Building (center). These buildings are elevated and did not sustain damage.*  
Courtesy of City of Fort Collins Utilities

and Orthopedic Center of the Rockies in the Seven Lakes Business Park along Prospect Road (Figures 1 and 2).

Another benefit to elevating structures above the 100-year flood level is reduced flood insurance premiums.

### Floatable Materials Regulation

A floodplain regulation that is unique to the Poudre River is the requirement that no floatable materials are allowed in the 100-year floodplain. This regulation is triggered when an addition, substantial improvement, or new structure is built on a non-residential property. Historically, there were several properties along Lincoln Avenue that stored large quantities of floatable materials including metal drums, plastic shipping containers, storage tanks, pallets, construction supplies, and vehicles. Due to implementation over the last 10 years, these properties now comply with the floatable materials requirement and have greatly reduced the amount of materials that could damage properties or public infrastructure downstream. Figures 3 and 4 show Team Petroleum along Lincoln Avenue before the clean-up of floatable materials. During the flood and clean-up operations, field crews reported very little of this type of material carried downstream. To learn more about the floodplain regulations adopted by the City of Fort Collins, visit [fcgov.com/floodplainregs](http://fcgov.com/floodplainregs).

### Open Space Preservation

The City's Natural Areas Program has proactively purchased floodplain property along the Poudre River Corridor, and the Parks Department owns and maintains



*Figure 2. Debris line is evident on west side of Orthopedic Center of the Rockies showing the water level against the building. Approximately 6 inches of freeboard remained before water would enter the building, making this a good example of the benefits of elevating structures to protect from flood damage.*  
Courtesy of City of Fort Collins Utilities



Table 1. Open Space Preserved in the Poudre River 100-year Floodplain

Parks in 100-year Floodplain (acres)	Natural Areas in 100-year Floodplain (acres)	Total Open Space Preserved (acres)	100-year Poudre River Floodplain Inside City Limits (acres)	<b>66% of the 100-year floodplain is preserved as Open Space.</b>
55	924	979	1,485	



Figures 3 and 4. The Team Petroleum site on E. Lincoln Avenue is shown prior to clean-up of floatable materials. As part of the clean-up, all storage tanks were anchored to prevent them from floating away and all pallets, shipping containers and drums were either removed or secured inside a building.

Courtesy of City of Fort Collins Utilities



Figure 5. Open Space preserved in McMurry Natural Area and Legacy Park. Floodwaters from the 2013 Poudre River Flood were able to spread out and slow down and not cause any damages.

Courtesy of City of Fort Collins Utilities

several parks in the floodplain. Table 1 compares the floodplain acreage in the city limits to the amount of open space preserved by the City of Fort Collins. Preserving this land as open space not only minimizes flood damages, but also enhances the natural and beneficial functions of the floodplain, such as providing

beneficial habitat and allowing floodwaters to spread out and slow down (Figure 5).

## Acquisition of At-Risk Structures

In addition to the City preserving large tracts of open space, the Fort Collins Stormwater Utility collaborated

with Natural Areas to purchase several properties on College Avenue and Vine Drive as part of the *Willing Seller–Willing Buyer* program. This program is specifically for existing residential structures in the floodplain or floodway and commercial structures in the floodway that are at high risk of being damaged. Two commercial structures on the west side of College Avenue were removed, and one residential structure just north of College Avenue and Vine Drive was removed. At the time of the flood, a second residential structure at 213 E. Vine Dr. had been purchased, but not yet demolished. That structure had 8-10 inches of water in the basement from the flood and is currently being removed (Figures 6 and 7).

## Capital Projects

Two important capital projects were constructed over the past 10 years to help mitigate flood damages along the Poudre River, each for different purposes and utilizing different structural techniques.

### Oxbow Levee

The Oxbow Levee was constructed in 2004 between Lincoln and Linden Streets to protect the Buckingham neighborhood and existing commercial structures on the north side of Lincoln Avenue. Levees are not the ideal mitigation strategy because they are subject to failure, but in this case, it was the only cost-effective solution capable of providing 100-year flood protection for this historic neighborhood. The levee was set back from the edge of the river to allow more room for the flood flows to overtop the left bank before coming into contact with the levee. The City performs routine inspections and maintenance and the levee performed as designed in the 2013 Flood and protected the Buckingham neighborhood.

## Controlled Spills into Gravel Pits

Just downstream of the Timberline Bridge over the Poudre River is a controlled spill on the left bank into former gravel pits that now comprise Riverbend Ponds Natural Area. This controlled spill and a smaller spill downstream were jointly constructed in 2006 by the City of Fort Collins Stormwater, Natural Areas and Engineering Departments to allow for safe overtopping of the left bank of the river. The controlled spills were part of a larger project to create a second bridge on Prospect Road to handle flood flows that break out of the river and flow through Riverbend Ponds. Without the controlled spills, the entire Poudre River could have potentially been captured into the gravel pits, causing significant erosion of the banks, overtopping of Prospect Road and ultimately leaving no flow in the natural river channel. The main controlled spill just downstream of Timberline Bridge overtopped in the 2013 Flood and performed as designed with no damage to the constructed spill structure (Figure 8).

## Public Education

Public education related to floods includes flood risk, flood safety, property protection, flood issuance and flood warning. It is important for citizens to be informed and know where to get additional information. A variety of media are used to reach as many people as possible.

One of the main public outreach efforts the City conducts annually is Flood Awareness Week. Historically, this happens in July, at the beginning of the monsoon season, when the Front Range is prone to large floods such as the Fort Collins flash flood in 1997. However, the past year clearly indicates that we need to be prepared for large floods at any time and that every flood is different. Flood Awareness Week is an opportunity to inform the



Figures 6 and 7. 213 E. Vine Dr. is a structure purchased as part of the City of Fort Collins' *Willing Seller–Willing Buyer* program. Before the house was demolished, the basement sustained 6-10 inches of water from the flood. Courtesy of City of Fort Collins Utilities



community about flood risk through various activities including display booths, videos on Cable 14, mailers to floodplain residents and owners, and to Realtors, lenders and insurance agents.

Other outreach efforts throughout the year include booths at community events, presentations to community groups, programs throughout the school district, reference materials at the public library and a comprehensive website.

Some public education efforts target specific audiences such as trail users and city drivers. The 1997 Spring Creek Flood is documented by a series of high water mark signs along the Spring Creek Trail. These markers provide a visual reminder to trail users about the magnitude of the 1997 Flood and that floods do happen in Fort Collins. Drivers are targeted by messages on bus benches warning them not to drive through flood waters, to “Turn Around – Don’t Drown.”

The effectiveness of the City’s public education efforts during the 2013 flood has not been quantified, but no rescues were needed in the city limits and damage was minimal. These results are probably due in part to informed citizens who knew their flood risk, where to get information, how to protect their property and how to be “flood safe.”

## Flood Warning

Flood warning systems often are not considered to be a form of flood mitigation, but in Fort Collins, they are a vital component of a comprehensive floodplain management program.

The City Flood Warning System (FWS) comprises a network of rain, streamflow, and weather gauges that provide data to personnel who implement emergency action plans that are triggered by pre-determined thresholds of rainfall intensity and flow depths. A lack of real-time data was a significant factor during the 1997 Spring Creek Flood, when responders and citizens had



Figure 8. Downstream of the Timberline Bridge on the Poudre River is a controlled spill into Riverbend Ponds Natural Areas. This photo was taken at 12:20 p.m. on Friday, September 13, 2013 during the flooding of the Poudre River and shows the spill functioning as designed. Courtesy of City of Fort Collins Utilities



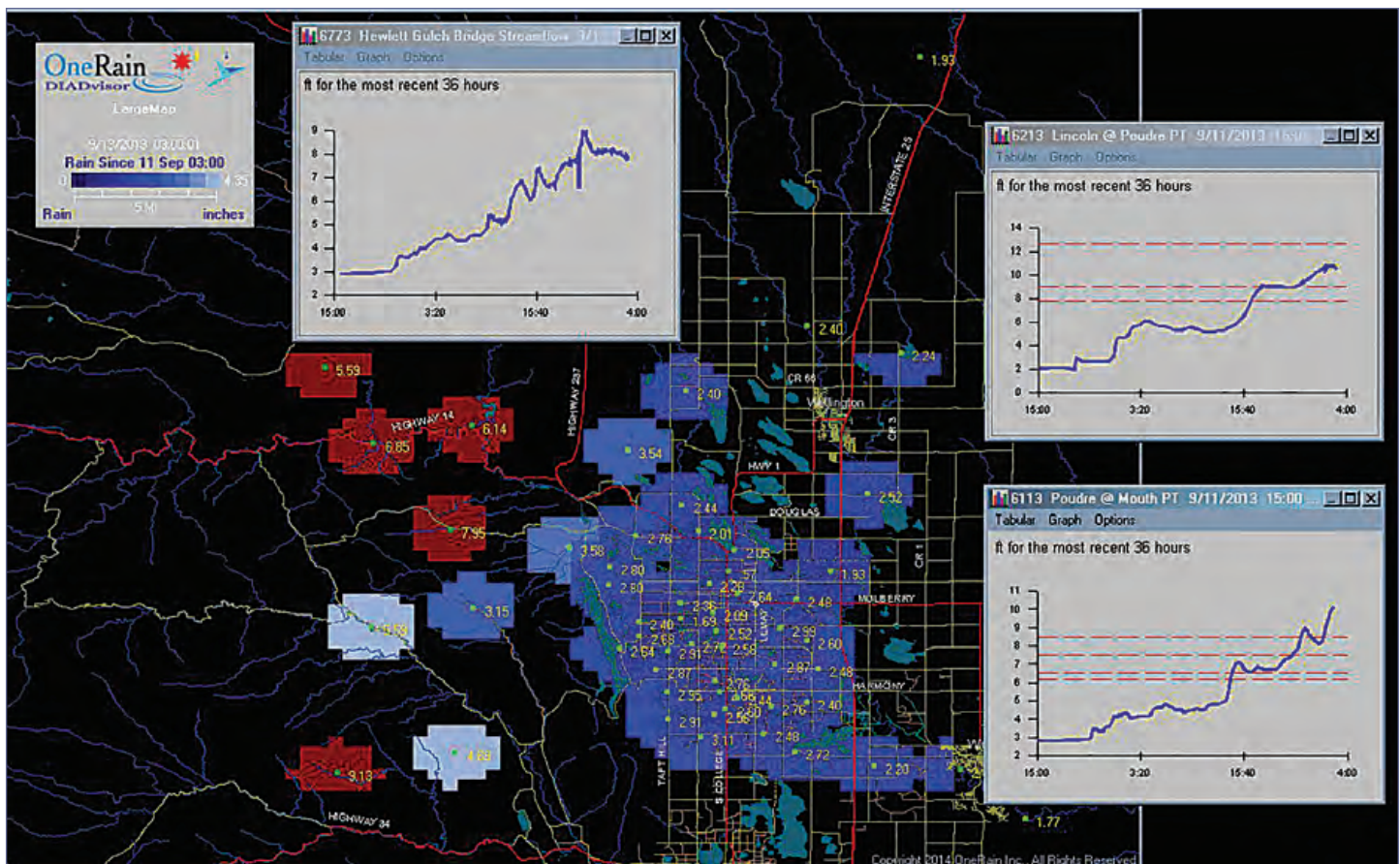


Figure 9. Screen capture at 3 a.m., September 13, 2013 of FWS data-management software showing 2-day rain gauge totals (in inches) and hydrographs (in feet) from three river gauge locations. Pre-established alarm (emergency response) thresholds shown on hydrographs as red dotted lines.

Courtesy of City of Fort Collins Utilities

limited information about the magnitude of the local storm and flooding conditions. Since initiation in 1999, the FWS has grown to 75 gauge locations, all monitored by staff on-duty 24/7 between mid-April and late September, our local flood season. During the 2013 flood on the Poudre River, the data from this network and other sources such as weather radar were critical to our City's response to the flood threat.

After the High Park Fire, the gauge network was expanded across the burn area and lower foothills west of town. Stormwater staff was alerted to the higher rainfall intensities in these upstream parts of the Poudre watershed. Streamflow gauge data from locations on the Poudre River at the Town of Poudre Park, the mouth of the canyon, and at Lincoln Avenue provided key information about river conditions (Figure 9) to the Emergency Operations Center. The response lead time allowed City crews to close trails and bridges, monitor roads for overtopping or inundation, identify areas requiring emergency notification of imminent flooding via the auto-dialer system ([LETA911.org](http://LETA911.org)), and to assist

in evacuations from three at-risk neighborhoods. The FWS data also were used to provide warnings and updates to the public via the City's website [fcgov.com/floodwarningsystem](http://fcgov.com/floodwarningsystem), press releases, videos, and social media. The information was invaluable in protecting people and property during the 2013 flood.

## Conclusion

Floods are a part of life in Fort Collins, and having a comprehensive floodplain management program is critical. No single *tool* in the floodplain management toolbox will work in every situation so we need many tools: floodplain regulations, open space preservation, acquisition of at-risk structures, capital projects, public education and flood warning. Each of these mitigation strategies provides benefits to our community as evidenced by the success stories documented during the 2013 flood along the Cache la Poudre River in Fort Collins.

To learn more about Floodplain Management in Fort Collins, visit [fcgov.com/stormwater](http://fcgov.com/stormwater). ●