



**Utilities**

electric • stormwater • wastewater • water  
700 Wood St.  
PO Box 580  
Fort Collins, CO 80522

**970.221.6700**

970.221.6619 fax • 970.224.6003 TDD  
[utilities@fcgov.com](mailto:utilities@fcgov.com) • [fcgov.com/utilities](http://fcgov.com/utilities)

**DATE:** *Drafted* October 26, 2012

**TO:** Desktop research study for public posting and information

**FROM:** Brian K. Varrella, P.E., CFM  
Floodplain Administrator / Civil Engineer III  
Fort Collins Stormwater Utility

**RE:** Case study of property values in floodplains; literature search and initial findings

---

## EXECUTIVE SUMMARY

Fort Collins City Council (FC Council) requested a review of policies and practices guiding the Stormwater program at an October 14, 2008 work session. During the discussion they expressed concern that flood mitigation projects removing private properties from floodplains were subsidizing land value increases and creating windfalls for development interests with public funds. This concern was based on the fundamental assumption that mapped flood hazards depress property values, thereby creating a flood risk discount for undeveloped property.

Staff at Fort Collins Floodplain Administration investigated this assumption with a literature search and desktop analysis. Three journal articles and one local property appraisal linking flood hazards to property values were discovered and considered for this study. The findings presented in these resources were nearly identical, and all lead to the conclusion that a property discount did not exist for properties in and near SFHAs in the arid Western United States. The initial assumption expressed by FC Council was, therefore, incorrect for the Northern Colorado region. More surprising was the trend identified by three of the four the resources that proximity to mapped SFHAs tended to *increase* the value of properties in the arid west.

The conclusions presented in this study warrant further research to expand data sources and increase confidence in identified trends and correlations. However, for the purposes of the original investigation initiated by Fort Collins Floodplain Administration, **it can be reasonably concluded that lands in the SFHA are no less valuable than lands outside mapped hazard areas located within City Limits.** Flood hazard mitigation projects initiated by the City of Fort Collins Stormwater Utility do not subsidize land value increases for development interests using public funds.

*(continued on next page)*

## INITIAL PROBLEM STATEMENT

Fort Collins City Council (FC Council) requested a review of policies and practices guiding the Stormwater program at an October 14, 2008 work session. Members of FC Council inquired about the status of vacant properties in floodplains across the City during the public event. The inquiry rose from a discussion of the Dry Creek Flood Control Project which removed 481 acres of mostly vacant property from a Special Flood Hazard Area (SFHA), or floodplain, regulated by the Federal Emergency Management Agency (FEMA). The \$10 million flood mitigation project was funded by fees collected by the FC Stormwater Utility and updated flood hazards maps became effective in 2008.

The financial impact of removing vacant property from a SFHA by a flood mitigation project is of particular interest to local decision makers, policy makers, floodplain managers, engineers and community planners across Northern Colorado. The specific inquiry from FC Council pertaining to the removal of vacant land from the 100-year floodplain reads from the 2008 work session minutes as follows:

*“Vacant land pays nothing [in stormwater fees] until it develops, yet if the City takes vacant land out of the floodplain, there is a benefit to the land owner; does the [capital project] financing plan account for this benefit?”*

– Fort Collins City Council, pg. 5 (2008)

This quote expresses the basic community assumption that mapped flood hazards depress property values. This is typically known as a **flood risk discount** in the available research. This assumption further presumes land development interests receive a property value windfall when removed from the floodplain by a hazard mitigation project. FC Council was concerned in 2008 that public projects were subsidizing development potential by increasing private land value with Utility fees.

The national economic discussion that began in 2008 has created a climate where government subsidies are a topic of passionate debate. It is the intent of this memo to investigate the assumption that mapped flood hazards depress property values through a literature search and desktop study of relevant published information. This study may provide interested parties and stakeholders in the Fort Collins and surrounding Northern Colorado area with an understanding of the effect of mapped SFHA on land values. This information may then be utilized to help determine how best to collaboratively manage flood hazard mitigation projects and development projects in and near SFHAs in Northern Colorado.

## AVAILABLE RESEARCH

A 2010 literature search revealed three key journal articles on the relation of flood hazards to property values in the Western United States. A Fort Collins real estate study was also discovered exploring these same impacts on properties in the City. Each of these resources used the Federal regulations and restrictions of the National Flood Insurance Program (NFIP) as a benchmark to assess the impacts of floodplains on the market value of homes and land.

The first article prepared by Chivers and Flores (2002) investigated the success or failure of the NFIP to meet its intended purpose of improving economic efficiency of floodplain occupancy. Chivers and Flores conducted their research in Boulder, Colorado; a community recognized nation-wide as one of the most at-risk communities for flood damage. Boulder is especially prone to flash-flood storm events commonly occurring along the Colorado Front Range at the eastern slope of the Rocky Mountains. It is also a community that shares a common hydrology, meteorology, and socio-economic atmosphere with Fort Collins, which is likewise located at the foot of the Front Range 40 miles north of Boulder.

The second journal article reviewed for this memo was prepared by Troy and Romm (2004). This research investigated the price effects of flood hazard information on existing home values across California. The research area included arid and semi-arid regions of California that experience severe flash floods similar to those encountered along the Colorado Front Range.

The third and most useful journal excerpt recovered during in the literature search was prepared by Rosenbaum (2005). This desktop analysis expands upon the findings of Chivers and Flores and Troy and Romm. Rosenbaum extrapolated previous findings to assess the environmental impacts of NFIP requirements and Community Rating System (CRS) practices across the United States, but still provides a relevant discussion of property values and SFHA designation and delineation.

The final resource used for this desktop research study was drafted as an e-mail to the City of Fort Collins from Ralph Campano who completed a 2004 market analysis of single family dwellings in the City. Campano's analysis reviewed existing structures in floodplains and compared them to similar structures located outside floodplains in four different neighborhoods including Countryside Estates, Fairview, Paragon Point, and Old Town.

## FINDINGS AND DISCUSSION

All resources reviewed for this desktop study explored the general assumption that properties burdened with mapped flood hazards tend to sell at a discount, and said discount was created by a reduced land value attributed to mapped flood hazards. The published research reveals this was not typically the case for properties already developed. **Chivers and Flores (2002)** offered the following explanation:

*“Our overall impression . . . is that even though a flood discount premium is typically found for properties that have recently been flooded, properties that are merely exposed to flood risk yet require flood insurance under NFIP often do not carry a flood risk discount.” – pg. 516*

The flood risk discount identified by Chivers and Flores is the perceived depression of property value idealized for properties in a floodplain. Their data indicated potential buyers of floodplain property were unaware mapped flood hazards existed on those properties until the time of final sale. In fact, 60% of SFHA homeowners surveyed in Boulder, Colorado, indicated they first

heard of mapped flood hazards on their property during title closing. The price of properties in all of those cases could not be affected by the presence or absence of mapped flood hazards since there was no prior knowledge of the hazards during sales negotiation.

The research of Chivers and Flores acknowledged previous research from Holoway and Burby (1990) that found a flood discount for undeveloped property, but the 2002 regional research negated the 1990 findings. Chivers and Flores found an opposite trend where no discount existed on properties located in SFHAs; developed or undeveloped. The most surprising conclusion offered by Chivers and Flores was that floodplain property values appeared to be inflated by the lack of information provided to prospective buyers. According to the 2002 research vacant properties are not subject to windfalls associated with removal of flood risks by flood hazard mitigation projects.

**Troy and Romm (2004)** continued some of the research prepared by Chivers and Flores during their investigation of the California Natural Hazard Disclosure Law known as AB 1195. The California forced-disclosure law intended to close the homeowner information gap identified in the Chivers and Flores study from 2002, and the 2004 research was exploring correlations in home purchase value in floodplains based on racial demographics.

Troy and Romm discovered previous analyses agreed with some of the findings of 2002, in particular the price discount for floodplain properties discovered in Gulf Coast and U.S. Midwestern states. Their research concluded that in most Western states the environmental, aesthetic, and natural amenities associated with properties in a floodplain tended to fully offset the price discount, or resale windfall, anticipated for properties in a floodplain.

Troy and Romm concluded that “*floodplain location had no impact on prices*” prior to the hazard disclosure law in California. The following explanation was offered to support this conclusion:

*“California (and the West in general) has highly seasonal precipitation patterns, many of its statutory floodplains are situated around intermittent and ‘flashy’ watercourses that may appear misleadingly dry much of the year . . . hence, California homebuyers probably perceive the same statistical flooding hazard differently than homebuyers in the markets [in the Southeast or Midwest U.S.], since they get fewer and less interpretable visual cues.” – pg. 158.*

Given the hydrologic similarities between the Colorado Front Range and the specific areas of California included in the 2004 research, the conclusions of Troy and Romm translate to developed and undeveloped properties in and around Fort Collins. Therefore, the uninformed or late-informed buyer should pay no more or less for property with flood hazards than he or she would if the developed property was removed from the floodplain by a capital improvement. It may be speculated by extrapolation that the statistical analyses of Troy and Romm do not support the perception that vacant land owners will receive a windfall from sales when their property has been removed from a floodplain, but the conclusion was not expressly published by the authors.

The research from Troy and Romm (2004) and from Chivers and Flores (2002) was further explored and analyzed by **Rosenbaum** in **2005**. Rosenbaum's research was specifically prepared with the intent of exploring the environmental and developmental impacts of the NFIP regulations on properties in floodplains. The findings of this desktop research study are, however, more useful in directly addressing FC Council's concern that flood mitigation projects subsidize land value increases. Rosenbaum's literature review agrees with the 2002 and 2004 findings that property values at the time of sale are not typically influenced by the presence of mapped flood hazards, except in the Gulf Coast states and portions of the U.S. Midwest. Rosenbaum offers the following explanation for his perspective:

*“Some studies assess the public’s perceptions about low frequency/high damage events, such as flooding, and conclude that many people are unaware of or [ignore] these risks when they make decisions about where to build or locate. . . In short, the literature consistently suggests that many people put their lives and homes in jeopardy because they underestimate the risks to which they are exposed.” – pg. 4.*

If the above statement from the 2005 study is true, then removing a property from a floodplain in Fort Collins will have little or no effect on the final sale price of that property. The statement suggests if the public does not believe they are at risk, then they will not seek prior compensation to that risk by negotiating a price for a home in a floodplain that is lower than its comparable counterpart outside the SFHA.

Rosenbaum takes his findings one step further than Troy and Romm, and Chivers and Flores, by suggesting public outreach and awareness has no effect on sale price. This goes against the general findings of the 2002 and 2004 research but aligns itself well to the speculation by Chivers and Flores that aesthetic and environmental values of floodplain properties in the Western United States tend to offset the perceived reduction in property value associated with mapped flood hazards.

Rosenbaum explores new construction in SFHAs with the following statement:

*“. . . requirements for post-FIRM construction have been a much greater inhibitor of floodplain development than had existed before and during the emergency period of the same communities. Once a community enters the NFIP, all new residential construction within SFHAs must be at or above the base flood elevation and meet other flood-related building standards. . . the cost of complying with flood-related requirements increases the cost of living in flood-prone areas, thus providing some deterrent to development in the floodway.”*  
– pp. 5-6

This statement suggests that the removal of a SFHA from an undeveloped parcel of land would decrease the cost of development on the same parcel, therefore removing potential upfront costs associated with said development. This clearly acknowledges that some economic burden is associated with increased costs of compliance with floodplain regulations during construction, which may be passed on to future homeowners as a higher property purchase cost.

The market analysis of existing developed properties provided in Fort Collins, Colorado by **Campano (2004)** widely agrees with the research presented in the three journal articles discovered for this memorandum. The local nature of this particular investigation validates the findings of Rosenbaum, Chivers and Flores, and Troy and Romm, but is applicable only to developed floodplain properties in Fort Collins. Campano stated, “*Market evidence shows that there is no discernable difference in sales price for being located within a floodplain.*” This is the same conclusion reached in the aforementioned journal articles.

Campano’s analysis provides the following insight in Fort Collins floodplain properties:

*“In some cases, the homes within the designated flood areas have higher sale process than those outside of the flood area. This disparity is most probably attributed to other characteristics of the home such as condition or upgrades. In any case no price difference is shown for homes located within floodplains.”*

Campano did not explore the potential impacts of environmental, aesthetic, and natural amenities on property value, nor did he explicitly investigate the values of undeveloped properties. However, his findings are similar in nature to those discovered by Troy and Romm, and tend to agree with the trends of increased flood property value suggested by Rosenbaum. Campano’s study adds further credence to speculation that vacant lands may not receive windfall profits following removal of mapped flood hazards by flood mitigation projects.

## CONCLUSIONS

The four resources investigated for this desktop research study provide three primary conclusions summarized as follows;

1. Mapped flood hazards do not depress the value of undeveloped properties in the Fort Collins area, *and*;
2. By the first conclusion above, removal of SFHAs through flood mitigation projects does not increase the value of developable lands, *and*;
3. By the second conclusion above, flood hazard mitigation projects initiated by the FC Stormwater Utility do not subsidize land value increases for development interests with public funds, *and*;

By these collective conclusions, there is no economic windfall for the owner of a developed property when flood hazards are removed by flood mitigation improvements. One reason offered for the primary conclusion is that the public often assumes or believes low risk storm events will not affect them directly, especially in arid and semi-arid environments. Typically flood and other natural hazards are not factored into the purchase price of properties located in floodplains, and therefore do not become part of the price negotiation process at the time of contract of sale.

Another reason behind this conclusion stems from the suggestion that the aesthetic and environmental benefits of amenities typically found on a property in and near a floodplain often

offset the costs associated with managing flood hazards and accommodating regulatory requirements. In two of the four studies, developed property values in floodplains were actually higher than non-floodplain counterparts. The authors of those studies suggested this might be due to the amenities created by close proximity to wetlands, to riparian forests, to streams and ponds, and to wildlife living in and around the floodplain. **It could be reasonably speculated that beneficial price adjustments created by these natural amenities on vacant land could offset the loss of available developable area. Beneficial price adjustments might also offset the costs associated with necessary infrastructure improvements or front-end mitigation efforts required to modify the floodplain for human habitation and use.**

If the beneficial price adjustment associated with natural floodplain amenities identified by the preceding suggestion is possible, then removal of these floodplain amenities on the undeveloped land would actually be a detriment to the resale value of the property if developed later. This may suggest removal of flood hazards from properties in Fort Collins could negatively impact the value. This is an extreme conclusion that warrants further research before it can be reached with confidence. However, the information provided by the four studies conducted over the last decade decisively conclude there is no property resale value windfall for properties removed from floodplains by flood mitigation projects, or by any other method.

## **FUTURE RESEARCH NEEDS**

The available research stresses the need for continued public awareness and education activities, not just for potential buyers of floodplain properties, but also for real estate professionals, lending agencies, insurance representatives, and community decision-makers. Public education serves two critical purposes;

1. To protect life safety and property from flood hazards by promoting pro-active planning measures, *and*;
2. To promote risk awareness activities that fully-disclose the land use restrictions associated with mapped flood hazards on a property before they are transferred to new owners and/or occupants.

The same research also exposes a need for continued investigation on a regional basis to determine conclusively how vacant property values might or might not be affected by SFHA determination. The clear trends in property discounts in the U.S. Gulf Coast and Midwestern states are not the same as those of arid Western states. However, with a large percentage of the United States' population concentrated on the East and West Coasts, it would be beneficial to expand the California study from 2004 north to Oregon and Washington, and across the Eastern seaboard.

The data from 2005 identifies a need to distinguish between market value of properties in floodplains, and increased cost of compliance. It has been suggested that compliance with floodplain construction standards and regulations translates to an indirect cost to consumers that may artificially inflate property costs. Data was not provided to support this suggestion and it was not offered as a conclusion in the 2005 study, but it is relevant to the current analysis. This last point of speculation suggests, as previously stated, that removing flood hazards from parcels

may actually depress property values in Northern Colorado. Until this trend can be explored with data collection, testing and synthesis, it will remain an intriguing thought for future research and exploration in floodplain management.

## REFERENCES

- Campano, Ralph, 2004. E-mail correspondence to Bob Smith from October 1, 2004; subject heading reads "Floodplain Property Prices."
- Chivers, James and Flores, Nicholas, 2002. "Market Failure in Information: The National Flood Insurance Program." *Land Economics*, Vol. 78 (November), Pgs. 515-521.
- City of Fort Collins, 2008. *Minutes of the City Council Work Session from October 14, 2008*, Pgs. 1-25.
- Holoway, James M. and Burby, Raymond, 1990. "The Effects of Floodplain Development Controls on Residential Land Values." *Land Economics*, Vol. 66 (August), Pgs. 259-270
- Rosenbaum, Walter, 2005. "The Developmental and Environmental Impacts of the National Flood Insurance Program: A Review of Literature." American institutes for Research (AIR), and University of Florida, Pgs. 1-25.
- Troy, Austin and Romm, Jeff, 2004. "Assessing the Price Effects of Flood Hazard Disclosure Under the California Natural Hazards Disclosure Law (AB 1195)." *Journal of Environmental Planning and Management*, Vol. 47, Pgs. 137-162.