Date: August 4, 2006

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: Preliminary Damage Report Regarding the Floods of July 27 through 31, 2006

Attached please find a preliminary report regarding flood damages that occurred from record flows on the Rillito River, with modest flows on other major rivers. The bottom line is that record flood flows occurred on the Rillito River with few if any flood damages. Flooding occurred where predicted and caused relatively minor inundation and sediment deposition damage. Damage is primarily related to Pima County park property and the Mt. Lemmon Highway.

In the floods of 1983 and 1993, the results were far different. In 1983 the community was devastated by flooding with loss of life, injury to a number of people, and the loss of many homes and businesses. The voters of Pima County, in 1984, authorized for the first time, flood repair bonds and initiated an aggressive floodprone land acquisition program and the Board substantially strengthened the regulatory aspects of our Floodplain Management Ordinance. These modest investments in bonds, planning and regulatory programs prevented literally hundreds of millions of dollars of damage that could have occurred from recent flooding.

The Rillito Corps of Engineers Bank Stabilization Project, authorized by Congress and constructed in the late 1980’s and early 1990’s, was money well spent. It is likely that using a combination of federal and local funds, approximately $50 million was spent on bank stabilization and bridge replacement along the Rillito Creek from Interstate 10 to Craycroft. These flood protective works prevented potential flood damages and erosional losses to $500 million worth of real and improved property (value of property within erosion hazard limits of Rillito without bank protection).

Floods are impossible to predict and our experience is that there will always be a flood larger than the last one that occurred, such as along the Rillito. The best that we can do is plan and prepare for these unknowns.

A balance of structural flood control programs such as bank stabilization, preventing unwise encroachment in floodplains through floodprone land acquisition, and a strong and effective floodplain management and regulatory program should be credited with largely preventing flood damage from the recent record flood flows along the Rillito Creek.
County damage assessment teams and the Arizona Department of Emergency Management will begin assessments of public and private damage starting Tuesday at 9:00 a.m. Until these assessments are completed, the final total damage value is unknown. However, in the final analysis, it is likely that flood damage to parks, roads, bridges and flood control facilities from recent events will be less than $2 million, with a majority of this damage occurring on Mt. Lemmon Highway.

CHH/jj

Attachment

c: John Bernal, Deputy County Administrator - Public Works
   Nanette Jenkins, Assistant County Administrator for Policy - Public Works
   Suzanne Shields, Regional Flood Control District Director
   Nicole Fyffe, Executive Assistant to the County Administrator
Record Flows Along the Rillito River, Few Damages


Background

Heavy rainfall fell over much of Southern Arizona between Thursday, July 27th and Monday July 31st. Over this five-day period, the Santa Catalina’s saw more than 15 inches of rain, 50 percent more than 1983. Many areas in and around Tucson received at least 5 inches of rain during this same period. This heavy mountain rainfall led to record flows along the Rillito River. Flows at the Dodge Boulevard Bridge and the Rillito River measured 30,000 cubic feet per second (cfs), compared to the previous record of 29,700 cfs set in 1983.

Damages are still being assessed, but preliminary reports show Catalina Highway received the most damage with one major landslide and several smaller slides. The newly completed highway also experienced severe undercutting in at least one location. Overall, only a few public roads and bridges received minor damage. The Marana Wastewater Treatment Facility was threatened when floodwaters rose 10 feet, nearly topping the surrounding berms. The plant remained operational throughout with no environmental incidents. Several County parks and park buildings were flooded. Maintenance equipment sustained significant damage but all buildings remain structurally sound. Thirteen roads remain closed. Utility outages were short lived with only the Rincon Valley sustaining prolonged service gaps. Most importantly, no lives were lost and only minor injuries reported. The majority of the recovery effort is now focused on debris removal and clean-up.

In 1983 and 1993, the story was quite different.

1983 Flood

In early October 1983, after a wet monsoon season, 10 inches of rain fell north of the Mexico border causing record flows on the Santa Cruz River. Early morning on October 3rd, the river topped it’s banks causing widespread flooding and devastation. The Rillito River and its tributaries swelled from similar rainfall in the Santa Catalina Mountains and topped its banks mid-morning on the same day. The entire Tucson Basin received at least seven inches of rain.

As the region’s major waterways spilled over their banks, the flooding caused severe erosion damage, as well as inundation damage on the Santa Cruz River, Rillito River, Pantano Wash, Tanque Verde Creek, Agua Caliente Wash, Pima Canyon Wash, Canada del Oro Wash and many smaller tributaries. The damage to public infrastructure was enormous. During the height of the flooding, 42 bridges were closed and 19 bridges sustained significant damage. Damaged bridges included those at First Avenue, Dodge, and Swan Road. In addition,
over 8,000 linear feet of sewer lines ranging in size from 27 to 15 inches were destroyed and water distribution systems damaged. Significant erosion occurred along the majority of Rillito River.

Private losses were devastating. Thirteen people were killed and 222 injured in the flooding. Over 40 businesses and 382 homes were damaged. Another 154 homes were completely destroyed. According to the Red Cross, 5,852 people were given emergency shelter. The economic impact to the community was staggering. On the Rillito alone, losses resulting from erosion damage were estimated at over $10 million. In comparison, between 1940 and 1983, the combined losses from floods along the Rillito, was $3.7 million.

1993 Flood

The January 1993 flood was a prolonged extent of 15 days of heavy rain and snow melt. Although it was a large flood event, no lives were lost and no residential or commercial structures were destroyed. Impacts from the flooding included loss of access for about 2,500 residents of the areas between Tanque Verde Creek and the Agua Caliente Wash, flooding a few residences in Sabino Creek and downstream of Finger Rock Wash. The most severe erosion occurred along the Rillito River in areas identified as high risk and planned for protection by the U.S. Army Corps of Engineers. Construction contracts for bank protection had been awarded prior to the flood, but construction had not begun prior to the flooding. Other erosion included a portion of the Tanque Verde Creek adjacent to Tucson Country Club Estates where a major sewer interceptor was damaged. During the flood, $3.4 million was spent in emergency repairs to roadways and drainage structures and after the flood $14 million was spent on long-term repairs along the Rillito Creek and the Tanque Verde Creek.

Flood Repair, Improvements, and Prevention Since 1983 and 1993 Floods

In February 1984, four months after the 1983 floods, Pima County voters approved $63.8 million in GO Bonds to repair damage and prevent future flooding. The total included $12.5 million for access improvements, $8.3 million for flood prone land acquisition and $43.0 million for bridge repair/replacement and bank stabilization. These funds were combined with $42 million of Federal and State funding; providing a total of $106 million for flood prevention.

These funds were used to provide bank stabilization and improve bridges and access along the Rillito River, Santa Cruz River, and Tanque Verde Creek including bridges for Houghton Road over the Agua Caliente Wash and Rillito Creek. The 1986 Bond Program included $24.9 million for flood prone land acquisition, bank stabilization and construction of the Tanque Verde Road Bridge over the Agua Caliente Wash. The 1997 Bond Program provided $21.9 million for flood control improvements including the construction of the Lower Santa Cruz River Levee to protect the Town of Marana. To date, the County has
expended $5.9 million of the 1997 bond program authorization on specific flood control projects along the Rillito River, for a total of almost $60 million in bond funded flood control improvements along the Rillito River. In addition to the bond funding, the Regional Flood Control District tax levy revenues and grants from state and federal agencies have allowed the County to make substantial infrastructure improvements to protect the citizens of Pima County.

A U.S. Army Corps of Engineers (Corps) report dated 1986, estimated that without flood control improvements, the cost of flood damages along the Rillito could exceed $6.5 million annually. The total cost of the improvements constructed by the U.S. Army Corps of Engineers was $33 million. The federal share was $25 million and the local share of the cost was $8.5 million and the County was responsible for securing right-of-way for the project. The Corps justification for investing in these improvements was to protect the existing structures along the Rillito valued at $184 million. In today’s dollars, those same structures are worth more than $359 million. The total property values, land and structures are worth $556 million today.

The Floodprone Land Acquisition Program, which was created in response to the 1983 floods, has provided funding for the acquisition of private property in floodprone areas. Since 1983, several previously flooded properties along Pegler Wash, a tributary to the Rillito River, were purchased. In addition, properties near Dodge Road and La Canada were acquired. These properties are now part of the Rillito River Linear Park and associated park facilities.

Improvements were not limited to buying land and building bank protection. Immediately after the 1983 floods, the Board amended the Floodplain Ordinance instituting an 18 month moratorium on rezonings and construction in floodplains while the County and FEMA assessed the flood risks posed by the flood damaged river systems. Other amendments to the Floodplain Ordinance included lateral erosion provisions to prohibit construction adjacent to unprotected riverbanks, and the riparian habitat protection requirements to promote natural riparian environments and reduce construction within floodprone lands. River Management Studies were conducted to determine the best way to provide structural flood control measures as well as floodplain management regulations to reduce the future risk of flood damages.

Successes

Preliminary assessments of damages from this week’s event show only minor damages compared to the aftermath of the 1983 and 1993 flood events. A combination of capital improvements, including consistent bank protection, well constructed bridges, land purchases in floodprone areas, improved floodplain ordinance regulations, and land use policies, since the 1983 and 1993 floods may have protected us from devastation that could have occurred with this week’s record flows.
Attachment A, shows photos of damages from the July 2006 flood event to Mt. Lemmon Highway, County parks along the Rillito, the Natural Resources Parks and Recreation Administration building location, and the Marana Wastewater Treatment Facility.

Attachment B, shows photos of damage that occurred along the Rillito River to private and public facilities in 1983 and 1993. And those same locations after the July 2006 flood event.

Clearly the flood flows along the Rillito could have caused, as much as nearly $500 million in flood damages had the voters not authorized flood control bonds and floodprone land acquisition programs, and had Federal Corps of Engineers projects not been completed in the 20 plus years since the devastating 1983 flood.
Appendix A

Damages from July 2006 Flood Event
Mt. Lemmon Highway, July 31, 2006

Mile Post 1

Mile Post 8

Mile Post 9.8
Marana Wastewater Treatment Facility, July 31, 2006

Aerial of the facility at peak flows.

Santa Cruz floodwaters encroaching onto the facility and filling the emergency overflow basin. The track-hoe is attempting to construct a berm to protect entry into the property.

Santa Cruz floodwaters encroaching on the APP reuse discharge area on the south side of the facility.
Floodwater entering the west pond, future site of 1.5 MGD BNROD facility, via the adjacent property.

Floodwaters cascading into the emergency overflow basin.

View of Santa Cruz floodwaters approaching the west side of the facility and inundating the AZPDES gravity fed outfall. July 29, 2006.
NRPR Office Complex

Looking north across Camino de la Tierra to maintenance yard, warehouse building, and administration building.

NRPR Office Complex

Looking south to entrance on River Road.

Flooding on River Road and Rillito beyond.

NRPR Office Complex

Flooded archive storage.
NRPR Office Complex

Flooded maintenance yard and inundated cement mixer, mower, and spreader.

Brandi Fenton Memorial Park

Looking southwest from River Road. Ramadas.

Brandi Fenton Memorial Park

Brandi Fenton Memorial Park
Looking southeast.
Small adobe house southeast of Garcia House. Note water line.

Foothills Park
North bank. Senior field outfield.

Foothills Park
North bank path on Rillito River Park.
Appendix B

Damages from 1983 and 1993 Flood Events Along Rillito River, Compared to Photos Taken at Same Locations After July 2006 Flood Event.
Rillito at Dodge Bridge 1983

Rillito at Dodge Bridge July 31, 2006
Rillito at Camino de la Tierra 1983

Rillito at Camino de la Tierra July 31, 2006
Rillito at Swan Bridge 1993

Rillito at Swan Bridge 2006
Townhouses collapsed.

No damage.