History of Flooding and Floodplain Management in North Texas

Texas Floodplain Managers Association, Fall Meeting, September 18-21, 2012 - Rockwall, TX


John Ivey, PE, CFM – Halff Associates, Inc.

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Part 1
History of Floodplain Management in North Texas

- History of Corps’ Flood Plain Management Program
- Examples of Early Floodplain Maps/Recent Maps
- Conclusions

Part 2
History of Flooding in North Texas
Part 1

History of Floodplain Management in North Texas

- West Fork 1963
- Duck Creek Floodplain -1968
- 1977
First Example of “Turn Around Don’t Drown” in North Texas
Corps’ Floodplain Information (FPI) Program

Authority:
Public Law 86-645
Flood Control Act of 1960, Section 206
Examples of Floodplain Information (FPI) Reports
1. Compile and disseminate information on floods and flood damages

2. Identification of areas subject to inundation by floods

3. Guidance in the use of floodplain areas

4. Provide engineering advice for planning to ameliorate the flood hazard

5. Request of a State or a responsible local government.
Corps’ Floodplain Information (FPI) Reports in Texas

1. West Fork of the Trinity River (1963) – 1st in Texas, Corps prepared for TRWD
2. Floodplain Information (FPI) Reports, Special Flood Hazard Information, and Expanded Floodplain Information (XFPI) Reports.
3. Over 100 TX studies were completed in a 15 year period (1963-1979 +/-). 38 in No.TX
1. History of past floods, include HWM and photos

2. Description of hydrologic and hydraulic studies

3. Discussion of floodplain management principles

4. Floodplain maps, profiles, cross sections and hydrographs
Additional Features of FPI Reports

- Small brochure was also printed
- Photographs of local landmarks to relate flood elevations
Some City of Dallas FPM History

- 1910 – George Kessler Plan – Floodplains for Open Space/Parkways, Turtle Creek

- March 1965 – Adopted Stormwater Ordinance With Floodplain Zoning

- 1969 – Bachman Branch Study, 1st Floodplain Management/Delineation/Alternatives

- 1972 – Strengthened Ordinance – Preserve the hydraulic capacity of streams, no rise in 100-year
City of Dallas Floodplain Management Reports

Flood Plain Management of Fivemile Creek

Flood Plain Delineation and Erosion Control on Lower White Rock Creek

Flood Plain Management and Storm Drainage Study of Browning Branch and Slaughter Branch

For The City Of Dallas, Texas

Albert H. Halff Assoc., Inc., Engineers
December, 1984
Floodplain Information Reports

EXAMPLES OF FLOODPLAIN MAPPING
Example Maps - Rush Creek in Arlington, Texas – 1971 to 2009 Mapping

Note: Channelization
Little Bear Creek – North Richland Hills

1971 FPI

2009 FEMA Map Mod
Spring Creek, Dallas/Collin Counties, Texas
(note intense urbanization, but lack of floodplain development, i.e. **GOOD FPM!**)
1. Two Part Study in 1973-74

2. 1978 – XFPI Report
Conclusions for Part 1 - FPM

1. Generally, the historical floodplain information in north Texas has been utilized by communities to protect development from flood hazards.

2. Urbanization of watersheds had a major impact upon the increase in projected flood levels over time, especially in last 50 years.
3. In some of the floodplains, flood disasters have occurred despite the available floodplain information.

4. It is noteworthy that in most examples where a “FEMA” floodway was developed in the 1970’s and 1980’s, it is rare to find buildings in the floodway area.
Part 2
History of Flooding in North Texas
Time Line – Flood History
North Texas

- Dallas Flood
- Fort Worth Flood
- Texas Floods
- Texas Floods
- Deadly Texas Floods
- Hermine Floods

May 25, 1908 - Flood
Trinity River at Dallas
184,000 cfs at Gage

Old Dallas Steam Electric Station –
Now American Airlines Victory Arena Site
MAY 1908 FLOOD - DALLAS

South side of Commerce St. Bridge. Taken from East bank of River.—Dallas, May 25, '08

This photo from Dallas Observer website
The Great Flood of 1908

Credit: Dallas Morning News Archives
The Great Flood of 1908

Commerce Street Bridge

This was April 20, 1908 Prior to Peak Flood in May 1908
Fort Worth or Bust!

Lots of People Left Dallas in 1908!
Marine Creek – 1938 Flood At Stockyards
Marine Creek – 1942 Flood At Stockyards

Figure 1.--FLOOD SCENES ON MARINE CREEK

Upper photograph shows damaging results of April 1942 flood in hardware store on North Main Street. Lower picture shows debris piled up near East Exchange Avenue and North Main Street after April 1942 flood. (Photos courtesy of Fort Worth Star-Telegram.)
Trinity flood of May 17, 1949 covered most of near west side

Between 6 p.m. May 16 and 3 a.m. May 17, 11 inches of torrential rain fell on the watershed of the Clear Fork of the Trinity River west of Fort Worth. Fort Worth residents found when they awoke on May 17 that the levee system had been breached and much of the town was under water. Ten lives were lost and more than a million dollars damage was done in Fort Worth. In the panorama above assembled from two National Weather Service photos, the Lancaster bridge is seen at bottom. At far right, the Holly Water Treatment Plant fortunately survived with a higher levee, so the city water supply was not interrupted. At top center and left, the huge Montgomery Ward store on West Seventh was inundated with water so deep that it reached the second floor. The 1949 flood was undoubtedly the greatest flood in Fort Worth history, surpassing the floods of 1908 and 1922. The flood resulted in the construction of Lake Benbrook and a channelization program of the river by the Corps of Engineers.
1949 Flood at 7th Street Traffic Circle
May 1949 – Fort Worth

Note Boats and Trucks
May 1949 – Fort Worth
MARINE CREEK NEAR HISTORIC STOCKYARDS, FORT WORTH, TEXAS – PROBABLY 1949
AFTER THE 1949 FLOODS PEOPLE SAID...
Let’s Move Back to Dallas!
Floods recorded here in 1900, 08, 22, 32, 42, and 49. Subdivision developed in 54, flooded in 57, 59, 61 and three times in 62. Protection project costing $2.1 million initiated in mid 64.
Village Creek at Mansfield Highway 1957

Note cheap gas!
Dallas, Texas - 1966

Looking Southeast along
2500 Block of Eighth Avenue
April 29, 1966
Bachman Creek, April 1966 – Dallas, Tx

FIGURE 25. – Flood damage on Bachman Branch. Peak marks can be seen on curtains. Photograph by Dallas Morning News
Probably 1981 Flood on Mountain Creek/West Fork
(Photo by Jose Novoa)

Pflash Floods - Grand Prairie
1989 – 1991
Three Wettest Years on Record
1989 or 1990

West Fork of Trinity River – Grand Prairie, TX
West Fork of Trinity River - Grand Prairie, TX
Floodwaters strand cars in the middle of a mobile home park near Kennedale on Wednesday. Continued rains caused flash floods around the region.

Spring flooding
Rising waters claim 3 lives

Raging creek floods homes

By Christopher Evans

Kennedale police closed Mansfield Highway over Village Creek yesterday morning, residents of nearby mobile home parks stood vigil on a bridge in the rain, watching their lives sweep by beneath them.

The creek, normally shallow enough to wade, had risen to the roadway. And the current had grown strong enough to dislodge mobile homes from their foundations and send them spinning down the creek. Trucks, cars and trailers were sucked into the maelstrom.

The Village Creek Mobile Home Park, which sits on the southwest bank of the creek, was devastation. “My trailer was the first one that went down,” said Calvin Wainwright, 55, as he stood on the bridge watching water rush through hastily abandoned trailers about 10 a.m. “It’s holding the bridge up... When they said, ‘Get out,’ I got the hell out. Everything I had except what I got on my back is gone.”

Kennedale police and firefighters began evacuating Village Creek and Taylor’s Acres mobile home parks near the creek about 10 p.m. Tuesday when the water began spilling over the.

Lake Arlington

Hundreds forced to evacuate

By Thomas Korosec

Violent thunderstorms that swelled some North Central Texas waterways to record flood levels killed at least three people yesterday, forced hundreds from their homes and left others watching in fear as lakes and rivers rose through the day.

The storm, which dumped as much as 13 inches on some parts of the already saturated Metroplex, forced Lake Arlington to rage over its spillway for the first time since 1991.

A Dallas woman and a Grand Prairie man who ignored barricades blocking bridges were killed, and Cleburne authorities found the body of a businessman in a creek downstream from where his car was washed off a low-water bridge.

Elsewhere in Texas, one woman was killed and 23 people were injured in Jarrell after an early-morning tornado hit the small community about 40 miles north of Austin.

A tornado that hit Cleburne on Tuesday night was one of at least six that touched down in North Texas as a line of severe thunderstorms roared through the region. Damage was most severe in Johnson County, although twisters also caused problems in Hood and Ellis counties.

Another wave of storms crossed the region before dawn yesterday, sending creeks out of...
For Lake Arlington, it seems like rains of '57 all over again

Lake Arlington's emergency spillway doesn't see many emergencies. In fact, until yesterday afternoon, water never went over the top.

The reservoir has been around since 1957, so the conclusion must be that the lake designer must have been exceedingly precise with his calculations. The rule for years has been that residents always seem to be taking more out of the lake than Mother Nature can manage to put back in.

"Though Lake Arlington seemed to be answer to the city's problems back in 1957 - the population was less than 40,000 - it hasn't done such a good job of keeping up. When it was built, it was supposed to provide a 500-year flood protection. But now, within a year, the water level has already reached 40 feet.

The lake is now at 42 feet, which is only 2 feet below the spillway level. If it doesn't rain soon, the city will have to start draining the lake, which means more flooding for the residents.

A radio station back in 1957 brought in an expert who said the Lake Arlington dam was so new that it might break. A minor panic resulted, though the dam proved resilient. In the end only about 25 homes and businesses were flooded.

The town would have liked to have gotten off that lightly. More autos (than that were washed down the rushing banks of normally pastoral Johnson, Reilly and Village creeks. Some apartment complexes flooded more than a hundred units.

Nature will wake up on you, sooner or later. It did in May of 1957. It's back again, 32 years later, with the same trick and a much larger city to play chess with.

O.K. Carter's column appears Tuesday and Thursday in the Arlington edition.
Grand Prairie, Tx
Backwater from Johnson Creek - 1990
Grand Prairie, Tx
Backwater from Johnson Creek - 1990
West Fork of Trinity River – Grand Prairie, Tx

Beltline Road 1989
West Fork of Trinity River – Grand Prairie, TX

International Wildlife Park
1990
Johnson Creek – Arlington, TX
Trinity River - Dallas, TX
Fort Worth June 2004 Floods

From City of Fort Worth Files
Fort Worth June 2004 Floods

From City of Fort Worth Files
Fort Worth June 2004 Floods

From City of Fort Worth Files
Fort Worth June 2004 Floods

From City of Fort Worth Files
THEN CAME THE DEADLY YEAR 2007

Fury from the skies
Storms flood parts of city, damage homes in neighboring counties

The Star Telegram - April 25, 2007
Summary of 2007 Floods in Texas

• 1,345 identified flood or flash flood events
• **51 Documented Flood-Related deaths**
• At least 3 deaths not fully documented for this presentation
• 35- Vehicle-Related Deaths
• Over $264 Million in flood damages.
• IT WAS A VERY HARD YEAR!
Map of FEMA
Disaster Declaration of October 2007

Includes flood and Wind events from June-August 2007
Wrong turn turned deadly for couple in rainstorm

Joe Min, the owner of the restaurant, said Mr. Kim was looking for work at the restaurant. Mr. Kim called because he had gotten lost, and he gave him directions.

But Mr. Min wasn’t overly alarmed — waters often rose around his business when it rained. He also said it was unusual for him to hire a Koreans because Mr. Min was standing outside his restaurant in the rain, waiting.

Mr. Kim also called 911. But the 911 operator couldn’t understand what he was saying, a woman, presumably Mrs. Kim, can be heard screaming in the background. The sound of what appears to be a rushing water can also be heard.

The operator repeatedly tried to find out what was wrong with the caller and where he was calling from. “What language are you speaking?” she asked. “Are you speaking Chinese or something?”

But the line went dead before she could get any information. The 911 operator tried to call the man back but got voice mail.

Joel Lavender, a Dallas Fire-Rescue spokesman, said since the person was calling from a cellphone and the operator wasn’t able to get a location, resources could not respond.

“That was the end of it because we didn’t have a location to dispatch to,” Mr. Lavender said. “It’s unfortunate all the way around.”

When the Kim’s didn’t report for work at a maintenance company Tuesday morning, their family knew something was terribly wrong. Authorities were contacted. Police said they drove the route that would have been taken by the couple and did not find the car.

Police then contacted the couple’s cellphone company, which tracked the cellphone signal to a tower.

The car was pulled out by about noon. As neighbors and reporters watched, police notified the couple’s children that the bodies had been found.

It was a devastating end for a couple who came to the United States more than a decade ago from South Korea, seeking a new and better life for them and their three children. They had dedicated themselves to mission work, said Danielle Kim.

Mr. Kim said he and his sister had taken a trip to Afghanistan in 2005. The couple’s children had gone on a mission trip to an Oklahoma Indian reservation. They were dedicated members of the First Presbyterian Church in Richardson.

“My father had a vision,” Ms. Kim said.

“They are a faithful Christian family,” said Kyoung Kim, an assistant pastor at their church. “They were committed to minister on work. They worked so hard.”

The Dallas Morning News
June 7, 2007
June 18-26, 2007 –
Dallas, TX

The rising Trinity River was contained by the levee system Wednesday morning after torrential rains. Weather forecasts predict continued heavy rains through Thursday.
June 18-26, 2007 –
Haltom City – Whites Branch

Lost one 4-year old Girl in flood.
Whites Branch – Flood of 2007
Teen dies as floods hit North Texas again

Boy swept away in Garland creek; emergency declared in Hood County

By PAUL MEYER
pmeyer@dallasnews.com

Heavy rain triggered widespread flooding that killed a Garland teenager Tuesday night and forced Hood County to declare a local disaster after residents fled onto the roofs of their homes to escape rising water.

The storms, unleashng inches of water on an already saturated region, stranded motorists, overtopped creek banks, submerged roads and led to high-water rescues across North Texas.

In Garland, the rushing waters of Duck Creek swept away a 15-year-old boy who was playing with a friend, said Garland fire spokesman Merrill Lander. Rescuers threw the boy a rope, but he couldn’t grasp it and vanished downstream shortly after 8 p.m. He was found about two hours later after an intense search. Paramedics performed CPR and took him to a hospital, where he was declared dead.

In Hood County, County Judge Andy Rush declared an emergency at 10 p.m., saying the floods were worse than any he has seen in four decades. Mr. Rush said nobody in the county was reported missing or injured but that the water was still rising.

“The water is from waist to chest deep in some areas, and there are some people even higher,” he said.

The Dallas Morning News
June 27, 2007
Aerial photographs of the Trinity River, seen from west of downtown Dallas early Thursday afternoon, show water from month-long rains nearly filling the flood plain of the river to the top of the levees.

G. J. McCarthy / DMN Photo Staff

The Dallas Morning News
June 28, 2007
June 29, 2007 – North Texas

The water log: 10.97 inches in June

Trinity River Floodway – Dallas in Background

The Dallas Morning News
June 29, 2007
July 2-4, 2007 – Tarrant County

Loop 820 At Big Fossil Creek

The Star Telegram
Photos by Paul Moseley
July 5, 2007 –
North Richland Hills, Whites Branch/Big Fossil Creek at
Interstate Highway Loop 820
July, 2007 –
Erosion on Big Fossil Creek

The Star Telegram
Photos by Tom Pennington & Stewart House
TS Hermine

September 3-9, 2010
Archived Flood Articles (2010)

Note: Volume 2 of 2 For 2007 is Missing
September 7 - 9, 2010 Rainfall Totals
DFW Metroplex – September 8, 2010
Flood Details from Various Sources
Near school at IH 20 and Rush Creek, Arlington
Woodland Park neighborhood in Arlington. Rush Creek (Star-Telegram/Joyce Marshall)
Willows II
Apartments
Arlington, Rush Creek
(Star-Telegram/Ian McVea)
Arlington Fire Department and EMS crews rescued residents of the Willows II Apartments near Rush Creek (Star-Telegram/Ian McVea)
Rush Creek Apartments (Star-Telegram/Joyce Marshall)
Rescue of Elderly Lady in Arlington, Rush Creek
(Star-Telegram/Joyce Marshall)
Saving the Dogs In Arlington!

(Star-Telegram/Joyce Marshall)
The city tells residents that it will seek federal aid to buy some homes damaged last week.

By Susan Schrock
sschrock@star-telegram.com

ARLINGTON — The city will seek federal assistance to buy out some of the 120-plus homes that flooded last week after Tropical Depression Hermine blew through North Texas, officials told residents Monday.

Many of the homes are in west Arlington along Rush Creek, where flooding has worsened as the area has developed, officials said.

On Wednesday, heavy rains rushed Rush Creek out of its banks, sending up to 6 feet of water into homes and apartments. At least 60 homes were seriously damaged and two were destroyed, according to Red Cross estimates.

While city officials continue to work on a long-term solution to Rush Creek flooding, Arlington will apply for money from the Federal Emergency Management Agency and the Army Corps of Engineers to buy out more flood-prone homes, Arlington Mayor Robert Cluck said. The city has already spent $2 million in FEMA money to buy and demolish six houses.

Flooding in Arlington in the wake of Tropical Depression Hermine spurred rescues like Florence Dobrey’s on Wednesday.

SEVERE WEATHER

Tornadoes, flooding slam North Texas

Twister cuts swath of damage through Dallas
City of Fort Worth/DeOtte Slides – Sep 8, 2010

Village Creek at RR downstream of Salt Road (Mapsco 93X)
Upstream of Kennedale, TX
City of Fort Worth Slides – Sep 8, 2010

Walker Branch Near Precinct Line Road and Trinity Blvd. (67A)

Note Car
City of Fort Worth Slides – Sep 8, 2010

Valley View Branch at Trinity Blvd. (67C)
September 8, 2010 – Walker Branch and Lorean Branch
Near Trinity Blvd.

11:35 a.m. Drillers and roughnecks on a gas well rescued by boat. - Troy Bush from HD Chopper 8
Litsey Road at Henrietta Creek, North Fort Worth, TX – Sep 8, 2010
Preliminary Estimate is About a 25-year Flood
9-8-10 Big Fossil Creek – US of Western Center Blvd – At Parking Garage Over Floodway @ 9:49 am
Big Fossil Creek at Glenview Drive, Haltom City, TX
No one killed this time. Oct 15, 1973 person drowned (3 cars washed off)
2007 – another drowning?
White Chapel Road at Bear Creek, Keller, TX
Keller Citizen/Adrian McCandless
Near Bear Creek Intermediate School in Keller.
Photo by Savannah Martinez
Bear Creek Overflow at Beltline Road and Oakdale Road

Note: New Beltline Road was designed for 100-Year Flood Protection
Overflow from Bear Creek (Rt. Of photo) Inundated So. Bound Lane

Bear Creek Overflow at Beltline Road and Oakdale Road
(Grand Prairie)
Bedford Rd @ Little Bear Creek (Colleyville)
Note: Car Stopped

Bedford Rd @ Little Bear Creek (Colleyville)
Little Bear Creek @ Oak Knoll Rd, Colleyville

Drift Line
Little Bear Creek @ Martin Parkway and at SH 121

Little Bear Creek @) SH 121 (Looking east or downstream)
Little Bear Creek, North Main in Euless. (Star-Telegram/ Richard W. Rodriguez)
Slides From City of Grapevine

Big Bear Creek at Pool Road

Hike and Bike Roadway
Just D.S. of Pool Road
Not Much North Texas Flooding In 2011-12
FLOODS AUG 19-20, 2012

Two men swept away; one body found

Creek rescue

A Dallas Fire-Rescue swift water team searched in vain for the missing man before sunset Saturday.
Creek rescue

A Dallas Fire-Rescue swift water team searched in vain for the missing man before sunset Saturday.
Conclusions/Hard Lessons Learned

• Much to be done to educate and inform the general public on the dangers/hazards of low water or bridge crossings of streams

• Despite significant efforts, drivers continue to ignore warning signs and barricades
Hard Lessons Learned

• Need to recognize the risk taken by first responders to perform swift water and other flood rescues

• Need to stop placing mobile homes and critical facilities such as nursing homes in floodplains
Hard Lessons Learned

- Children are often the victims of uninformed and careless parents in flood-related deaths.

- Need to enforce laws regarding motorists who drive around barricades and put their own life and that of their family in grave danger.
Conclusions...

Now a Final Word from our Next President, as both candidates agree on ONE THING:
Turn Around
Don’t Drown!

Turn Around
Don’t Drown!

Turn Around
Don’t Drown!
QUESTIONS?