



Federal Flood Assessment Conference Recommendations and Proceedings

**Convened by
Congressman Silvestre Reyes
16th Congressional District of Texas**

**Organized by
Peter Brock, Community Liaison,
El Paso Office of the 16th Congressional District of Texas**

**Proceedings Editor: Dr. Ari Michelsen
El Paso Agricultural Research Center
Texas Agricultural Experiment Station
The Texas A&M University System**

Texas Water Resources Institute

Texas A&M University

Federal Flood Assessment Conference Recommendations and Proceedings September 6, 2006

**Convened by Congressman Silvestre Reyes
16th Congressional District of Texas**

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El Paso Office of the 16th Congressional District of Texas
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Participating Agencies and Organizations:

NOAA, National Weather Service

U.S. Geological Survey

U.S. International Boundary and River Commission

U.S. Army Corps of Engineers

U.S. Bureau of Reclamation

El Paso County Water Improvement District No. 1

Elephant Butte Irrigation District

Department of Homeland Security

Federal Emergency Management Agency

Texas Department of Transportation

U.S. Environmental Protection Agency



Texas Agricultural Experiment Station
THE TEXAS A&M UNIVERSITY SYSTEM

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 EPCWID#1, J. Reyes, anonymous internet photo, and TAES, Z.Sheng.



Federal Flood Assessment Conference Recommendations and Proceedings

Background and Purpose

Beginning in late July and continuing through mid September 2006 the Paso del Norte region, consisting of El Paso City and County, Texas, southern New Mexico and Ciudad Juarez, Mexico, experienced a number of record high precipitation events and severe localized and widespread flooding. According to the National Weather service, the July 31 to August 4 rains alone were more like a 100-150 year recurring event over the areas hardest hit. These floods that continued over a period of more than a month caused extensive and costly damage to infrastructure, homes, businesses and other property to the extent the region was declared a Federal Disaster Area. In this bi-national, three state region many different Federal agencies and other organizations have jurisdiction or roles in forecasting climate and river flows, monitoring hydrology, water management operations, flood control design and construction, security, infrastructure, communication and disaster assistance.

Congressman Silvestre Reyes convened this Federal Flood Assessment Conference to tap into the recent experiences regarding levels of coordination between federal agencies during this month's flood control operations in the Hatch/Las Cruces area of southern New Mexico and the El Paso/Juarez area of West Texas. This meeting between the federal water management agencies was foreseen as timely and important for reviewing the effects of the storm and to offer recommendations for needed changes and improvements. Valuable information was shared at the conference that will greatly assist in assessing the flood events, improving management and coordination among federal agencies and mitigating future impacts. Insight gained from the conference and the follow up summary reports contained in the proceedings will also help lay the groundwork for future planning and coordination with state and local agencies, irrigation districts and other organizations.

One of Congressman Reyes' desired outcomes from the conference is a proceedings report containing summaries of each organization's observations, responses and recommendations regarding the area's flood events. This conference proceedings and recommendation report contains a summary of priority agency and organization recommendations, conference agenda, list of participants, individual agency follow up reports identifying the agency responsibilities, flood event impacts from the agency perspective, agency actions, lessons learned, communication successes, full list of agency priority recommendations, identification of planned incident reports and agency contact information.

Infrastructure funding, improved communication, river and levee maintenance, and the need for additional weather and gauging stations, telemetry and coordinated or centralized access to real-time monitoring data are among the highest priority recommendations. A summary of common priority recommendations follows this section. A more complete list of agency and organization priority recommendations is provided following the individual agency reports. The report also includes agency conference Power Point presentations and as additional background, maps showing gauging station locations and monitoring organizations.

Recommendations and Common Priorities

Several common priority recommendations emerged from the conference discussions and individual agency reports. Complete conference report recommendations are provided with the individual agency reports. Summary highlights of common priority recommendations include:

- A comprehensive post-flood assessment is needed with inundation maps, identification of high water marks, storm discharge and hydrologic analysis, evaluation of individual and cumulative precipitation events, and economic impact assessment.
- Very little data were gathered because of the lack of recording rain gages, stage recorders, and stream gages in the watershed. This is a short- and long-term problem. Almost every agency and organization ranked the need to have additional real-time gauges, reporting and recording devices along with centralized web access to monitoring data as one of their highest priority recommendations.
- Because of the large size of the region and localized, intense nature of storms, more weather stations are needed placed in strategic places to provide timely and accurate measurements and appropriate warning of climate and precipitation events
- Better, updated knowledge of storm event severity and probable recurrence frequency is needed for planning, management, insurance and engineering applications. This will require funding support for updated calculation and analysis of precipitation events and associated hydrologic discharge and infrastructure capacity.
- Although communication was good in a number of areas, the need to improve agency coordination and communication was frequently recommended along with establishing a communications and flood warning network for response and operations agencies.
- Establish real-time flow and stage remote monitoring systems on large/wild arroyos.
- Funding is needed to rehabilitate aged and inadequate flood control (SCS) dams.
- The existing storm drain system within the city of El Paso is complicated and poorly documented, particularly in the central area of the city. A survey of the drainage facilities, and a GIS-based catalog of the facilities, would prove very useful in the preparation of flood damage reduction studies.
- IBWC alone estimated more than \$286 million is needed to repair or replace flood control gates at 12 structures, clean sediment and debris from the flood plain/channel and restore Rio Grande flood capacity to original design for water management and to reduce future damages.

Federal Flood Assessment Conference Agenda

September 6, 2006

El Paso Agricultural Research Center
Texas Agricultural Experiment Station
Texas A&M University
1380 A&M Circle, El Paso, Texas
(915) 859-9111

Peter Brock, Community Liaison, Congressman Silvestre Reyes
El Paso Office of the 16th Congressional District of Texas

Moderator: Dr. Ari Michelsen, director, Texas A&M University Research Center

Morning Session 8:30 a.m. to 11:45 a.m.

Proposed Focus: "Lessons Learned – August 1-4 Storm Event:
How did the federal infrastructure fare?"

Congressman Silvestre Reyes
Introductory remarks

National Weather Service
Meteorology of event and observations of short term weather systems
Review of Precipitation/Storm data (Did this exceed the 100 year event?)

US Geological Survey
Presentation of data
Report on Findings/Observations

IBWC
River and Levee Observations
Status of American & International Diversion dams
Status of Juarez storm retention basins

Corps of Engineers
Status of Flood Retention basins/dams
Geotechnical observations

Environmental Protection Agency
Contaminant issues
Mechanisms for Emergency Response

Bureau of Reclamation
Water Operations
Coordination of River/Storage Releases
American Canal diversion

Upstream diversion operation
Continuity of Operations - COO Plan

El Paso County Water Improvement District No. 1
24x7 Operation of American Canal System
Real time flood monitoring
Levee breach repair and control
Storm water impact on agricultural drainage system

Elephant Butte Irrigation District
Issues associated with storm event

Department of Homeland Security
Storm-associated issues at Ports of Entry
Security assessment
Affects on movement of cargo

Tex DOT
Assessment of storm effects on transportation infrastructure

FEMA
Overview of agency coordination and response

Lunch: Noon - 1 p.m. Hosted by the Texas A&M Research Center

Afternoon Session 1:15 to adjournment
Proposed Focus: “Lessons learned and recommendations.”
(if necessary, continuation of Agency Reports from Morning Session)

General discussion (potential topics):
Need for post-flood delineation/mapping
Defining storm severity and probability (how likely is this to happen?)
Is the Federal Infrastructure up to the Challenge of a 100-Year Event?
Redefining flood hazards in the region?
Infrastructure adequacy, needed improvements?
Communication and coordination across agencies
Planning for emergencies
Monitoring hydrology and local weather events – adequacy and real time reporting
Communication with media and the public (right message and timely?)
Recommendations for Funding and Planning

Agency and Organization Conference Reports

One of Congressman Reye's desired outcomes from this conference is a proceedings report containing brief summaries of each organization's observations, responses and recommendations regarding the flood events in our area. As agreed upon by the conference participants, proceeding reports, one-three pages maximum, were to be prepared summarizing each organization's observations, responses and recommendations regarding the flood events in our area. Agencies were requested to use the following headings and report outline guidelines for consistency.

Individual Agency Summary Report Sections

1. Agency/organization primary role or responsibilities (one-few sentences)
2. Brief overview of flood events/impacts from agency perspective (over the month-plus of flood events)
3. Agency/organization actions/response(s)
4. Lessons learned
5. Communication successes and recommendations
6. Agency/organization priority recommendations (short- or long-term)
 - a.) Identify up to 5 priority recommendations and estimated costs.
For example, recommendations, among many others, included: review of the Annual Recurrence Level; need for post flood assessment; installation of a crest stage network; inventory/survey of storm drain system; coordination of federal/emergency/bi-national responses; need for additional weather/arroyo/river monitoring and telemetry; dam safety analyses; improved agency, organization and bi-national communication; river channel maintenance; monitoring/retention basins on wild arroyos; greater telemetry sharing; regulation of arroyo/urban development; increase federal share of dam rehabilitation; establish central point of communication for media; and integrated, interagency assessment and management).
 - b.) Recommendations for interagency actions and/or coordination
7. List on-going or anticipated assessment or incident reports and indicate completion time-line
8. Identify agency contact information and web site addresses that may be of interest

Conference Agencies/Organizations and Report Point Person (agenda order)

National Weather Service – Tim Brice tim.brice@noaa.gov

US Geological Survey – Jim Stefanov jestefan@usgs.gov

International Boundary and Water Commission – Ken Rakestraw kenrakestraw@ibwc.state.gov

US Army Corps of Engineers, Albuquerque – Susan Bittick susan.m.bittick@usace.army.mil

US Environmental Protection Agency, Region VI – Maria Sisneros sisneros.maria@epa.gov

US Bureau of Reclamation, El Paso Field Office – Bert Cortez fcortez@uc.usbr.gov

El Paso County Water Improvement District No. 1 – Jesus Reyes jreyes@epcwid1.org

Elephant Butte Irrigation District – Gary Esslinger gesslinger@ebid-nm.org

Department of Homeland Security – Luis Garcia (fax 915-633-7249)

TX Department of Transportation – Chuck Berry cberry@dot.state.tx.us

FEMA – James Orwat james.orwat@dhs.gov



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE OFFICE
7950 Airport Road
Santa Teresa, NM 88008

Summary and Recommendations from the National Weather Service Concerning the Record Flooding in the El Paso Area from July 27 – August 4 2006 as Presented to the Federal Assessment Conference on September 6, 2006 at the Texas A&M Research Center in El Paso Texas.

Summary:

A synoptic and climatological overview was presented showing this unusual and historic flooding event.

Synoptically, an upper level low pressure system formed and remained over southern New Mexico and Far West Texas from July 27 through Aug 4 causing an inflow and convergence of very moist saturated air from Mexico into the region over a prolonged period of time. Minor disturbances from the Low enhanced convection from an already moist and unstable air mass.

It is a very rare event to have low pressure aloft over this area during July and August during the monsoon season. Furthermore, thunderstorms that developed were slow moving and training (one after another following the same path) which dumped excessive precipitation often over the same saturated ground areas. Considerable thunderstorm activity was enhanced as it moved near and over the Franklin Mountains producing not only extremely heavy rainfall but torrential runoff from the mountains.

This was a prolonged event persisting over several days with some areas being hit more than once adding to the flooding problems. A majority of the flooding was “flash” flooding which is the most dangerous type.

Is not unusual for flash floods to occur in El Paso in August but what was unusual was the magnitude of the event. The last time something like this happened in El Paso was July 9, 1881 when 6.5 inches of rain fell at the official measuring site downtown.

Additional flooding occurred from the Rio Grande itself (9.3 feet on August 1-2) Which last exceeded its banks in September of 1958. There were 5 fairly large peaks in the Rio Grande from August 1 to September 3.

Officially at KELP (El Paso International Airport) received 6.84 inches of rain fell in the 9 day period which is 73% of the annual average (9.43 inches). Unofficially some 7 to 10 inches of rain from more than one location on both sides of the Franklin Mountains was reported. This amounted to about **a years worth of rain in 2 days** in some areas.

Below is a summary (using the best available NOAA Atlas 14 rainfall data) of the average return interval (ARI) of this precipitation to obtain return intervals.

ARI

48 HOUR KELP 3.52 IN - 25 YRS

9 DAYS kelp 6.84 IN ~ 100 YRS

Averaging the precipitation amounts over the city from the 48 hour period of July 31-August 1 comes out in the 4.76-5.12 inch range

Giving ~ 108-158 yrs average return interval/

Eastwood trained weather spotter 2in/30 min = 100 yrs

WSR88D reports 2.5/60min ~ 100 yrs

There were at least 5 7+ inch reports/ 48 hrs = ~200 yrs

The airport (KELP) (single point measurement which missed the brunt of the event) was basically only a 25 – 44 year event for 48 hours (July 31-Aug 1 and Aug 3-Aug 4); however, doing an average of the values obtained (using the best filtered unofficial data possible along with comparison to the Doppler Weather Radar estimates), **the event was more like a 100-150 year recurring event over the areas hardest hit.**

Recommendations:

NOAA Precipitation ATLAS 14 needs updating so that more recent and relevant rain return intervals can be calculated for insurance and engineering applications. The Precipitation Branch told us this cannot happen without funding from outside agencies such as the Corps of Engineers. Updated tables will lead to better flood prevention designs in the future.

Due to the spotty and intense nature of convective storms in this area, more weather stations are needed to be placed in strategic places to better obtain over the entire metropolis and surrounding areas the “true” distribution of wind and rainfall. This mesonet of stations is **BADLY NEEDED AND WE BELIEVE SHOULD BE PRIORITY ONE.**

This network of stations would not only provide a real time output of data to monitor high winds and heavy rain etc. but would at the SAME TIME provide a plethora of data for modeling the weather in the complex environment in the El Paso area divided by the Franklin Mountains.

This mesonet of weather stations would provide the exact data needed to characterize the localized storms to best fit the hourly intensity data which is critical for culvert and drainage design as well as 48 hours data which is needed to assess river stage levels as well as provide the public more meaningful real time weather they can relate to near their homes as opposed to a point measurement only at the airport.

This mesonet would be a win-win situation for the National Weather Service and the research community. While providing real time data for observations that would aid in forecasts and add to PUBLIC SAFETY, it would also be archived for future research activities and modeling to improve the forecast of local events which in turn would benefit the public safety in characterizing those local areas prone to specific hazards.

9/15/06

David J. Novlan
Meteorologist
Climate Focal Point
NOAA National Weather Service
El Paso, Texas.

Federal Flood Assessment Conference USGS Summary Report

1. The U.S. Geological Survey (USGS) is a Bureau within the Department of the Interior that serves the Nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.
2. No USGS facilities or equipment were impacted by this flood event.
3. Because the USGS recognized this as a significant hydrologic event, assistance was offered via telephone and/or e-mail to the City of El Paso, TXDOT, USIBWC, Fort Bliss, and the Army Corps of Engineers. The Army Corps of Engineer and Fort Bliss accepted the assistance offer and three technical staff were mobilized from the Austin and San Angelo USGS offices to assist the one USGS staff member assigned to El Paso. Two USGS teams worked August 4 through August 6 at the Sparks Arroyo and Fort Bliss. Work at Sparks Arroyo included documenting high-water marks, documenting scour, surveying cross-sections, and indirectly calculating peak discharge. At Fort Bliss, high-water marks were marked and surveyed at 8 storm-water retention ponds.
4. Lessons learned include the need for the USGS to better educate other organizations as to USGS assets and capabilities related to the measurement and documentation of flood events. Ideally, if the USGS had more staff assigned to the El Paso area, direct measurements of flooding could have been made at many locations during flooding.
5. Although communications were eventually established thru telephone calls and e-mail, pre-existing technical assistance agreements would likely have improved communications and the speed of response.
6. Top five USGS recommendations: (1) Determine if any more high-water marks can be found in multiple areas of El Paso, (2) Conduct surveys of areas with reliable high-water marks and stable channel geometries to determine peak discharge values (3) Establish a crest-stage gage network (4) Establish flood warning networks on tributaries of the Rio Grande (this would involve rain-gage networks in the upper portions of watersheds), and (5) Establish a geomorphic assessment network
7. The USGS has no requirement to prepare an assessment or incident report. The USGS is willing to provide any data it has free-of-charge to agencies requesting data. The USGS can assist on a reimbursable basis any agency requesting technical assistance to develop their reports.
8. POC: Jim Stefanov, Deputy Director, USGS Texas Water Science Center, 8027 Exchange Drive, Austin, TX 78754-4733, jestefan@usgs.gov, 512-927-3543, <http://tx.usgs.gov>

**Federal Flood Assessment Conference
Sept 6, 2006**

**U.S. Section, International Boundary and Water Commission
Summary Report**

The International Boundary and Water Commission consists of a U.S. Section and a Mexican Section, with Headquarters in El Paso, Texas and Cd. Juarez, Chihuahua. The U.S. Section is charged with operation and maintenance of the Rio Grande Canalization Project (from near Percha Dam to American Diversion Dam), American Diversion Dam, International Diversion Dam, and the upper portion of the American Canal. Key functions include flood control and water deliveries and diversions to the U.S. and Mexico. The two Sections of the Commission share responsibilities for operation and maintenance of the concrete-lined portion of the Chamizal Reach and for the Rectification Reach which extends downstream to Little Box Canyon near Ft. Quitman, Texas.

Facilities operated by the U.S. Section were impacted significantly due to the high runoff volumes which occurred in the El Paso area beginning on August 1 and continuing intermittently through early September. Runoff from the August 1 storm resulted in flows that nearly reached the maximum capacity of the U.S. levee in the reach from American Dam through the upper portions of the Chamizal. Freeboard in this reach was inadequate. Flood waves from the August 1 and subsequent storms were controlled with no breaches nor overtopping of the U.S. levees. Levee and floodplain erosion was noted in some areas. Significant sediment deposition and debris accumulated on the diversion dams and in the Rio Grande floodplain, most notably in the American Dam to Chamizal reach.

Beginning on the morning of August 1, the U.S. Section began closely monitoring flow conditions along the Rio Grande and along the U.S. levees. This continued on a 24-hour basis until August 2 and on an as-needed basis during the next several days in the Rectification reach as the major flood wave proceeded downstream. Intermittent 24-hour surveillance/monitoring during the month of August was required for additional peak flow periods due to heavy rainfall runoff in southern New Mexico. The accumulation of debris and the deposition of sediment at the Diversion Dams required significant clearing operations to ensure the operability of those structures.

The U.S. Section benefited from the rainfall/runoff event in that additional data was obtained regarding flooding characteristics, levee conditions, flow peak travel times, etc. U.S. Section personnel were able to make several high flow stream flow measurements at key gaging stations to improve the accuracy of stage-discharge rating curves at those stations. The flood experience also pointed out a weak link in USIBWC's telemetry system in that the wireless leg of USIBWC's internet access proved to be vulnerable to outages during periods of rainfall and during lightning storms. This resulted in a blockage of USIBWC external email services, general internet access, and the ability to post telemetry data to the USIBWC web site.

During these events the U.S. Section was in close contact with the Mexican Section regarding the flooding situation. The U.S. Section also coordinated closely with the National Weather Service and the U.S. Bureau of Reclamation. During the flood event of August 1, the U.S. Section was unable to post its near real-time river gage data to the USIBWC website for access by other agencies and the public due to the problem with a wireless communication leg. The U.S. Section also was in close communication with the City of El Paso, the U.S. Corps of Engineers and the Mexican Section regarding the potential failure of La Montada Dike (a detention structure on the the Arroyo Las Viboras) in Cd. Juarez on August 4 and 5. Contacts with the local and national media were numerous during the various high water events during the month of August.

Following is a list of priority recommendations following the August flooding from the U.S. Section perspective:

- 1) Clean trash, debris and vegetation and remove sediment from Rio Grande floodplain/channel, estimated cost \$57.5 million.
- 2) Repair/replace flood control gates at 12 structures, El Paso to Fort Quitman, estimated cost \$7.3 million.
- 3) Restore Rio Grande flood capacity to original design, Riverside Dam to Little Box Canyon, estimated cost \$135 million.
- 4) Restore Rio Grande flood capacity to original design, Canutillo to American Dam, estimated cost \$13.5 million.
- 5) Canutillo Flood Wall, estimated cost \$8.4 million.
- 6) American Diversion Dam, gate replacement and new sheet piling, estimated cost \$4.9 million.
- 7) Modification of American Canal to match flood capacity of American Canal Extension, lining and mitigation, estimated cost \$60 million.
- 8) Install 2 new stream gauging stations with telemetry on the Rio Grande, estimated cost \$0.11 million.

The U.S. Section is surveying high water marks from the August 1 flooding in the river reach from Canutillo to Zaragoza Bridge. Final review is anticipated by October 31, 2006. The U.S. Section is also computing the final flow records for the river gaging stations, and will include the data in a Flood Report; a draft should be completed by October 15, 2006.

The U.S. Section web page at <http://www.ibwc.state.gov> can be accessed to learn more about the activities of the U.S. Section, as well as to access near real-time and historical flow data for gaging stations on and near the Rio Grande. Additional information can be obtained by

contacting Ms. Sally Spener (915)832-4175, Acting Secretary and Public Affairs Officer, Mr. Kenneth Rakestraw (915)832-4160, Acting Principal Engineer, Operations, and Carlos Marin(915)832-4157, Acting Commissioner.

FEDERAL FLOOD ASSESSMENT CONFERENCE
Corps of Engineers, Albuquerque District
Status of Flood Retention Basins/Dams
& Related Observations

AGENCY / ORGANIZATION ROLE AND RESPONSIBILITY

At the request of the city of El Paso, TX, the U.S. Army Corps of Engineers, Albuquerque District (Corps), constructed the El Paso Local Protection Project, a system of detention reservoirs and diversion channels to collect, regulate, and discharge arroyo runoff into the Rio Grande to reduce flood damages within the City. Congressional authority for the project is contained in Section 204 of the Flood Control Act of 1965, PL 89-298. The city of El Paso sponsored and cost shared the project. The El Paso Local Protection Project includes three independent sub-systems which protect the Northwest Area, the Central Area, and the Southeast Area of the City. The Corps completed the project features of the Northwest Area in 1986, the Central Area in 1987, and the Southeast Area in 2002. In accordance with applicable guidance, all structures were designed to maximize net economic flood damage reduction benefits, resulting in projects of varying levels of protection.

OVERVIEW OF FLOOD EVENT / IMPACT FROM AGENCY PERSPECTIVE

The Northwest Project Area includes Mulberry Dam, Thorn Drive Dam, Mesa Dam, and Highway Diversion, which contribute flow to the Borderland Diversion. Borderland Diversion carries floodwater to Keystone Dam, which provides retention and an outlet to Rio Grande. Buena Vista Division collects and transports flow to Oxidation Pond Dam, and Oxidation Pond Dam releases flow to the Rio Grande. During the flood events of August 2006, the Northwest Area system operated as designed with no signs of distress. It was reported that two pressure manhole covers in the Oxidation Pond system and two pressure manhole covers in the Keystone Dam system were displaced under the heavy flows. Corps personnel will investigate the cause.

The Central Project Area consists of Range Dam, Northgate Dam, Sunrise Dam, and Mountain Park Dam. Regulated outflow from these structures travel along the Fort Bliss Diversion Channel to the Fort Bliss Sump. Controlled outflow from the Fort Bliss Sump travels through the Fort Bliss Outlet Conduit to Pershing Dam. McKelligon Dam and Van Buren Dam regulate flow into Mountain Avenue Outlet Conduit, which diverts flow to Pershing Dam. Controlled flow from Pershing Dam travels along Government Hill Ditch, a TXDOT structure, to the Rio Grande. In addition, Durazno Basin, a city of El Paso facility, contributes flow to the Rio Grande. During the flood event of August 2006, the Central Area projects performed as designed with no signs of distress. On 4 August 2006, Pershing Dam experienced an uncontrolled spillway flow. Downstream of, but unconnected to Pershing Dam, Durazno Basin also spilled. None of the dams upstream of Pershing Dam spilled. It should be noted that Pershing Dam, designed for the standard project flood (approximately a 200-year event) spilled, but none of the 100-year-design dams experienced a spill. This suggests a very localized, high intensity rainfall in the Pershing-Durazno area. Also, the storm was one in a series of storms, and some water from previous events may have remained in the facilities.

The Southeast Project Area consists of Phelps Dodge Basin and Phelps Dodge Diversion Channel, Lomaland Basin, Carolina Basin, and the Americas Basin and Bluff Channel system. Storm water is detained in the basins and released into Mesa Drain, which carries flow to Basin G for release to the Rio Grande. The existing capacity of Mesa Drain is an integral factor in the design of the Southeast Area flood control projects. All of the basins are designed with gated outlet structures that regulate discharges

up to the maximum capacity of Mesa Drain. The projects in the Southeast Area performed as designed with no evidence of distress during the flood event of August 2006.

AGENCY / ORGANIZATION ACTION / RESPONSE

The Corps dispatched hydraulic engineers, geotechnical engineers, and design engineers to the city of El Paso during and after the flood event to monitor the Corps structures and to be available if emergency assistance was requested. Although the Corps inspected the structures during the event, some aspects of the facilities were not visible while water was impounded. Therefore, the Corps will conduct a comprehensive post-flood assessment of the projects during the first quarter of FY-2007. As part of this assessment, the Corps will conduct the first periodic inspections of the Lomaland and Carolina Basins in the Southeast Area. Because the structures were designed and constructed by the Corps, and are periodically inspected in accordance with Corps criteria, any damage sustained will be repaired under authority of the PL-99 program at 100% federal cost.

LESSONS LEARNED

The Corps prepared operation and maintenance manuals in support of the individual flood reduction facilities and presented the manuals to the City upon project completion. However, the operation and maintenance manuals do not address a coordinated operation of the facilities. According to City officials, the gate at the Fort Bliss Sump was not closed until after Pershing Dam began to spill. Due to the intensity of storm, it may not have made a difference, but it is possible that closing the gate earlier in the event could have reduced the spill at Pershing Dam. It is anticipated that additional recommendations will be made upon completion of the comprehensive post flood assessment.

COMMUNICATION SUCCESSES AND RECOMMENDATIONS

The USGS offered assistance to the Corps during the flood event

AGENCY / ORGANIZATION PRIORITY RECOMMENDATIONS

1. The existing operation and maintenance manuals do not address a coordinated operation of the facilities, and the potential exists for the reduction of flood risk with the implementation of a coordinated operation. Therefore, the Corps recommends that a single operation manual be prepared that addresses systematic operation during flood events.
2. The existing storm drain system within the city of El Paso is complicated and poorly documented, particularly in the central area of the city. A survey of the drainage facilities, and a GIS-based catalog of the facilities, would prove very useful in the preparation of flood damage reduction studies.
3. During the August flood event, very little data were gathered because of the lack of recording rain gages, stage recorders, and stream gages in the watershed. The Corps recommends that additional gages and collection and recording devices be installed to gather future hydrologic data. At present, the hydrologic models developed by the Corps are uncalibrated due to the lack of coordinated rainfall-stream flow data, resulting in a high degree of uncertainty in flood prediction. Real-time data collection would benefit the city by providing information for real-time operation of the system, for allocation of emergency services during a flood, and for informed evaluation of project performance.
4. The city would benefit from the installation of a flood warning system to provide valuable advance warning time.

5. The city of El Paso reportedly obtained recent orthophotographic mapping of the area. The Corps recommends the production of quality digital topographic mapping, which, in conjunction with the orthophotographic mapping, would allow determination of drainage boundaries and the direction of contributing flow paths for hydraulic analysis.

6. Under authority of the Corps Civil Works Programs, the city of El Paso and El Paso County have requested the following studies to reduce flood damages within the city and county:

A. *Northwest El Paso Floodplain Management Plan and Feasibility Report for Arroyos 42-28.* The city of El Paso requested a Floodplain Management Plan for the northwest section of the city of El Paso. The study area is drained by a series of arroyos that convey storm runoff from the Franklin Mountains through the study area across the Rio Grande valley to the river. The feasibility study will include a floodplain management plan, and will examine structural and non-structural solutions to existing flooding problems in the study area, and determine the Federal interest for proceeding with implementation.

B. *El Paso, Texas, General Re-Evaluation Report.* The study will re-evaluate the feasibility of additional flood control features including detention dams, diversion dikes, conduits, and channels, that collect, regulate, and discharge runoff into the Rio Grande. This study will address the potential for flood damage reduction for 8,830 urban acres subject to damaging floods from arroyos on the slopes of the adjacent Franklin Mountains.

C. *Sparks Arroyo Feasibility Report.* The Sparks Colonia is adjacent to the rapidly growing east, northeast, and lower valley sections of El Paso. The Corps has evaluated a portion of the watershed, and has recommended expanding the scope of study to include a significant adjacent drainage basin. The El Paso County Commission is expected to approve expanding the existing scope of work after which the study will proceed.

D. *Northeast El Paso Feasibility Report.* On 10 August 2006, the Corps received a letter from the city of El Paso requesting that a Feasibility Study be initiated to investigate flood damage reduction measures for the northeastern area of El Paso (in the vicinity of Woodrow Bean-Trans Mountain Road and Martin Luther King Boulevard).

E. *Gage Analysis.* On 10 August 2006, the Corps received a request from the city of El Paso to analyze existing monitoring and measuring devices associated with the various flood control features in the City. The request includes examining the feasibility of automated, telemetered devices to transmit information such as water elevation, velocity, and flow rate for the central storm water system including Fort Bliss Sump, Pershing Dam, IH-10 interchange basins, Mountain Park Dam, Sunrise Dam, Northgate Dam, and the Range Dam, including the river outlet.

PROPOSED ASSESSMENT REPORT

The Corps has proposed, and has received funding for, preparing a Post Flood Assessment Report to document the August 2006 flood events in the El Paso area. The report will serve as a record of the flooding as well as provide recommendations for future study and improved flood management systems. The report will include a description of the watershed and a review of past flood history and a description of the August 2006 events. An analysis of the hydrologic and hydraulic data collected and an estimate of rainfall frequency and areas of flood inundation will be included. The report will evaluate the flood damages sustained, as well as those prevented, and will describe the actions taken during the event and post-event by the City and by the various agencies involved. The document will describe the current floodplain management systems and the Corps flood control structures and provide an evaluation of their

performance, including successes and deficiencies. The report will also provide an evaluation of areas at risk and the potential for significant future damages.

AGENCY CONTACT INFORMATION AND WEBSITE ADDRESS

Susan Bittick
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Project Manager, El Paso and Vicinity
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Chief, Emergency Operations Section
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E-Mail: matt.m.bourgeois@usace.army.mil

FLOOD EVENTS CONFERENCE FOLLOW-UP: U.S. Environmental Protection Agency

1. Agency/organization primary role or responsibilities:

The U.S. Environmental Protection Agency's mission is to protect human health and the environment. In October of 1994, the U.S. Environmental Protection Agency established the "El Paso Border Liaison Office" to lead EPA's outreach efforts in border communities of the New Mexico – Texas and the four Mexican states across the border. The EPA Border office encourages border and / or tribal communities in the New Mexico and Texas region in conjunction with officials and leaders of the four Mexican border states and communities across the border to take an active role in improving their environment and their health; providing information and facilitating communities' efforts to address high - priority environmental and environmentally related health issues.

In addition, the Border Office works closely with regional programs including the Chemical Emergency Preparedness and Prevention Office under the Superfund Division in Dallas, Texas. This Office is responsible for emergency response to oil and chemical spills in the six U.S. states that EPA Region 6 is responsible for. Federal on-scene coordinators are the personnel in these emergencies that help coordinate the response, when activated or called upon.

2. Brief overview of flood events/impacts from agency perspective (over month-plus events):

None, other than having coordination with TCEQ, Bureau of Reclamation and IBWC with regards to exchanging communication on the Juarez Holding Dam event (see Item#3b).

3. Agency/organization actions/response(s):

A) Chemical Emergency Preparedness and Prevention Office Actions/response(s):

To date, EPA Chemical Emergency Preparedness and Prevention Office or any other Regional Program Office, has not officially been contacted or involved with the flood events with the exception a minor incident that took place on September 4, 2006, due to more rainstorms in the area, at Asarco's plant. This incident has been resolved with coordination between ASARCO, TCEQ and other agencies.

However in most incidences that involve an emergency chemical or oil spill due to an accident or natural event that is beyond the local abilities to respond to the incident, authorized personnel would notify the National Response Center (NRC). Once a report is made, the NRC immediately notifies a pre-designated EPA On-Scene Coordinator (OSC), based on the location of the spill. The OSC is the federal official responsible for monitoring or directing responses to all oil spills and hazardous substance releases reported to the federal government. In general, the OSC has the following key responsibilities during and after a response to a hazardous substance release or an oil spill: (1) assessment; (2) monitoring; (3) response assistance; and (4) evaluation. The procedure for determining the lead agency is clearly defined so there is no confusion about

who is in charge during a response. The OSC determines the status of the local response and monitors the situation to determine whether, or how much, federal involvement is necessary. It is the OSC's job to ensure that the cleanup, whether accomplished by industry, local, state, or federal officials, is appropriate, timely, and minimizes human and environmental damage.

The OSC may determine that the local action is sufficient and that no additional federal action is required. If the incident is large or complex, the federal OSC may remain on the scene to monitor the response and advise on the deployment of personnel and equipment. However, the federal OSC will take command of the response in the following situations:

- If the party responsible for the chemical release or oil spill is unknown or not cooperative;
- If the OSC determines that the spill or release is beyond the capacity of the company, local, or state responders to manage; or
- For oil spills, if the incident is determined to present a substantial threat to public health or welfare due to the size or character of the spill.

The OSC may request additional support to respond to a release or spill, such as additional contractors, technical support from [EPA's Environmental Response Team \(ERT\)](#), or Scientific Support Coordinators from EPA . The OSC also may seek support from the [Regional Response Team \(RRT\)](#) to access special expertise or to provide additional logistical support. In addition, the [National Response Team \(NRT\)](#) stands ready to provide backup policy and logistical support to the OSC and the RRT during an incident. The federal government will remain involved at the oil spill site following response actions to undertake a number of activities, including assessing damages, supporting restoration efforts, recovering response costs from the parties responsible for the spill, and, if necessary, enforcing the liability and penalty provisions of the Clean Water Act, as amended by the Oil Pollution Act of 1990.

It is important for future incidences such as the flooding events that took place from July-September, that if local officials need assistance responding or coordinating agencies, they can notify the NRC to get this assistance, especially if there is a potential that there is an environmental threat that may impact public health.

B) EPA Border Office Actions/response(s):

EPA Border Office personnel did have several conversations with Bureau of Reclamation and IBWC personnel concerning certain events that took place during the floods.

Currently, EPA Border Office is working closely with city officials to establish a bi-national emergency communication mechanism.

4. Lessons learned:

These flood events have indicated that natural disasters or even emergency events do not have borders. It is important to recognize that in border communities, a good and effective bi-national emergency response mechanism is needed. In addition, considering the unique situation of El

Paso, Texas, Las Cruces, New Mexico and Cd. Juarez, Mexico, improved communication is also needed between local, state and federal agencies within this region. For example, events that may take place in Southern New Mexico, can affect the west Texas region and/or Northern Chihuahua region. It is important that the region as a whole work on an emergency communication notification mechanism and potential response system that will alert agencies in this region of potential threats to communities, in order to work together effectively and respond to such emergency or extraordinary events.

5. Communication successes and recommendations:

The EPA Border Office has strong relations with federal agencies located in the region and was in communication with these agencies as it relates to water issues.

It is important that local officials are aware that if Federal Assistance or coordination is needed during an emergency where there is a potential threat to public health to a local community this can be quickly accomplished by notifying the National Response Center.

Recommendation: See Item#4 – Lessons Learned.

6. Agency/organization priority recommendations (short- or long-term):

a.) Identify up to 5 priority recommendations and estimated costs.

(For example, recommendations, among many others, included: review of the Annual Recurrence Level; need for post flood assessment; installation of a crest stage network ;inventory/survey of storm drain system; coordination of federal/emergency/bi-national responses; need for additional weather/arroyo/river monitoring and telemetry; dam safety analyses; improved agency, organization and bi-national communication; river channel maintenance; monitoring/retention basins on wild arroyos; greater telemetry sharing; regulation of arroyo/urban development; increase federal share of dam rehabilitation; establish central point of communication for media; and integrated, interagency assessment and management).:

Recommendation 1: See Item #4-Lessons Learned: Official Binational emergency communication mechanism for emergency events. A regional emergency communication mechanism (Southern New Mexico, West Texas & Northern Chihuahua). In addition, establish an “extraordinary events” binational committee.

Recommendation 2: Extraordinary events such as recent floods have been included in the 10 Border States Governor’s Conference (BGC) Water Work-Table. Information from lessons learned and findings from the Floods Conference should be exchanged and coordinated with appropriate institutions across the border.

b.) Recommendations for interagency actions and/or coordination:

See Item#6a.

7. List on-going or anticipated assessment or incident reports and indicate completion timeline:

None

8. Identify agency contact information and web site addresses that may be of interest.:

a) To report oil and chemical spills and radiation emergencies, call the National Response Center: 1-800-424-8802

b) Local EPA Office Contacts

U.S. EPA Region 6 Border Office

Carlos Rincon, Director (rincon.carlos@epa.gov) or

Maria Sisneros, Environmental Engineer (sisneros.maria@epa.gov)

4050 Rio Bravo Suite 100

El Paso, Texas 79902

Phone: (915) 533-7273

Fax: (915) 544-6026

c) Website:

Main: www.epa.gov

Environmental Emergencies Information: www.epa.gov/epahome/emergenc.htm

Border Office Programs: www.epa.gov/usmexicoborder

RECLAMATION

Managing Water in the West

Reclamation Summary Report:

Rio Grande Project Flood Events of August 1-4, El Paso,
Texas

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I. Organization

The Bureau of Reclamation is an agency under the U.S. Department of Interior. We are responsible for the operation and maintenance of the Federal Rio Grande Project (Project). In this capacity the El Paso field Office (EPFD) is responsible for storage and delivery of Rio Grande Project water for use by the users in Southern New Mexico & West Texas. (Elephant Butte Irrigation District in Southern New Mexico, El Paso County Water Improvement District #1 in West Texas and the City of El Paso) Water is also delivered to the Republic of Mexico through the International Boundary & Water Commission (IBWC) under the “Convention of 1906.”

II. Role and Responsibility

The Rio Grande Project furnishes irrigation water supply for about 178,000 acres of land and electric power for communities and industries in the area. Drainage water from project lands provides a supplemental supply for about 18,000 acres in Hudspeth County, Texas. Project lands occupy the river bottom land of the Rio Grande Valley in south-central New Mexico and west Texas. Water is also provided for diversion to Mexico by the International Boundary and Water Commission-United States Section to irrigate about 18,000 acres in the Juarez Valley.

Physical features of the project include Elephant Butte and Caballo Dams, 6 diversion dams, 139 miles of canals, 457 miles of laterals, 465 miles of drains, and a hydroelectric power plant. The project is operated as two divisions: The Water and Land Division, and the Power and Storage Division.

III. Agency Flood Impact and Response

During the monsoon season of August 2006, the EPFD coordinated “water operations” with the irrigation districts and the IBWC to minimize flood impacts to the federal levees, diversion dams, canals and drains. The project was severely impacted starting with the storm event of

August 1, 2006. The release gates at Caballo Reservoir were operated in close coordination with the IBWC and water users per the following:

- Aug 1, 2006 Gates Closed /Shut Down
- Aug 7 Gates Opened / Release started at 170 cfs
- Aug 9 Release increased to 900 cfs
- Aug 15 Gates Closed /Shut Down
- Aug 17 Gates Opened / Release started at 240 cfs
- Aug 19 Gates Closed /Shut Down
- Aug 24 Gates Opened / Release started at 250 cfs
- Aug 27 Release increased
- Sept 4 Gates Closed /Shut Down

While the storm events caused flooding, there was a benefit to the water users in that the Project Reservoirs “captured” over 250,000 acre-feet (af) of storm/monsoon water. The projected August release from storage was scheduled to be approximately 100,000 AF. The actual release was 26,000 AF. In addition the inflow into Elephant Butte Reservoir was projected to be 32,000 AF but 147,000 AF was captured. In summary the project storage increased by a total of 302,000 AF over the anticipated reservoir storage levels.

On August 3, EPFD responded to a request from the water users to provide high capacity pumps to protect project facilities and adjacent infrastructure due to floods. EPFD provided pumping equipment from the Elephant Butte, Socorro and Chama Field Division offices. These pumps remain in use as of September 7 in the Hatch, New Mexico and Esperanza, Texas areas.

A river monitoring team periodically observes the flows of the river and monitors the “peak” flows for impacts and possible over bank flooding. (*Attach flood pictures*)

IV. Lessons Learned

The majority of flooding and storms impacted at nonfederal infrastructure, such as municipal streets and storm drains. The areas where urban development has occurred and encroached on natural washes and arroyos experienced the most damage. Many of these arroyos are not rip rapped, armored or lined in any manner. The dikes or levees are constructed of sandy erodable material. There are many arroyos which do not have a retention dam/basin to detain the flood

flows. This is the case with the Placitas arroyo at Hatch, New Mexico (see photo #0255 attach), Rincon Arroyo, Canutillo Arroyo, Guayuco canyon., and at Faulkner canyon which discharges into the Rio Grande one mile upstream of Leasburg Diversion Dam. The discharge caused damage to the railroad on the opposite bank and moved railroad cars off the tracks. (See photo 0278 attach).

Further downstream the series of storm retention basins constructed by the Corps of Engineers known as the Keystone project performed as designed. These retention dams detained a flood peak and kept additional water from reaching the main channel of the Rio Grande.

As the storm water reached the Rio Grande a “flood peak” of 9,992 cfs was measured at “Rio Grande below American dam” at 3:15 pm on August 1. This storm event flow caused a peak flow at Ft. Quitman of 8,000 cfs 36 hours later.

Approximately 3.5 miles upstream of Ft. Quitman gauge the Guayuco Arroyo discharges into the Rio Grande. This arroyo has carried a large amount of sediment which has deposited in the main channel causing aggradation, resulting in flooding and a high water table to adjacent irrigable lands in the Esperanza Texas area. **The irrigation districts continue to utilize Reclamation pumps at this location.**

V. Communication Successes and Recommendations:

The Bureau of Reclamation (Reclamation) requires its offices and facilities to have Continuity of Operations Plans (COO Plans). The purpose of the COO Plan is to maintain operations of Reclamation’s offices and facilities during emergencies by providing detailed steps for physically moving the office out of danger to a location where normal or near normal functions can be resumed. In the El Paso Field Division, the COO Plan will allow continued management of the operations of the releases from Elephant Butte Dam and provide some assistance for flood operations of Caballo Dam (International Boundary and Water Commission takes over the operations of Caballo Dam under flood conditions which is in excess of 230,000 acre-feet).

A bright spot during the recent flooding was that the communication plan, as stated in the Continuity of Operations Plan (COO Plan), worked. Since the City of El Paso had evacuated

some of the residences near the El Paso Field Division, the COO Plan was on stand-by. (Fortunately, the El Paso Field Office did not have to be evacuated). This stand by status required notifying all employees of the EPFD of the threat to the office with the possibility of moving the office. Reclamation had no problems reaching any of its employees and other entities and agencies.

The initial action requiring Reclamation and other federal entities to develop COO Plan is Federal Response Planning Guidance (FRPG) 01-04, Continuity of Operations, dated December 4, 1994. Some of the other authorizations which covers not only the COO Plan but other emergency actions are as follows: The Homeland Security Act of 2002, PL 107-296, enacted on November 25, 2002; the National Security Act of 1947, 50 U.S.C. 401; Executive Order 12472, Assignment of National Security and Emergency Preparedness Telecommunications Functions, dated April 3, 1984, and Presidential Decision Directive (PDD) 62, Combating Terrorism—Homeland Defense, dated May 22, 1998, and Presidential Decision Directive (PDD) 67, Enduring Constitutional Government and Continuity of Government Operations, dated October 21, 1998.

Successes:

Communication network established by RGBFCC set up by Congressman Reyes.

Cooperation exhibited by all agencies in responding to the emergency.

Assistance from locations in New Mexico and Texas that were not affected.

Recommendations:

Inventory of available equipment which can be used during emergencies.

VI. AGENCY PRIORITY RECOMMENDATIONS

a. SHORT TERM:

- i. Improve Rio Grande remote monitoring system***
- ii. Establish flow monitoring system on the larger arroyos***

b. LONG TERM

- i. *Improve Rio Grande to state of the art monitoring and remote operations for storage dams and reservoirs and diversion dams*

c. RECOMMENDATIONS FOR INTERAGENCY CORDINATION

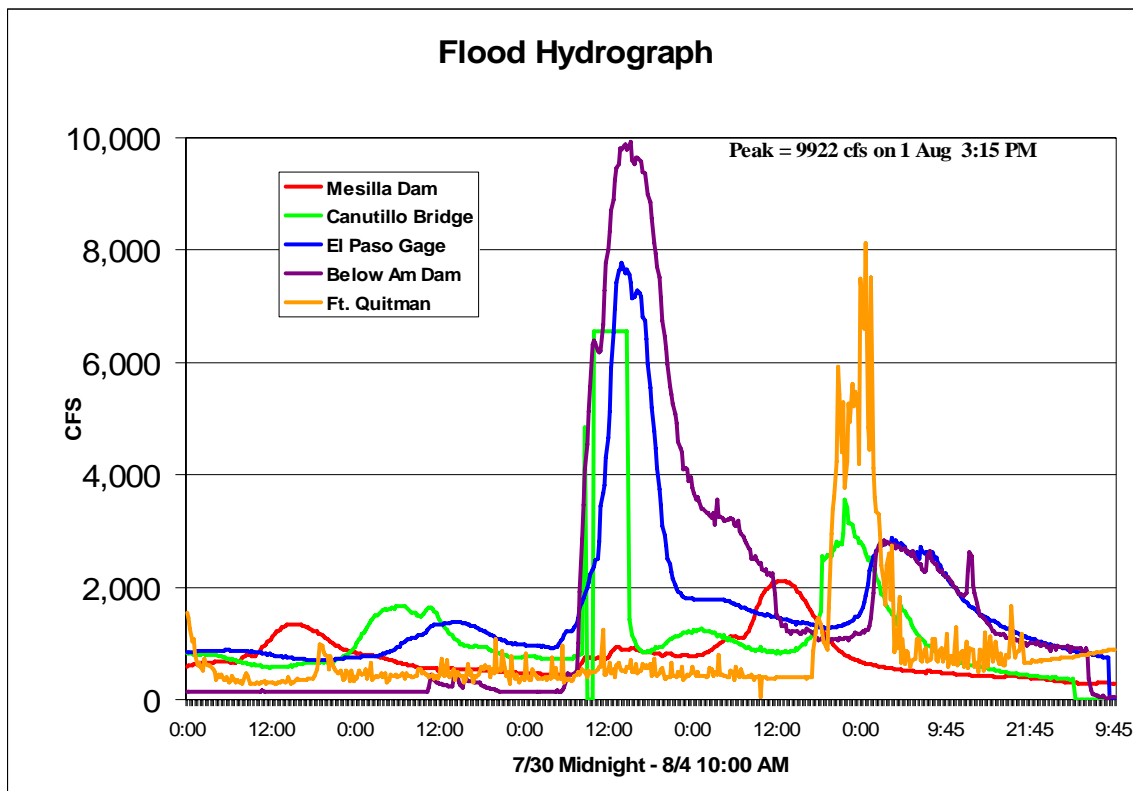
- i. *Establish communications network for response and operations agencies.*
- ii. *Centralize web access to flow data.*

VII. . List on-going or anticipated assessment or incident reports and indicate completion time-line

VII. Identify agency contact information and web site addresses that may be of interest

<http://www.usbr.gov/uc/elpaso/water/index.html>

<http://www.usbr.gov/uc/elpaso/water/RioGrandeProject/CurrentData/WFlow/daily.html>









EL PASO COUNTY WATER IMPROVEMENT DISTRICT No. 1
294 CANDELARIA • EL PASO, TEXAS 79907-5599 • (915) 859-4186 • FAX (915) 858-4183
TAX OFFICE (915) 859-0819 • DISPATCHER (915) 859-9128

September 14, 2006

Congressman Silvestre Reyes
16th District
310 N. Mesa
El Paso, Texas 79901

Re: Flood 2006

Dear Congressman Reyes,

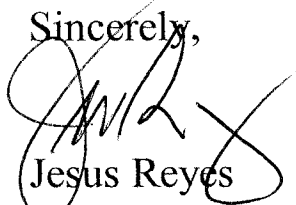
On behalf of the community in El Paso County, Texas we would like to thank you for all of the assistance that you and your staff provided during the flooding events in the past two months. The Federal Flood Assessment Conference was very beneficial and informative to everyone who attended and will hopefully bring positive results for future emergency situations. As we had discussed with you and IBWC staff, the El Paso County Water Improvement District No.1's key issues are clean up which include digging out the Rio Grande River where it can handle capacities as the project was designed to do and repair or replacement of gates located on the waste way channels which connect to the river. Also, adding and upgrading telemetry equipment remains a top priority to monitor the river from New Mexico to Hudspeth County, to include canals and drains. As you are aware the City of El Paso utilizes our drains to capture storm water and during the

flooding events monitoring the capacity of these drains becomes important to everyone in the El Paso area. To some it is about being able to discharge water into our drains to keep from flooding homes and streets. The El Paso Water Utilities was able to drain water from the Robert Bustamante Treatment Plant into our drain which helped them with all the storm water that went into the sewer lines which could have caused them a major problem at the plant. Due to all of the water in our drains we then created a problem further down the irrigation system where all the water gathered and caused flooding problems for farmers in El Paso County and Hudspeth County because of the assistance we provided to the City of El Paso. Therefore, because of all the mentioned events it is imperative that this be a priority and that funding be appropriated. I think everyone in our community has realized how important the irrigation project and drains have been during the flooding events.

Dr. Al Blair and I have been working on an idea of creating a drainage district, which by law could be set up to be a taxing entity. This would have to be an El Paso County project that would cover from the New Mexico State line to the Hudspeth County line. The Irrigation District would have to play a major role because we have a lot of the infrastructure already in place to handle storm events. This would be the creation of a new Board of Directors, General Manager and staff, plus equipment to upgrade and maintain such a project. We are preparing a power point presentation which will emphasize on some of our ideas. I will notify you and your staff once we are ready.

In conclusion, thank you, again for everything you do
and all your help in the flooding events.

Sincerely,

A handwritten signature in black ink, appearing to read 'JR' or 'Jesus Reyes', written over the printed name.

Jesus Reyes

General Manager

El Paso County Water Improvement District No. 1

**Gary Esslinger, Treasurer Manager
Elephant Butte Irrigation District
and Doña Ana County Flood Commissioner**

**Flood Threats in Southern New Mexico's Rio Grande Area
September 6, 2006**

First, my intention is to speak plainly, and I must issue a disclaimer: the opinions I express here are my own, and do not necessarily reflect the position of Elephant Butte Irrigation District (EBID) or Doña Ana County. Wearing the two hats of Manager of Elephant Butte Irrigation District and Doña Ana County Flood Commissioner, many people are pointing their fingers at each other, and me, for responsibility for the recent flooding our area has endured. The worst flooding was in Hatch, where three floods occurred on August 14, 21, and 28. The Leasburg area north of Las Cruces sustained flooding damage on September 1 and 2. In fact, the current state of the area's flood control is the result of many factors that conspire to leave us unprepared for events such as July 2006 through the present.

We are playing a game of Russian roulette with our flood control and planning in our area. The gun has six chambers, loaded as follows:

The first bullet is river and levy maintenance. When it was designed and built in about 1938, one of the primary functions of the Canalization Project was to provide flood control for the river reach between Percha Dam and Courchesne Bridge. The Canalization Project has not been maintained for the past ten years. Accumulation of sediment in the main channel and no-mow zones have raised the stage of a given flood; meanwhile, the levees have been largely neglected. In fact, FEMA has just decertified the levee system, which will cost our area millions of dollars in flood insurance for property that is supposed to be protected by the Canalization Project.

The second bullet is the more than 50 wild arroyos that discharge into the river or irrigation system below Caballo without retention or proper channel stabilization. In the recent flooding in Hatch, the Placitas Arroyo peaked at about 10,000 cfs, in a 100-foot wide channel. The sleeping giant is the Rincon Arroyo.

The third bullet is the aged and inadequate flood control dams in the reach. There are 33 SCS (now NRCS) built under PL 566 programs about 50 years ago to protect farmland. Their design life is typically 50 years. Five of these discharge directly into the river, while the other 28 discharge into EBID canals, laterals, and drains. These dams are at the end of their design lives and under-designed for the high hazard protection they now perform. In addition, many of the over 25 private dams, originally built by farmers to protect their fields, now have residential development below them. Funding to rehabilitate and upgrade these dams is not available.

The fourth bullet is the irrigation system that serves as flood conveyance to the Rio Grande, but during the monsoon season when flood conveyance is most critical, irrigation demand is high. The system simply lacks capacity to perform both functions simultaneously.

The fifth bullet is the increasing public demand for access to the river. Recreational facilities and environmental restoration activities between the levees affect both the flood stage with no corresponding improvements to the levees and increase the security hazard associated with the federal diversion structures that supply EBID's constituents. An attack on Mesilla Dam in 2004 was quickly mitigated, but it illustrates the increasing exposure these facilities face.

With the sixth bullet, the gun is fully loaded, and this is no longer Russian Roulette. The uncontrolled and unrestricted development of the alluvial fans below 50 year-old dams with a 50-year design life and a 50-year design flood, and private dams that were not engineered create an environment that will result in fatality when the trigger is pulled.

We are not without solutions. EBID and New Mexico State University (NMSU) are partnering to establish a Flood Safety Center that will provide comprehensive solutions to the web of hydrologic, hydraulic, geotechnical, cultural, financial, and jurisdictional problems that has brought us to our current situation. It is our intention to involve many of your agencies in this effort.

**Re: Fw: Federal Flood Assessment
Conference summary from DHS
(Document link: LUIS DFO GARCIA)
(submitted as e-mail message)**

Mr. Garcia - John Rivera, MSO Facilities, sat in on the meeting for us. There was little in the discussion that directly pertained to CBP or the Field Office. The presentations and discussions were more involved for the emergency response agencies. We did not make any presentations or participate significantly in the conference.

Primarily, the following points were what could be distilled from the meeting:

- * The need to improve communication between agencies.
- * Drainage reservoirs need to be larger.
- * Gates for drains need to be maintained and serviced regularly, many of the gates could not be opened because they were rusted shut.
- *The canal on border highway needs to be wider to accommodate more water to prevent water overflow.
- * U.S. needs to work with Mexico Officials on upgrading the dams in Juarez

CBP-OFO did not experience any significant issues pertaining directly to our facilities or operations. The impact of the recent rains and flooding on us stemmed from the issues that other entities, i.e. Mexican transportation, International Water Boundary Commission, etc., experienced as a result of the rains, such as impaired border crossing operations due to closures on the Mexican side, flooding around our port footprints due to poor flood control, and miscommunication by city officials concerning bridge operations.

BR

Texas Department of Transportation El Paso Flood 2006 Conference Report

On August 1st the District Disaster Committee (DDC) was called into operation by the Department of Public Safety (DPS) Committee chair LT. Luis Najera. His instructions were to assist with state forces areas that were flooded due to the constant rain that the El Paso area had received. From August 1, 2006 to August 13, 2006, TxDOT was operating 24 hours a day. Two 12 hour shifts were being worked by TxDOT personnel. Twenty maintenance workers from areas such as Dell City, Marfa, Van Horn, Ft. Davis, Alpine, Terlingua and Presidio were brought in to assist. Also, 40 workers with equipment were brought in from Lubbock, Odessa and San Angelo. Along with our 50 personnel from our local maintenance sections, the group responded to multiple locations on and off the state highway system. TxDOT also contracted out through the Association of General Contractors, contractors to assist in pumping water and restoring drainage ditches. Areas of response were prioritized by the DDC.

TxDOT and its contractors responded to various sites that were inundated with flood waters. Response locations included IH-10, Loop 375, Village of Vinton, Community of Canutillo, Mowad Street, Thunder Rd. in City of Socorro, and the Clint Landfill. Severe flooding occurred at IH-10 at Piedras, IH-10 at Raynolds Street, US54 at Pershing, Loop 375 and IH-10 at Goodyear Drive.

The state freeway system is designed for a 50 year flood event. Many of the areas experienced floods that exceeded the 50 year criteria. The City of El Paso will be developing a study of the Cebada Street storm system that discharges storm water from Interstate 10 to the Rio Grande. TxDOT has been informed by City of El Paso sources that consideration will include increasing storage capacity upstream of I10 versus the pressurized pumping of more water to the Rio Grande. Other options may also be evaluated in the proposed study.

Noteworthy are some of the successes that occurred. The local emergency declaration by the DPS was on August 1st at approximately 1:00 PM. The DDC was kept operational for 24 hours a day until the immediate emergency was addressed. Within 48 hours TxDOT brought in 60 personnel from TxDOT offices outside El Paso. Additionally, TxDOT issued emergency contracts that included 200 workers with over 200 pieces of equipment that were used to assist State, County and City forces. Also noteworthy is the assistance and coordination with International Boundary and Water commission (IBWC) and the Rogelio Sanchez State Jail. IBWC provided pumps to TxDOT to remove flood waters and the State Jail inmates filled sandbags to assist the locals.

TxDOT expended approximately \$3 million dollars with their personnel and their contractors within the first 4 days of emergency response. Since that time TxDOT has also awarded over \$17 million dollars in additional contracts for cleanup on state highways such as IH-10, US54, Loop 375, SH20 and other highways. Approximately 200 TxDOT personnel and 200 contracted personnel with equipment were activated for the emergency response.

TxDOT personnel response was immediate. TxDOT and contracted crews were even asking where else they could assist. TxDOT will be preparing an After Incident Report over the next several months in order to identify strengths and areas of needed improvement. TxDOT is very proud of the efforts of their employees and contracted personnel.

**Summary Report
FEMA Region VI Mitigation's
Response to
Federal Flood Assessment Meeting
Held September 6, 2006**

Summary Report Request Item	Response
1. Agency/organization primary role or responsibilities	<p>FEMA Region VI Mitigation Division's role in a post disaster situation is:</p> <ul style="list-style-type: none"> • To establish a local office to coordinate data collection, response activities, and mitigation activities. • To assist the local governing bodies in recording and assessing the location and extent of damages from the extreme weather event in the declared disaster area(s). • To identify actions to be taken by the local entities to make the area less vulnerable to damages from severe storms, related flooding and other natural hazards. • To assist in identifying and implementing methods, practices, and programs that will help citizens of El Paso to avoid and/or minimize damages from future disasters.
2. Brief overview of flood events/impacts from agency perspective	<p>On July 31, 2006 and subsequently throughout August and early September 2006, severe thunderstorms struck the incorporated and unincorporated areas of El Paso County. As a result of these rainfall events, widespread flash flooding occurred throughout the City of El Paso and especially in the northwestern and the north central portions of the City/County. Also, some riverine type flooding occurred along portions of the Rio Grande. Damage to homes, businesses, transportation features and stormwater/drainage systems was of such severity that the State of Texas requested and was granted a Federal "major" disaster declaration on August 15, 2006.</p>
3. Agency/organization actions /response	<p>On August 31, 2006, the El Paso FEMA JFO staff and FEMA Region VI staff met with representatives from the City of El Paso, El Paso County, the Texas Department of Transportation (TxDOT), the International Boundary and Water Commission (IBWC), a Congressional representative and MAP 6, an IDIQ Contractor for FEMA. The meeting, which took place at the City of El Paso offices, was held to discuss the ways, means and need to collect and develop Flood Recovery Data from these storms. At this meeting preliminary damage center location information was provided</p>

	by the City of El Paso, El Paso County, and JFO staff, and preliminary High Water Mark locations were provided by the City of El Paso. The representative from TxDOT also indicated a portion of Interstate Hwy 10 was inundated and therefore closed for a period of time.
4. Lessons learned	Although the area may receive only ten inches (+/-) of rain in a year, many times the rain comes in large doses on just a few days of the year. Stormwater and floodplain management should therefore be a very high priority in the local areas.
5. Communication successes and recommendations	Recommend that all Federal Agencies that are having disaster coordinate fully with their local government counterparts. We have successfully communicated with the City of El Paso and El Paso County regarding the proposal of the development of flood recovery data.
6. Agency/organization priority recommendations (short- or long-term)	<p>FEMA Region VI's Assessment Team has determined that there is a need and associated benefit(s) in collecting flood recovery data as a result of the recent storms and have recommended the following:</p> <p>Short-Term Action</p> <ul style="list-style-type: none"> • That horizontal vertical control data be gathered and compiled for identified high water mark locations • That a flood inundation map or a map indicating the areas that received flood damage be developed; • That areas that received severe flooding damage, and especially areas that are experiencing growth and development and/or re-development, be studied using technical hydrology and hydraulic floodplain analysis to determine appropriate velocities, potential flooding problem locations and flooding depths • That flood frequencies be determined by damage center location or drainage basin for approximately 10 locations, based on the most intense storm of that area.
7. List on-going or anticipated assessment or incident reports and indicate completion time-line	After meeting with local officials, FEMA Regional staff prepared an assessment report which contained the above recommendations.
8. Identify agency contact information and web site addresses that may be of interest	www.fema.gov

FULL LIST OF ORGANIZATION PRIORITY RECOMMENDATIONS

(extracted from agency follow up reports)

NWS Recommendations:

NOAA Precipitation ATLAS 14 needs updating so that more recent and relevant rain return intervals can be calculated for insurance and engineering applications. The Precipitation Branch told us this cannot happen without funding from outside agencies such as the Corps of Engineers. Updated tables will lead to better flood prevention designs in the future.

Due to the spotty and intense nature of convective storms in this area, more weather stations are needed to be placed in strategic places to better obtain over the entire metropolis and surrounding areas the “true” distribution of wind and rainfall. This mesonet of stations is **BADLY NEEDED AND WE BELIEVE SHOULD BE PRIORITY**

This network of stations would not only provide a real time output of data to monitor high winds and heavy rain etc. but would at the SAME TIME provide a plethora of data for modeling the weather in the complex environment in the El Paso area divided by the Franklin Mountains.

This mesonet of weather stations would provide the exact data needed to characterize the localized storms to best fit the hourly intensity data which is critical for culvert and drainage design as well as 48 hours data which is need to assess river stage levels as well as provide the public more meaningful real time weather they can relate to near their homes as opposed to a point measurement only at the airport.

This mesonet would be a win-win situation for the National Weather Service and the research community. While providing real time data for observations that would aid in forecasts and add to PUBLIC SAFETY, it would also be archived for future research activities and modeling to improve the forecast of local events which in turn would benefit the public safety in characterizing those local areas prone to specific hazards.

USGS Recommendations

Top five USGS recommendations: (1) Determine if any more high-water marks can be found in multiple areas of El Paso, (2) Conduct surveys of areas with reliable high-water marks and stable channel geometries to determine peak discharge values (3) Establish a crest-stage gage network (4) Establish flood warning networks on tributaries of the Rio Grande (this would involve rain-gage networks in the upper portions of watersheds), and (5) Establish a geomorphic assessment network

USIBWC Recommendations

Following is a list of 5 priority recommendations following the August flooding from the U.S. Section perspective:

- 1) Clean trash, debris and vegetation and remove sediment from Rio Grande floodplain/channel, estimated cost \$57.5 million.
- 2) Repair/replace flood control gates at 12 structures, El Paso to Fort Quitman, estimated cost \$7.3 million.
- 3) Restore Rio Grande flood capacity to original design, Riverside Dam to Little Box Canyon, estimated cost \$135 million.
- 4) Restore Rio Grande flood capacity to original design, Canutillo to American Dam, estimated cost \$13.5 million.
- 5) Canutillo Flood Wall, estimated cost \$8.4 million.
- 6) American Diversion Dam, gate replacement and new sheet piling, estimated cost \$4.9 million.
- 7) Modification of American Canal to match flood capacity of American Canal Extension, lining and mitigation, estimated cost \$60 million.
- 8) Install 2 new stream gauging stations with telemetry on the Rio Grande, estimated cost \$0.11 million.

USCOE PRIORITY RECOMMENDATIONS

1. The existing operation and maintenance manuals do not address a coordinated operation of the facilities, and the potential exists for the reduction of flood risk with the implementation of a coordinated operation. Therefore, the Corps recommends that a single operation manual be prepared that addresses systematic operation during flood events.
2. The existing storm drain system within the city of El Paso is complicated and poorly documented, particularly in the central area of the city. A survey of the drainage facilities, and a GIS-based catalog of the facilities, would prove very useful in the preparation of flood damage reduction studies.
3. During the August flood event, very little data were gathered because of the lack of recording rain gages, stage recorders, and stream gages in the watershed. The Corps recommends that additional gages and collection and recording devices be installed to gather future hydrologic data. At present, the hydrologic models developed by the Corps are uncalibrated due to the lack of coordinated rainfall-stream flow data, resulting in a high degree of uncertainty in flood prediction. Real-time data collection would benefit the city by providing information for real-time operation of the system, for allocation of emergency services during a flood, and for informed evaluation of project performance.
5. The city would benefit from the installation of a flood warning system to provide valuable advance warning time.
5. The city of El Paso reportedly obtained recent orthophotographic mapping of the area. The Corps recommends the production of quality digital topographic mapping, which, in conjunction with the orthophotographic mapping, would allow determination of drainage boundaries and the direction of contributing flow paths for hydraulic analysis.

6. Under authority of the Corps Civil Works Programs, the city of El Paso and El Paso County have requested the following studies to reduce flood damages within the city and county:

USEPA Organization priority recommendations (short- or long-term):

Recommendation 1: It is important that the region as a whole work on an emergency communication notification mechanism and potential response system that will alert agencies in this region of potential threats to communities, in order to work together effectively and respond to such emergency or extraordinary events.

Establish a regional emergency communication mechanism (Southern New Mexico, West Texas & Northern Chihuahua). In addition, establish an “extraordinary events” binational committee.

Recommendation 2: Extraordinary events such as recent floods have been included in the 10 Border States Governor’s Conference (BGC) Water Work-Table. Information from lessons learned and findings from the Floods Conference should be exchanged and coordinated with appropriate institutions across the border.

USBR Recommendations-

a. **SHORT TERM:**

- i. Improve Rio Grande remote monitoring system
- ii. Establish flow monitoring system on the larger arroyos

b. **LONG TERM**

- i. Improve Rio Grande to state of the art monitoring and remote operations for storage dams and reservoirs and diversion dams

c. **RECOMMENDATIONS FOR INTERAGENCY CORDINATION**

- i. Establish communications network for response and operations agencies.
- ii. Centralize web access to flow data.

EPCWID#1 Comments and Recommendations (from presentation and report)

Recommend creation of a “drainage district”

System almost had catastrophic failure

Actual flow during the flood events was much less than design flow

Without Agricultural Drains damage to City would have been much greater

Telemetry system needs upgrading

Communications need improvement

EBID (Gary Esslinger with disclaimer)

Russian roulette with six chambers:

- 1 Need maintenance of Canalization project levees and channel
- 2 50 wild arroyos – monitoring, channel stabilization/retention needed
- 3 Aged and inadequate flood control (old SCS) dams – funding needed to rehabilitate
- 4 Irrigation system also used as flood conveyance, irrigation system not designed for both

- 5 Increasing public demand for river access – security needs to be addressed
 - 6 Need to plan and control development of alluvial fans – only 50 year flood design
- Recommend and working on establishing a Flood Safety Center. Federal agency involvement.

FEMA Recommendations

FEMA Region VI's Assessment Team has determined that there is a need and associated benefit(s) in collecting flood recovery data as a result of the recent storms and have recommended the following:

Short-Term Action

- That horizontal vertical control data be gathered and compiled for identified high water mark locations
- That a flood inundation map or a map indicating the areas that received flood damage be developed;
- That areas that received severe flooding damage, and especially areas that are experiencing growth and development and/or re-development, be studied using technical hydrology and hydraulic floodplain analysis to determine appropriate velocities, potential flooding problem locations and flooding depths
- That flood frequencies be determined by damage center location or drainage basin for approximately 10 locations, based on the most intense storm of that area.

Federal Flood Assessment Conference, Sept. 6, 2006

Participant List



Texas Agricultural Experiment Station

The Texas A&M University System

Agricultural Research and Extension Center, El Paso
1380 A&M Circle • El Paso, TX 79927-5020 • 915/859-9111 • FAX 915/859-1078

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Chuck Berry	District Engineer	Texas Department of Transportation	cberry@dot.state.tx.us	915-790-4320
Zhuping Sheng	Hydrogeologist	El Paso Agricultural Research Center, Texas A&M University	z-sheng@tamu.edu	915-859-9111
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Woody Irving	Planner	U.S. Bureau of Reclamation	wirving@uc.usbr.gov	915-534-6325
Ken Rakestraw	Acting Principal Engineer	U.S. International Boundary & Water Commission	kenrakestraw@ibwc.state.gov	915-832-4160
Callie Gibson	Field Representative	Senator Pete V. Domenici	callie_gibson@domenici.senate.gov	505-346-6731

Gauge Station Locations and Operating Organizations

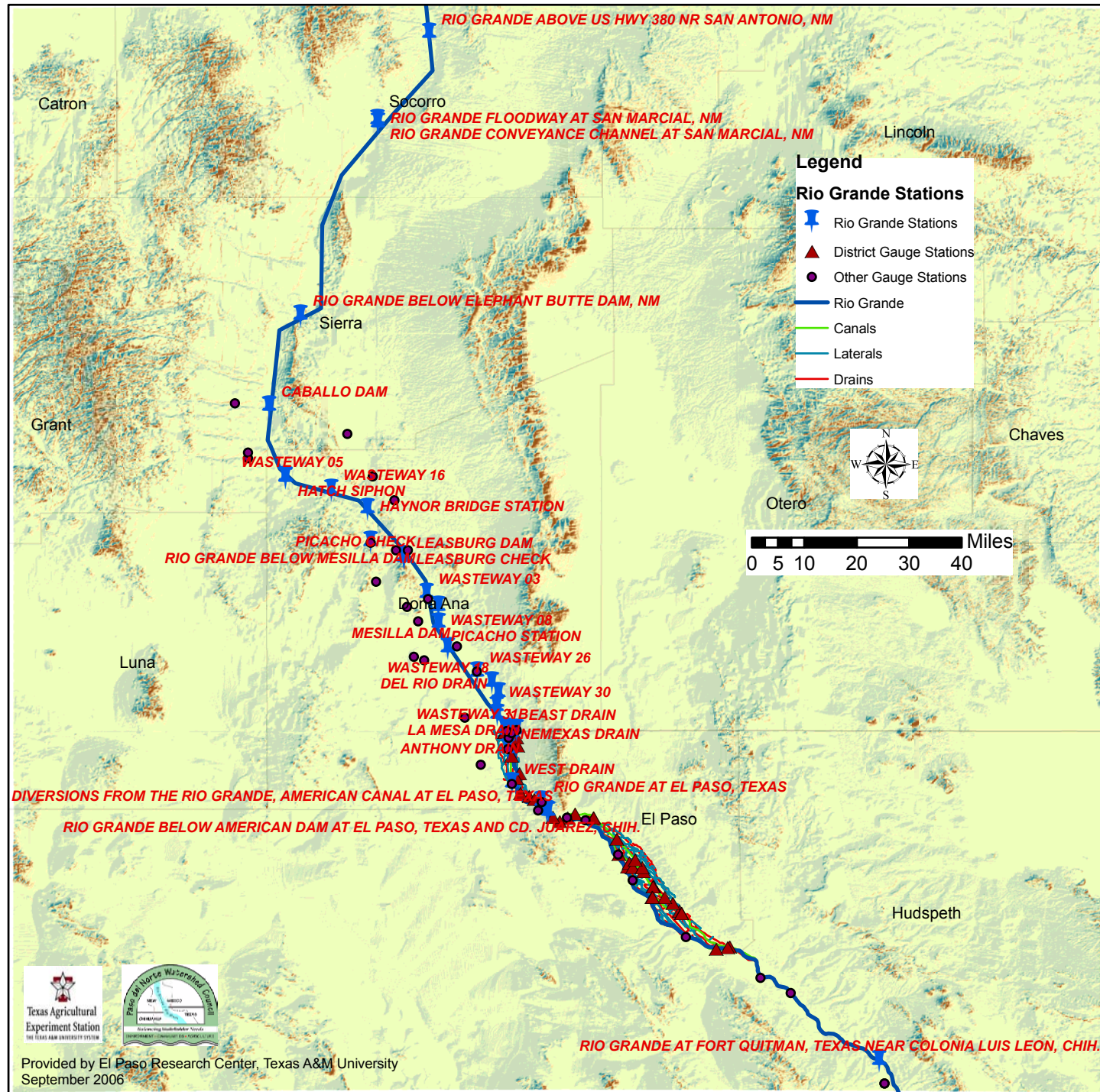
Two maps of gauge station locations and operating organizations were provided to conference participants, Gauge Stations Along the Rio Grande, from above Elephant Butte to Fort Quitman and Gauge Stations in El Paso County. These were provided to facilitate flood assessment discussions at the conference by Dr. Zhuping Sheng's Geohydrology Research Project team at the Texas A&M El Paso Agricultural Research Center in collaboration with the Paso del Norte Watershed Council's Coordinated Water Resources Database and GIS and with support from the USDA-CSREES Rio Grande Basin Initiative.

The Coordinated Water Resources Database and GIS is a collaborative large scale phased effort to identify and provide web based access to the myriad of different and independent agency's water resources monitoring and reporting systems. The Coordinated Water Resources Database and GIS can be accessed at: <http://river.nmsu.edu/website/pdnwc4/> and a one-page fact sheet summary is available at: <http://elpaso.tamu.edu/Research/Fact Sheets 04-28-06/Sheng Coordinated Water 4-28-06.pdf>.

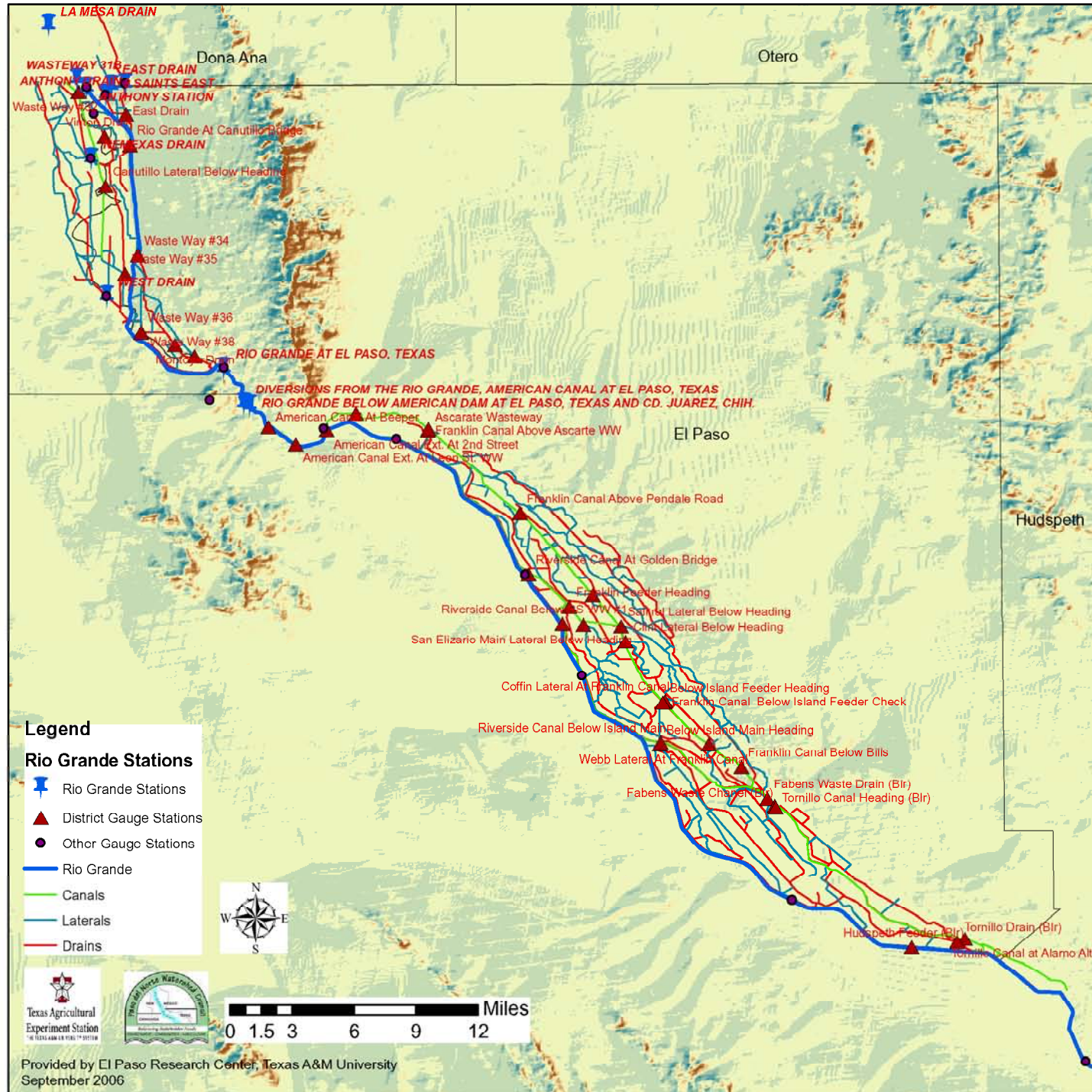
Support for the Coordinated Database and GIS has been provided by the U.S. Army Corps of Engineers, Albuquerque Office, El Paso Water Utilities, U.S. Bureau of Reclamation, USDA Rio Grande Basin Initiative, New Mexico State Water Resources Research Institute and Texas Agricultural Experiment Station, Texas A&M University.

Although the Coordinated Database provides web access to information, the actual gauge monitoring data is retained and reported separately by each individual agency. As reiterated in many of the conference comments and agency recommendations, substantial additional gauges, telemetry and real-time monitoring, as well as improved coordination or centralized access to monitoring data is needed to better manage water resources and to prepare for and avoid future hazardous events such as the 2006 floods in the region.

Gauge Stations Along The Rio Grande



Gauge Stations in El Paso County



Federal Flood Assessment Conference Power Point Presentations

National Weather Service

Rogash

Novlan

U.S. Geological Survey

U.S. International Boundary and River Commission

U.S. Environmental Protection Agency

Sisneros, El Paso Office

Harris, District 6

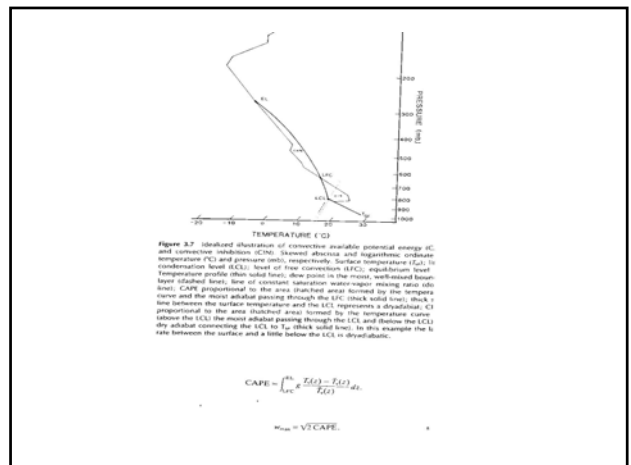
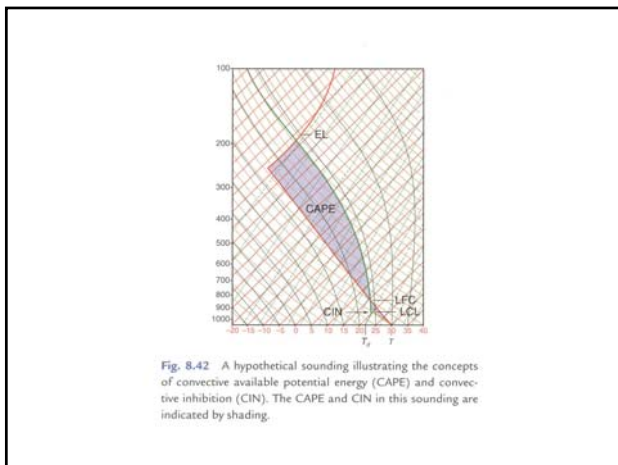
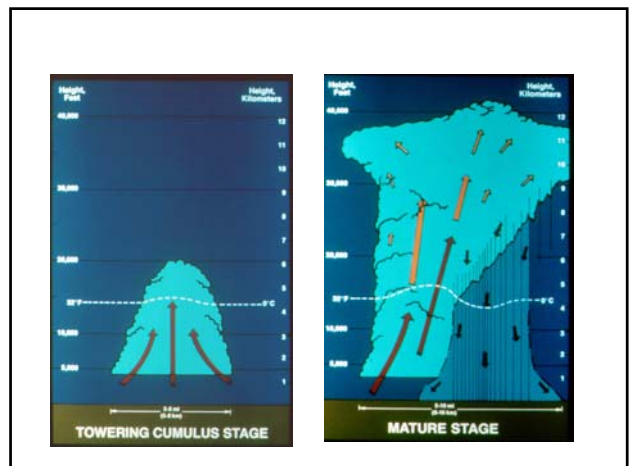
U.S. Bureau of Reclamation

El Paso County Water Improvement District No. 1



Thunderstorm Ingredients

- Moisture
- Unstable Air
- Lift



$$C_r = - \int_{CB}^{CT} \rho W \frac{\partial r_s}{\partial Z} \Delta Z$$

$$W_{max} = \sqrt{2 \text{CAPE}}$$

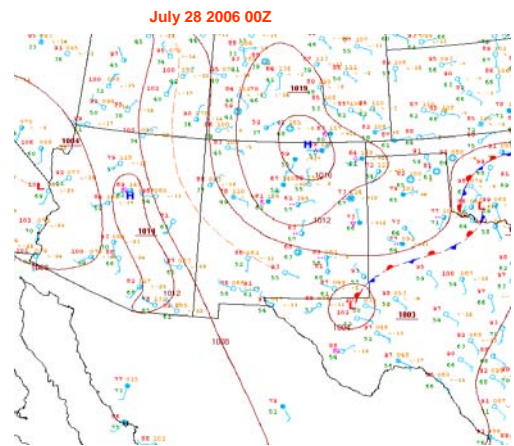
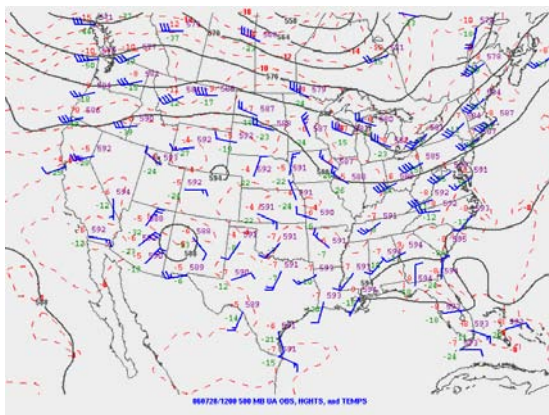
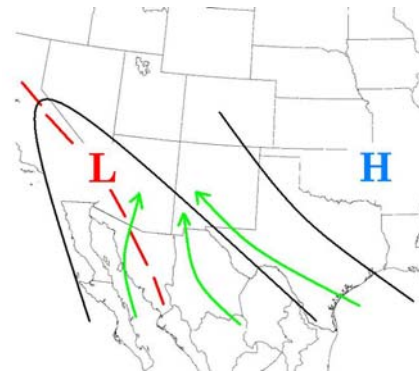
ρ = AIR DENSITY

W = UPDRAFT SPEED

r_s = SATURATION MIXING RATIO

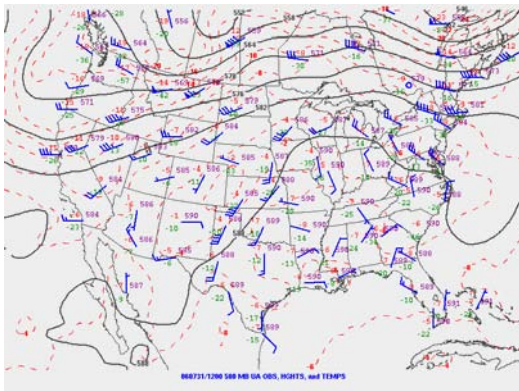
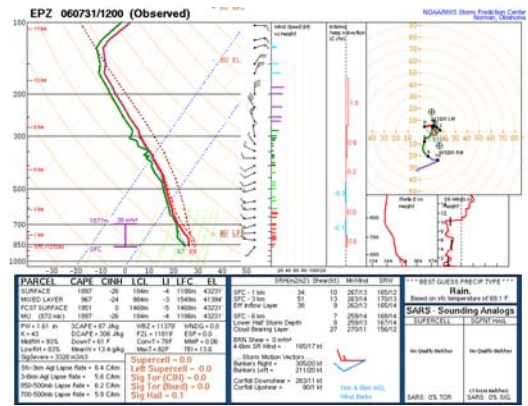
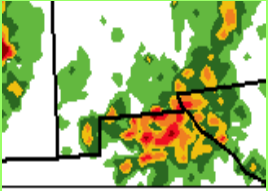
ΔZ = CLOUD DEPTH OF LAYER

C_r = RATE OF CONDENSATE PRODUCTION
COLUMN OF UNIT AREA

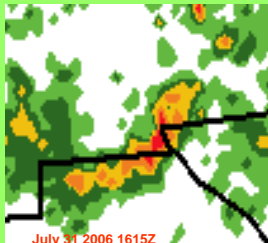
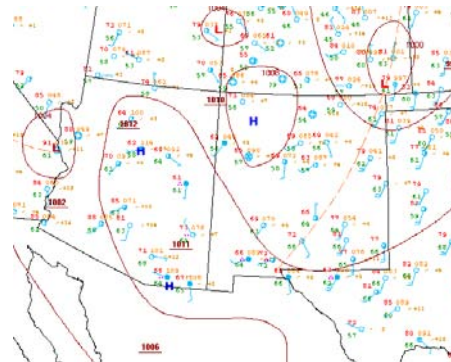


Mudslides Over Clint from July 27-28 rains

July 28 2006 0715Z



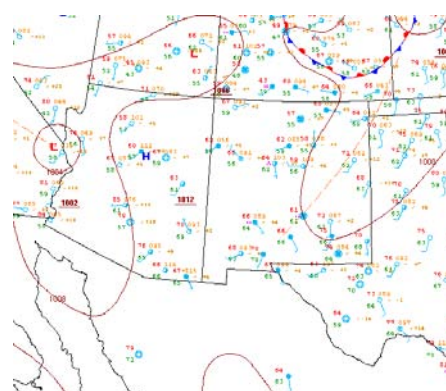
July 31 2006 15Z

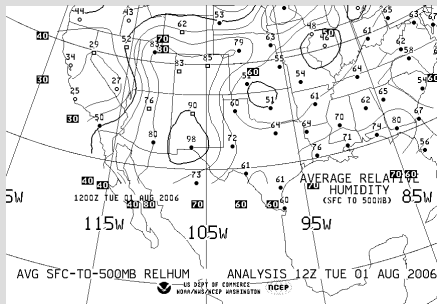
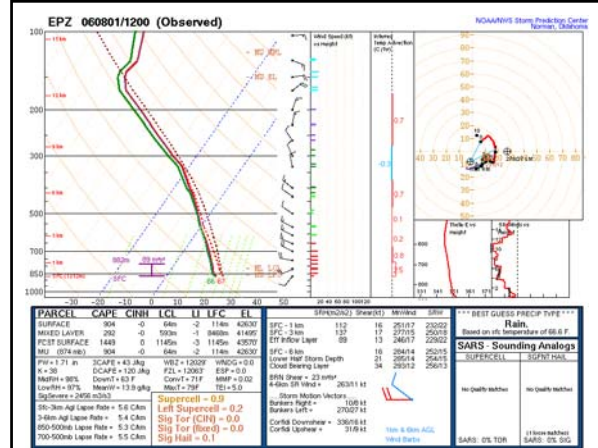
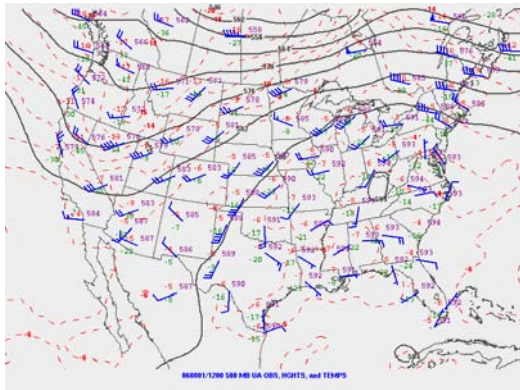


July 31 2006 1615Z

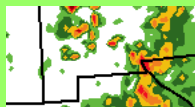
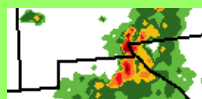
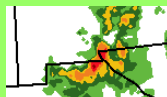
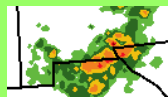


August 1 2006 12Z (6 AM)





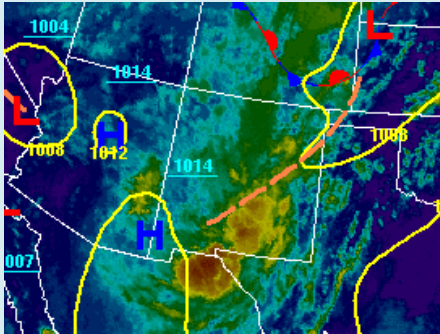
August 1 2006



Stationary Thunderstorms over west El Paso Aug 1 2006



Aug 1 2006 1515Z Infrared Satellite image



Doniphan and Frontera



Emory Road West El Paso



Doniphan St. near Frontera



Water damage to Blockbuster Video Mesa St.



Rio Grande Flooding Along Country Club Road



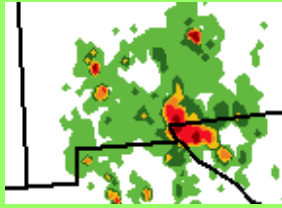
Northern Doniphan St.



Thunderbird and Mesa



Aug 3 2006 00Z 500 mb



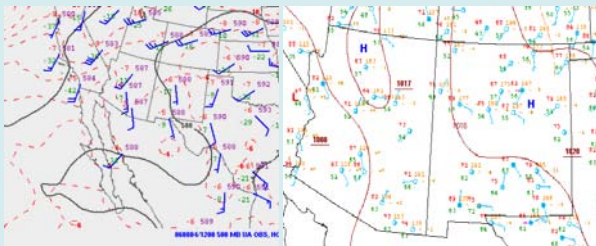
Aug 3 2006 0715Z



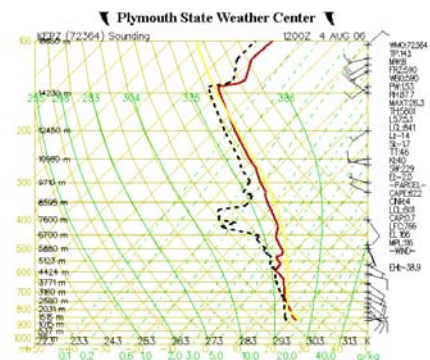
Mulberry St

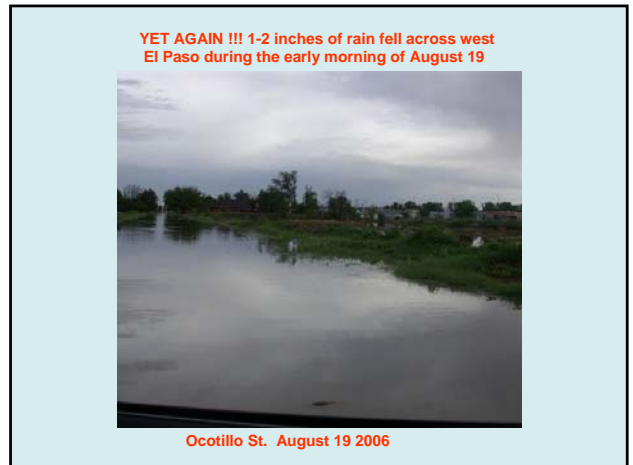
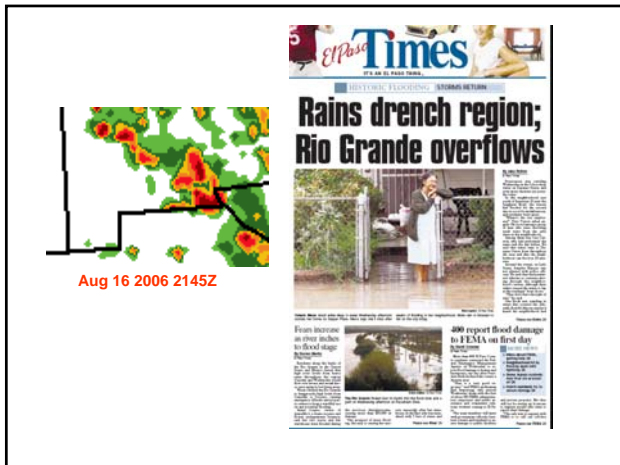
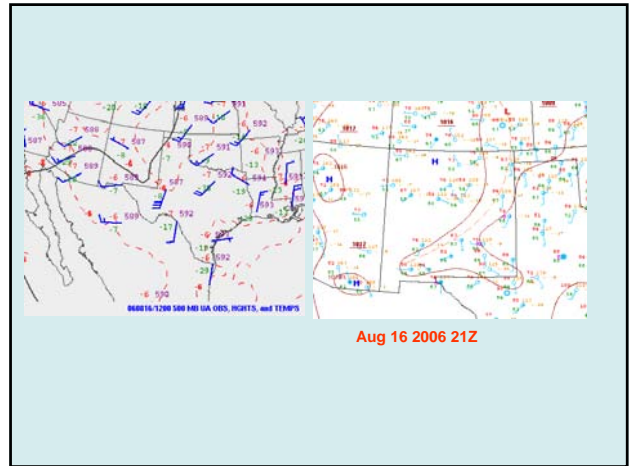
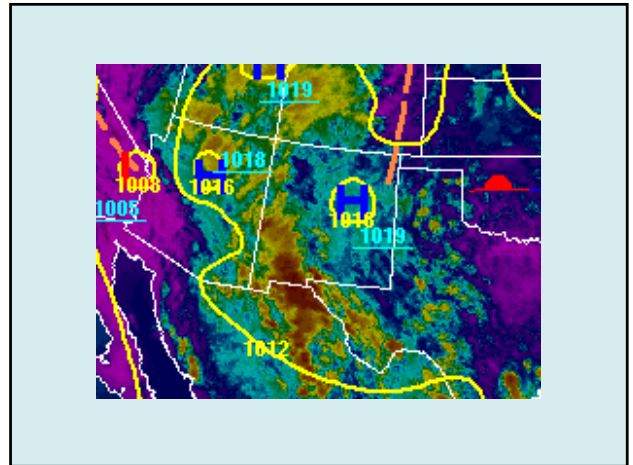
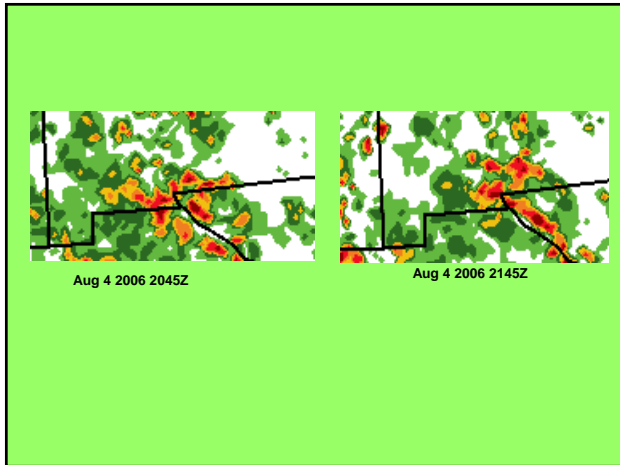




Emory and Sunland Park







Aug 04 2006 18Z







**A CLIMATOLOGICAL PERSPECTIVE OF THE HISTORIC
FLOODING IN EL PASO TEXAS
LATE JULY EARLY AUGUST 2006
DAVID J. NOVLAN
CLIMATE FOCAL POINT KEPZ**




FROM 07/27/06 – 08/04/06 EL PASO

**OFFICALLY RECEIVED
(at KEMP)**

6.84 in

= .725 OF R (ANNUAL AVERAGE 9.43 in)



**UNOFFICIALLY SOME SITES AROUND THE AREA
RECEIVED**

5 - 6 IN / 24 HR

7 - 10 IN / 48 HR

UNCONFIRMED REPORTS OF UP TO 12 - 16 IN / 9 DAYS



THIS RESULTED IN CONSIDERABLE

FLASH FLOODING

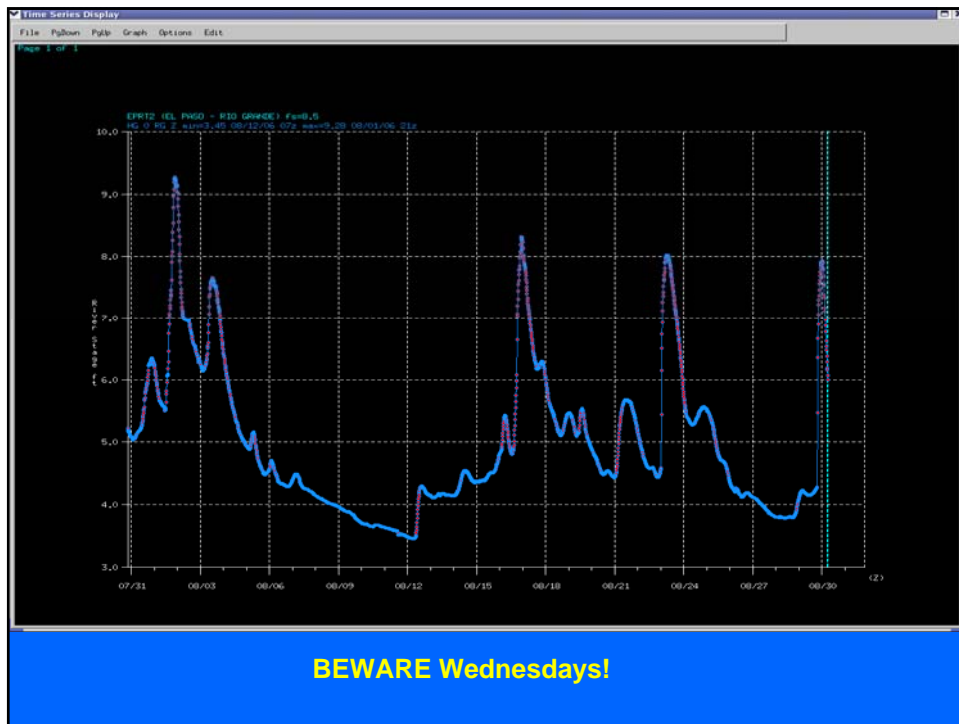
AND EVEN

**ADDITIONAL FLOODING BY THE RIO GRANDE ITSELF
(9.3 FEET)**

**(WHICH LAST EXCEEDED ITS BANKS
IN THE LATE SUMMER OF 1958 - 6.29in rain)
(1744, 1829, 1868, 1897, 1925, 1958, 2006)**

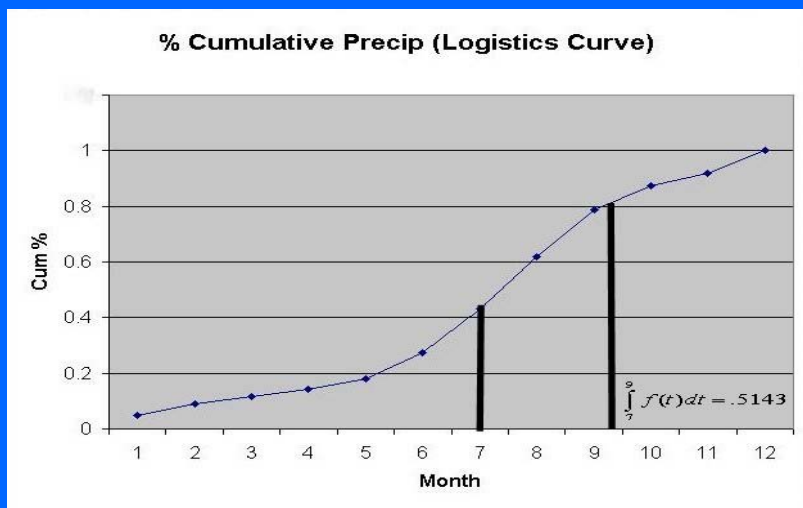
~~44 year periodicity

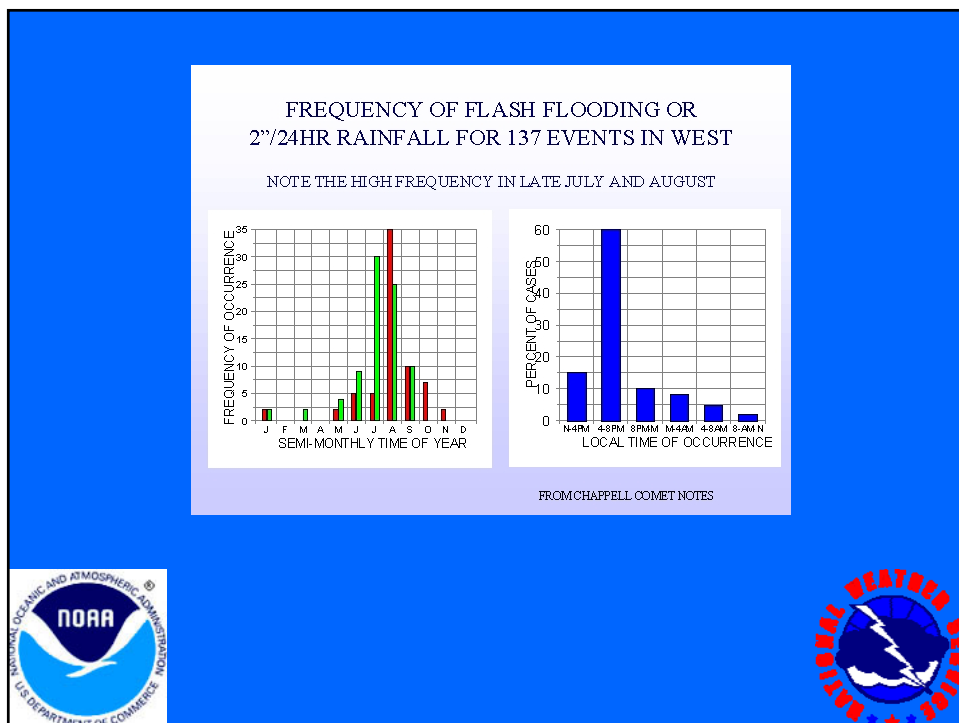
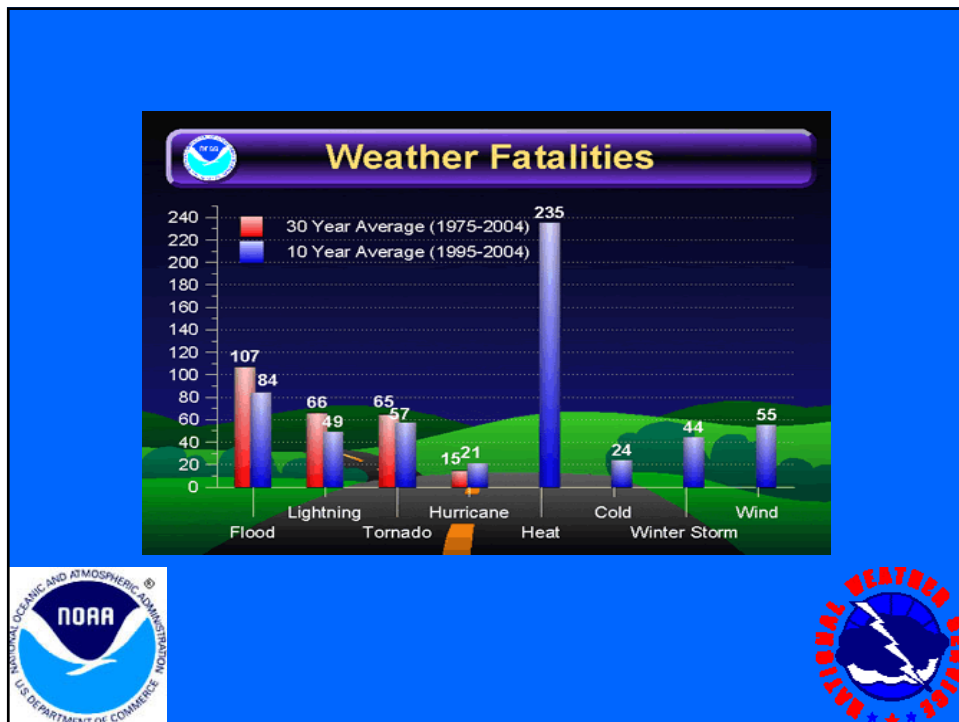




PUTTING THIS IN PERSPECTIVE:

FIRST SOME METRO/CLIMO BACKGROUND





**FACT:
THE DESERT IS A REGION OF
EXTREMES...DIVERSITY...CONTRAST
METEOROLOGY IS NO EXCEPTION!
YES YOU CAN HAVE A FLASH FLOOD
IN THE MIDDLE OF A
DROUGHT**



THESE EVENTS ARE NOT UNPRECEDENTED!

**5 Killed in 1978
AT WHITE SANDS MISSILE RANGE**

On Saturday, Aug. 19, 1978, a huge thunderstorm (55k) formed over and around the Organ Mtns. Over a period of five hours this storm dumped a record 10 inches of rain on the area.

Del (precip) = 9.5in/5mi

$$R(t) = C_1 * e^{(-C_2 * t)} + C_3$$

**ARI OF ~ 100 YR
Near repeat Aug 1981**



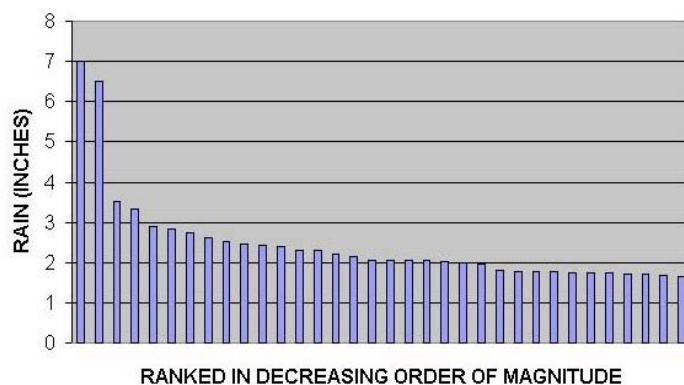
CONVECTIVE PRECIPITATION IN THE DESERT IS

**SUDDEN
INTENSE
DYNAMIC (NON LINEAR—FEEDBACK OUTFLOWS)
VERY LOCALIZED
VIOLENT AND EVEN DEADLY**

**WIND...LIGHTNING....RUNOFF EFFECTS
CAN EXTEND 10+ MILES AWAY FROM THE
STORM!**

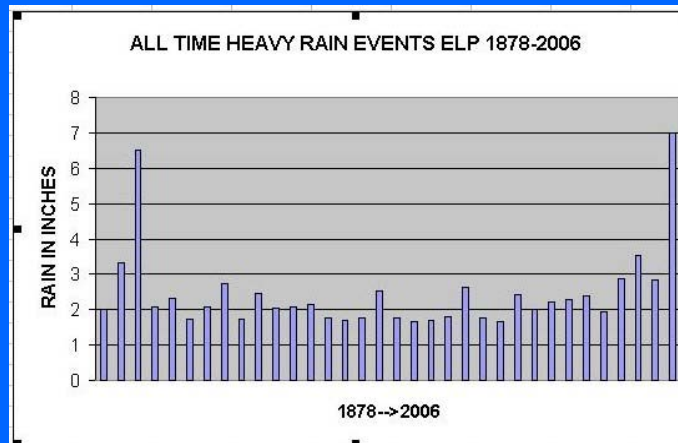


ALL TIME HEAVY RAIN EVENTS ELP 1880-2006

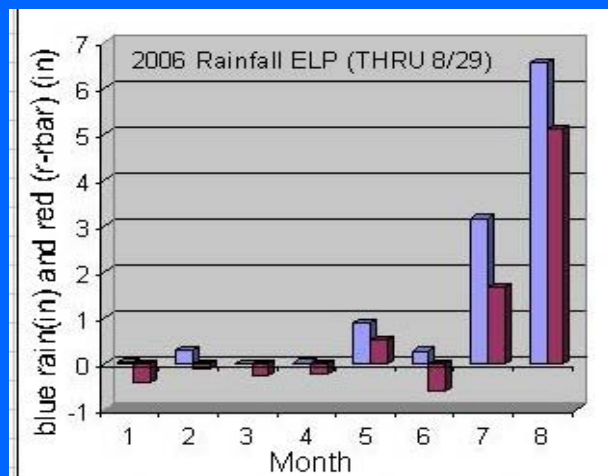


**START 7/1878
XBAR = 2.46 INCHES
 $\Delta t < 48$ hr**



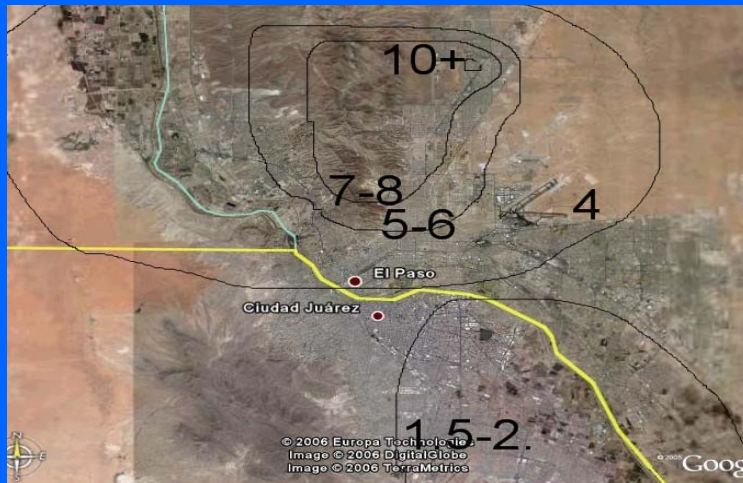


JULY 9 1881 benchmark
NOTE: ~symmetry



1	0.45	0.02
2	0.39	0.28
3	0.26	0
4	0.23	0.01
5	0.38	0.89
6	0.87	0.27
7	1.49	3.17
8	1.75	6.57





Orographic enhancement
~1.5-2 X
NE ELP rbar ~ 1.6 x KELP



- >>
- >> El Paso 6.3WNW.....7.90"
- >> El Paso 5.4W.....7.78"
- >> El Paso 1.6NW.....5.97"
- >>

Def of Heavy rain (FMH #2) $dr/dt \geq .3/hr$



Aug rainfall at KERP 6.85 in
A record daily amt Aug 1 2.84 in
A Record Aug rainfall since 1878

3rd wettest month ever
2 = 7.54 Jul 1880
1 = 8.18 Jul 1881

3 events in the El Paso/WSMR area since 1881
3/26 yrs= 2.28% prob/yr

Extreme precipitation data for Monsoon 2006 at El Paso airport:

0.76" in 1 hour- August 3rd
0.92" in 2 Hours- August 3rd
1.05" in 3 Hours- August 1st and August 3rd
2.66 inches in 12 hours- August 1
2.84 inches in 24 hours- August 1
3.98 inches in 48 hours- 3AM August 1 through 3AM August 3rd
4.95 inches in 96 hours- August 1 through August 4
5.84 inches in 7 days- July 28th through August 3rd
6.79 inches in 10 days- July 28th through August 6th
7.19 inches in 20 days- July 28th through August 16th
8.31 inches in 30 days- July 21st through August 19th
9.51 inches in 45 days- July 17th through August 30th
12.11 inches in 60 days- July 5th through September 3rd

POINT PRECIPITATION
FREQUENCY ESTIMATES
FROM NOAA ATLAS 14

32.017 N 106.595 W 3907 feet
from "Precipitation-Frequency Atlas of the United States" NOAA
Atlas 14, Volume 1, Version 4



Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.25	0.38	0.47	0.63	0.78	0.89	0.94	1.06	1.15	1.33	1.43	1.62	1.83	2.02	2.53	2.99	3.54	4.03
2	0.32	0.49	0.61	0.82	1.01	1.16	1.22	1.36	1.47	1.70	1.82	2.08	2.35	2.60	3.25	3.83	4.52	5.16
5	0.43	0.66	0.81	1.10	1.36	1.57	1.63	1.78	1.92	2.23	2.39	2.73	3.10	3.45	4.28	4.99	5.84	6.65
10	0.52	0.79	0.98	1.31	1.63	1.89	1.94	2.11	2.25	2.64	2.85	3.25	3.71	4.14	5.08	5.86	6.82	7.74
25	0.63	0.96	1.19	1.61	1.99	2.32	2.38	2.55	2.70	3.22	3.52	3.98	4.56	5.12	6.16	7.05	8.10	9.15
50	0.73	1.10	1.37	1.84	2.28	2.67	2.73	2.90	3.04	3.69	4.07	4.58	5.28	5.92	7.02	7.99	9.08	10.23
100	0.82	1.25	1.55	2.09	2.58	3.03	3.10	3.26	3.40	4.21	4.70	5.23	6.06	6.83	7.94	8.96	10.11	11.31
200	0.92	1.41	1.74	2.35	2.90	3.42	3.49	3.65	3.77	4.76	5.39	5.94	6.90	7.80	8.90	9.98	11.14	12.43
500	1.06	1.62	2.01	2.70	3.34	3.96	4.04	4.18	4.27	5.59	6.42	7.01	8.17	9.22	10.37	11.39	12.57	13.95
1000	1.18	1.79	2.22	3.00	3.71	4.39	4.49	4.60	4.68	6.29	7.35	7.92	9.25	10.45	11.57	12.61	13.65	15.09

ARI = 1/probability



$$\log_{10}(\text{ARI}_{0.99, 90, 910}) =$$

$$-1.1034 + (1.7518)P_{0.99} - (1.0425)(P_{0.99})^2$$



ARI

48 HOUR KELP 3.52 IN - 25 YRS

9 DAYS kelp 6.84 IN ~ 100 YRS

PRECIP AVE 48 HRS 4.76-5.12
~ 108-158 yrs

Eastwood spotter 2in/30 min = 100 yrs

WSR88D reports 2.5/60min ~ 100 yrs

5 ~ 7 in reports/ 48 hrs = ~200 yrs



Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.25	0.38	0.47	0.63	0.78	0.89	0.94	1.06	1.15	1.33	1.43	1.62	1.83	2.02	2.53	2.99	3.54	4.03
2	0.32	0.49	0.61	0.82	1.01	1.16	1.22	1.36	1.47	1.70	1.82	2.08	2.35	2.60	3.25	3.83	4.52	5.16
5	0.43	0.66	0.81	1.10	1.36	1.57	1.63	1.78	1.92	2.23	2.39	2.73	3.10	3.45	4.28	4.99	5.84	6.65
10	0.52	0.79	0.98	1.31	1.63	1.89	1.94	2.11	2.25	2.64	2.85	3.25	3.71	4.14	5.08	5.86	6.82	7.74
25	0.63	0.96	1.19	1.61	1.99	2.32	2.38	2.55	2.70	3.22	3.52	3.98	4.56	5.12	6.16	7.05	8.10	9.15
50	0.73	1.10	1.37	1.84	2.28	2.67	2.73	2.90	3.04	3.69	4.07	4.58	5.28	5.92	7.02	7.99	9.08	10.23
100	0.82	1.25	1.55	2.09	2.58	3.03	3.10	3.26	3.40	4.21	4.70	5.23	6.00	6.83	7.94	8.96	10.11	11.31
200	0.92	1.41	1.74	2.35	2.90	3.42	3.49	3.65	3.77	4.76	5.39	5.94	6.90	7.80	8.90	9.98	11.14	12.43
500	1.06	1.62	2.01	2.70	3.34	3.96	4.04	4.18	4.27	5.59	6.42	7.01	8.17	9.22	10.37	11.39	12.57	13.95
1000	1.18	1.79	2.22	3.00	3.71	4.39	4.49	4.60	4.68	6.29	7.35	7.92	9.25	10.45	11.57	12.61	13.65	15.09

Brown- airport data

Green- maximum unofficial
reports/ estimates

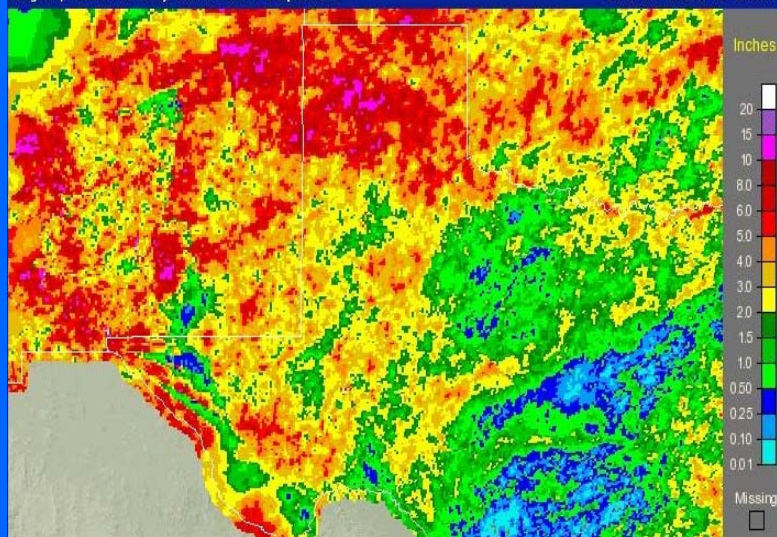
If we include unofficial data, the average recurrence intervals are far more impressive.
(Consider the OFFICIAL coop observer with almost 8" in 2 days: red oval: > 1000 yr event!)

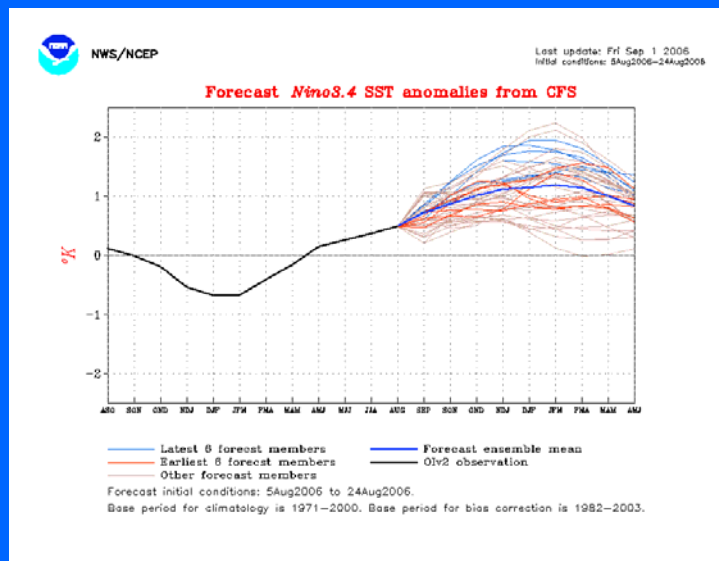
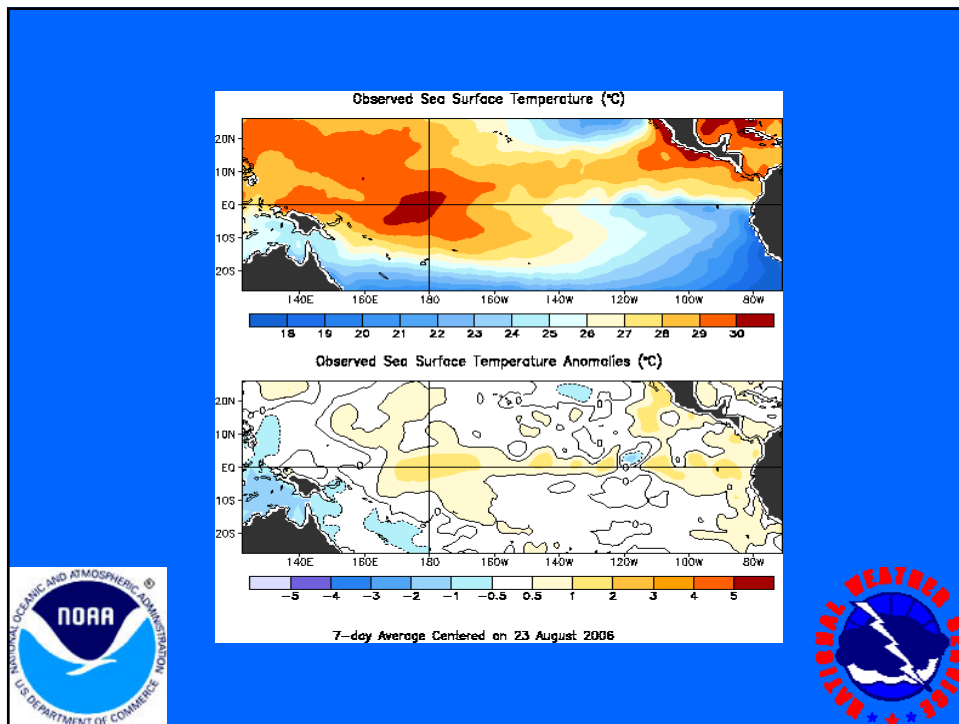
Discussions with Dept of Civil Engineering UTEP
(Dr. John Walton):

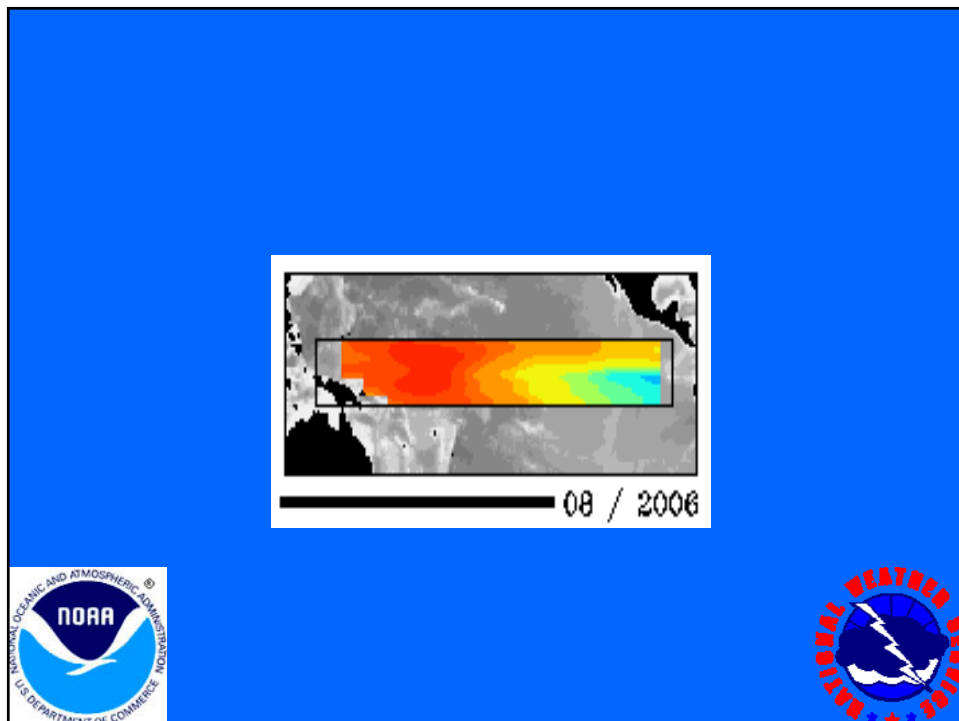
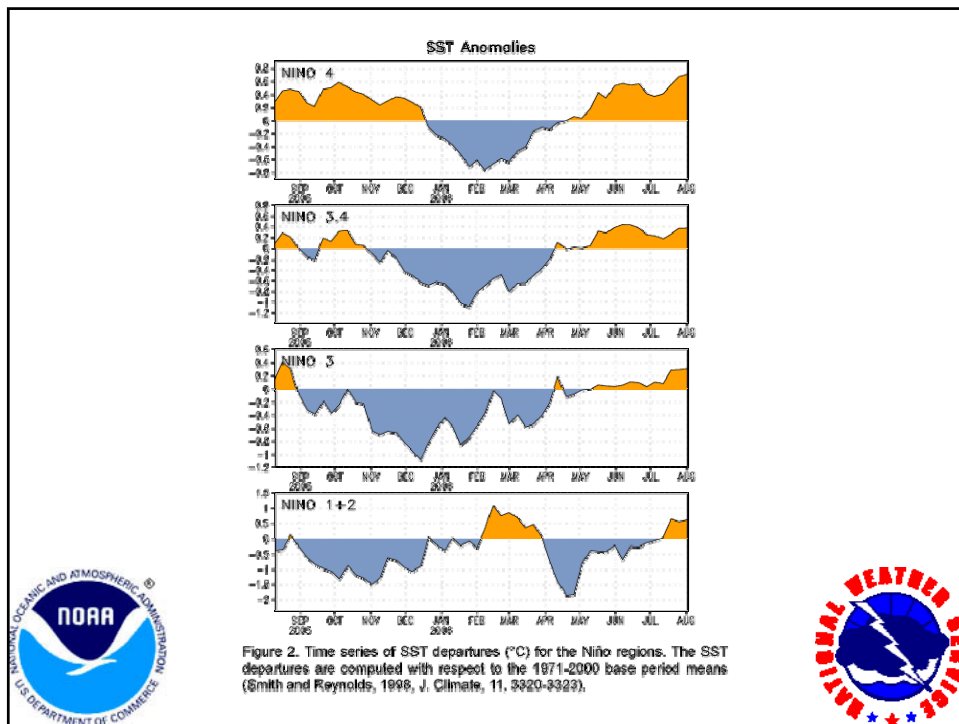
- * Better application of Annual Recurrence Interval concepts
- * AREAL/TEMPORAL AVERAGING AND INTEGRATION OF RAINFALL RECURRENCE INTERVALS INSTEAD OF SINGLE POINTS (i.e. airport data) ARE **MORE REPRESENTATIVE**
- *WE NEED TO RECONSIDER AND UPDATE RECURRENCE INTERVAL DATA
- * $ARI = f(\text{scale, time, area [all representative of the event]})$
- * NOT ENOUGH WEATHER STATION DENSITY IN THE MTN WEST
- * SPOTTY, INTENSE NATURE OF CONVECTIVE STORMS
- *Flood insurance awareness
- *Mesonet (network of weather stations over the El Paso metroplex) needed **BADLY** for official archives

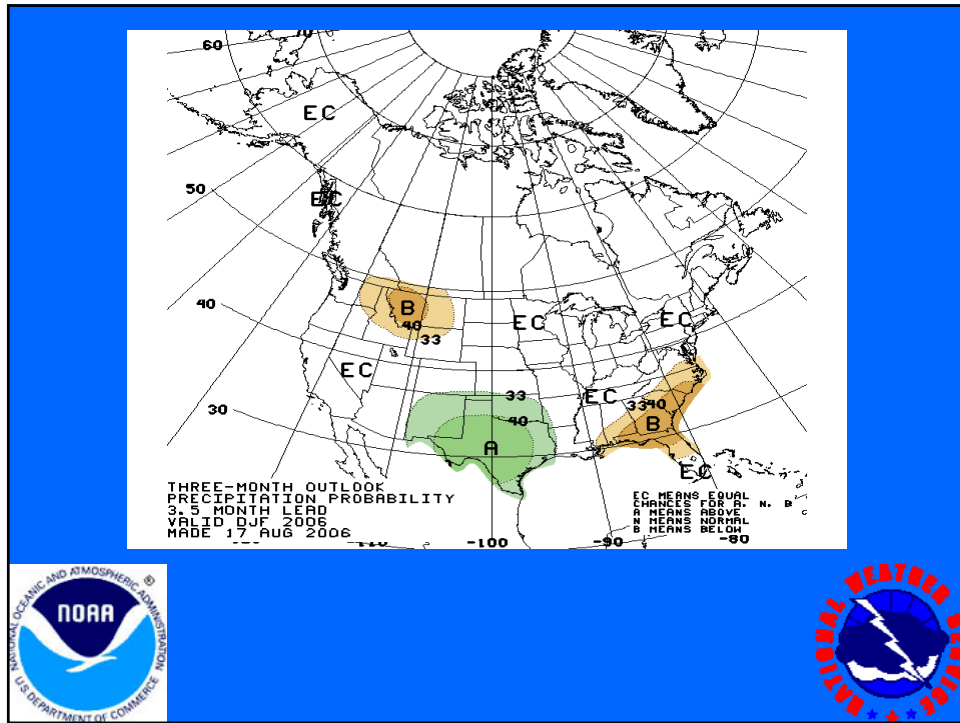
West Texas
August, 2006 Monthly Observed Precipitation

Click on the image to zoom in
Click on "States" to zoom out









USGS Data Collection Effort for the El Paso Flooding Event of August 1-4, 2006



Primary Objectives

- Survey high-water marks and cross-sections for Sparks Arroyo (east side of El Paso) to determine peak discharge.
- Survey high-water marks and water levels of retention ponds on Fort Bliss.



Sparks Arroyo

Differences of Channel Geometry between the two events (August 1 and 4, 2006)



Top Photos = Post August 1 event



Bottom Photos = Post August 4 event



Approximately 10-20 feet wider and two feet of deposition!

High-Water Marks from August 4, 2006 Event found in Sparks Arroyo



The primary high-water marks found were debris lines where the channel widened out.



Difference between the high-water marks from the August 1 event and the August 4 event (higher in elevation but not necessarily in discharge).

Survey of Sparks Arroyo using Real-Time Kinematic GPS

- 1.8 mile reach of Sparks Arroyo surveyed
- 13 cross-sections
- 24 high-water marks



Slope-Area Calculations for Sparks Arroyo for August 4, 2006 Event

- 5.7 square mile drainage area
- Approximate peak discharge estimate = 2000 cfs
- Assumption was made that channel bottom was two feet deeper than surveyed channel because deposition most likely occurred on the falling limb of the hydrograph
- Peak discharge is difficult to determine because of rapidly changing channel geometry.



Scour Documentation for Sparks Arroyo



Same site:
Top Photo taken August 4, 2006.
Bottom Photo taken August 5, 2006



Fort Bliss Survey of Retention Ponds

- Surveyed, using Real-Time Kinematic GPS, high-water marks for eight retention structures on Fort Bliss.
- Assisted staff on Fort Bliss to better understand the drainage situation for the Fort.



Additional Work Needed

- Determine if any more high-water marks can be found in multiple areas of El Paso.
- Conduct surveys of areas with reliable high-water marks and stable channel geometries to determine peak discharge values.
- Use existing topography maps to determine the extent of channel changes from the storm events.
- Crest-stage gage network
- Early flood warning network
- Geomorphic assessment network

Questions?



El Paso on August 4, 2006

UPPER RIO GRANDE FLOOD CONTROL PROJECT

Carlos Marin, Acting Commissioner
United States Section, International Boundary and
Water Commission
September 6, 2006



AUGUST 1 STORM



- ♦ No breaches or overtopping of U.S. levees
- ♦ Levee patrols and monitoring began early morning on August 1
- ♦ Above American Dam, water levels were contained with adequate freeboard
- ♦ Below American Dam through upper Chamizal reach, freeboard was not adequate
- ♦ Flood wave was contained by the U.S. levee in the Rectification Project reach

AUGUST 1 STORM



AUGUST 1 STORM



AUGUST 1 STORM



AUGUST 1 STORM



AUGUST 1 STORM



Wasteway #1

levee erosion

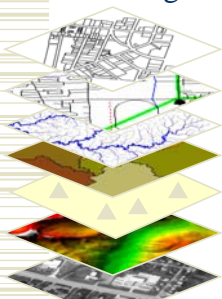


near downtown

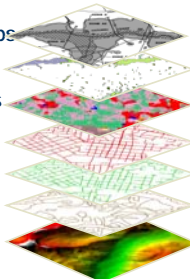
Condition Assessment of USIBWC Levees



The USIBWC contracted the U.S. Army Engineer Research Development Center (ERDC) to perform an integrated condition assessment of the USIBWC Canalization and Rectification projects using airborne geophysics, geologic studies, ground truth investigations and enterprise Geographic Information System.



Topographic Maps
Transportation
Surface Waters
Boundaries
Engr. Borings
Elevation
Aerial Photos



Geology
Segments
Borrow pits
Utilities
Levee drains
Soils
LiDAR,
EM data



Levee Deficiencies

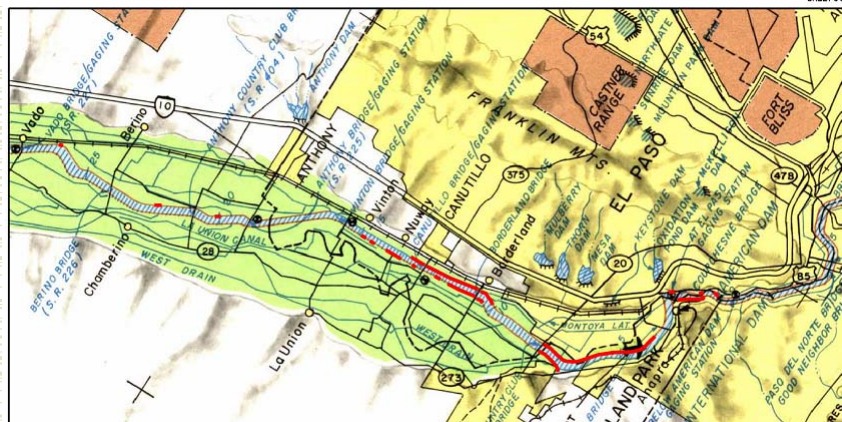


- ♦ The following maps identify levee segments in the Canalization and Rectification Projects in the El Paso area subject to freeboard encroachment or overtopping
- ♦ Segments marked in **red** show less than 2 feet of freeboard

Levee Deficiencies



SHEET 3 of 3



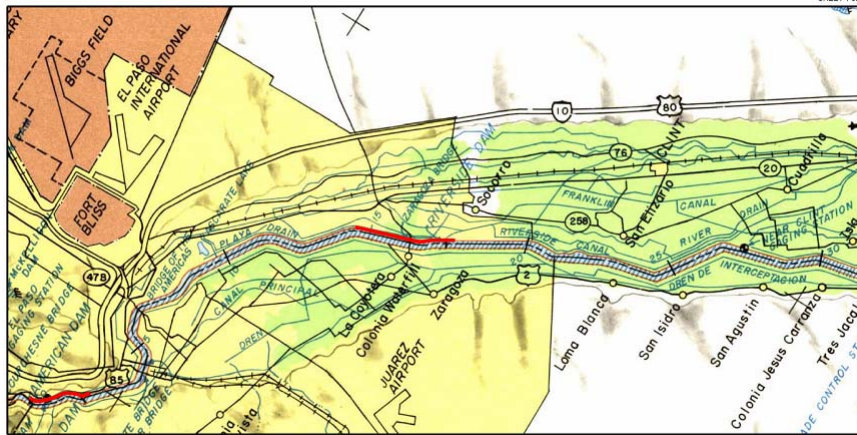
CANALIZATION

LEVEE WITH LESS THAN 2' FREEBOARD

Levee Deficiencies



SHEET 1 of 3



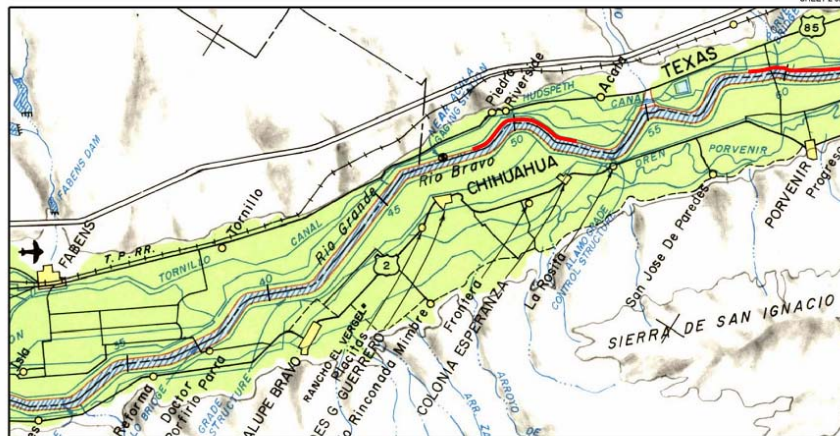
RECTIFICATION

LEVEE WITH LESS THAN 2' FREEBOARD

Levee Deficiencies



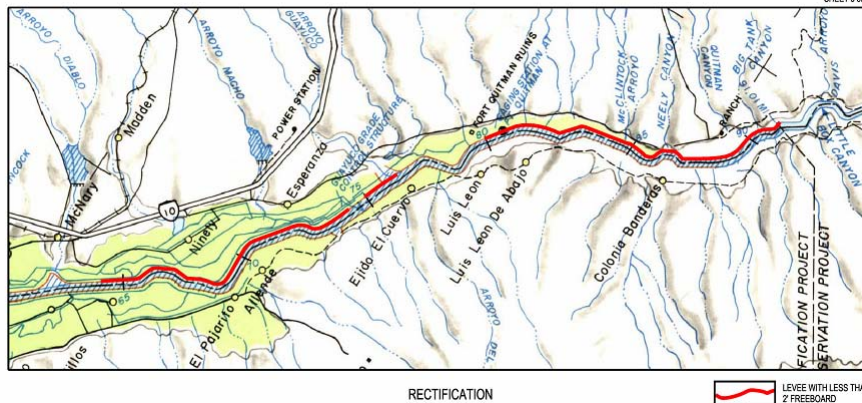
SHEET 2 of 3



RECTIFICATION

LEVEE WITH LESS THAN 2' FREEBOARD

Levee Deficiencies



Damage Repair & Mitigation USIBWC Estimates



- ♦ Clean trash, debris, and vegetation - \$19.5 M
- ♦ Rio Grande sediment removal - \$38 M
- ♦ Repair flood control gates - \$7.3 M
- ♦ Restore Rio Grande flood capacity to original design, Riverside to Little Box Canyon - \$135 M
- ♦ Restore Rio Grande flood capacity to original design, Canutillo to American Dam - \$13.5 M
- ♦ Canutillo Flood Wall - \$8.4 M

Damage Repair & Mitigation USIBWC Estimates



- ♦ American Diversion Dam, gate replacement and new sheet piling - \$4.9 M
- ♦ Modification of American Canal to match flood capacity of American Canal Extension, lining and mitigation - \$60 M
- ♦ Install 2 flow measurement stations with telemetry on the Rio Grande \$ 0.11 M
- ♦ **USIBWC TOTAL - \$286.7 M**

Communications & Coordination



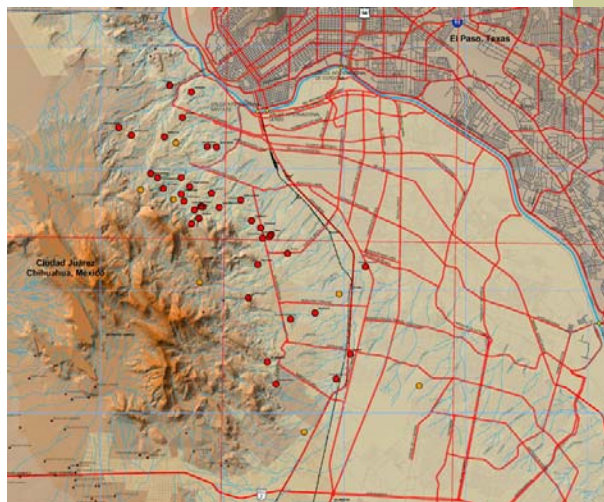
- ♦ USIBWC web site provides the public with near real-time data about gage height and river flow volume
- ♦ Severe weather caused USIBWC to lose its wireless connection with the Internet Service Provider (ISP), disrupting USIBWC ability to post updated data
- ♦ ISP will provide a secondary line with its own router to act as a backup solution
- ♦ USIBWC will change to a more reliable wired solution

Communications & Coordination



- ◆ Need to improve coordination with local entities to ensure proper operation of structures that drain into the river
- ◆ Standard USIBWC license/MOU requires the licensee to operate and maintain these structures
- ◆ Mexican canals perpendicular to the river cause flow to be concentrated on the U.S. floodplain
- ◆ Need to consider installation of an additional flood warning station downstream of American Dam
- ◆ Sediment removal in Chamizal to continue contingent upon funding

Cd. Juarez Dikes



La Montada Dike



La Montada Dike



La Montada Dike



Contact Information



United States Section
International Boundary and Water Commission
4171 N. Mesa, C-100
El Paso, TX 79902
915-832-4100
www.ibwc.state.gov

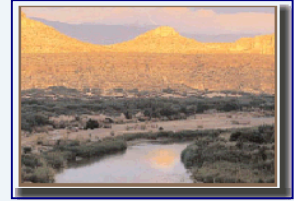


U.S. EPA REGION 6 Border Office

Maria A. Sisneros, E.I.T.
El Paso Border Office

EPA Region 6 Border Office Mission

- **Mission:** Encourage border and / or tribal communities in the New Mexico and Texas region in conjunction with officials and leaders of the four Mexican border states and communities across the border to take an active role in improving their environment and their health; providing information and facilitating communities' efforts to address high - priority environmental and environmentally related health issues



EPA Region 6 Border Office

- **Region 6 Border Office Resources:**
 - Staff knowledgeable with regards to Air, Water, Waste and Import & Export Programs, as well as, other environmental programs.
 - Bi-national mechanisms in place to work closely with Mexican Environmental Counterparts:
 - Office is a good resource for obtaining participation on bi-national level
 - Staff works in conjunction with Regional (Dallas) Program Staff to address local issues that may arise.

Border Staff

- Dr. Carlos Rincon – Director & Air Contact
- Maria A. Sisneros – Water Contact
- Debra Tellez – Waste Contact
- Ed. Makarewicz – Import & Export Program Contact
- Staff addresses a variety of other environmental issues

Contaminant Issues

- **Stormwater Runoff** – monitoring programs and enforcement actions delegated to State Agency or local agencies. In some case where NPDES has not been delegated to state, EPA will oversee permits, monitoring and enforcement actions.
- **Drinking Water** – Locally, Public Service Board for monitoring. Comply with drinking water standards. If for some reasons, water can not be treated and needs to by-pass plant, again state agency or EPA will get involved. EPA Dallas NPDES Program Office will be involved.
- **River/Streams** – IBWC monitors, discharges handled by state agency and/or EPA. If there are illegal discharges to river(s) state agency or EPA would be involved.

Contact Information

El Paso Border Office
(915) 533-7273
4050 Rio Bravo Suite 100
El Paso, Texas 79902

Emergency Response: Federal Involvement

- Once a report is made, the NRC immediately notifies a pre-designated EPA [On-Scene Coordinator \(OSC\)](#).
- The OSC determines the status of the local response and monitors the situation to determine whether, or how much, federal involvement is necessary. It is the OSC's job to:
 - ensure that the cleanup, whether accomplished by industry, local, state, or federal officials, is appropriate, timely, and minimizes human and environmental damage.
 - The OSC may determine that the local action is sufficient and that no additional federal action is required. If the incident is large or complex, the federal OSC may remain on the scene to monitor the response and advise on the deployment of personnel and equipment. The OSC may take command of a situation in certain events.
 - The OSC may request additional support to respond to a release or spill, such as additional contractors, technical support from EPA's [Environmental Response Team](#), or Scientific Support Coordinators from EPA, [Regional Response Team](#) to access special expertise or to provide additional logistical support.
- In addition, the [National Response Team](#) stands ready to provide backup policy and logistical support to the OSC and the RRT during an incident.

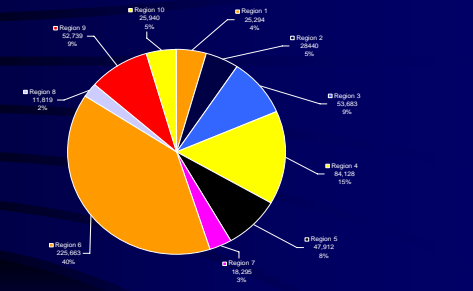
Coordination With Federal Assets

EPA Emergency Response Activities

Scott Harris, Ph.D.
Federal On-Scene Coordinator
USEPA Region 6

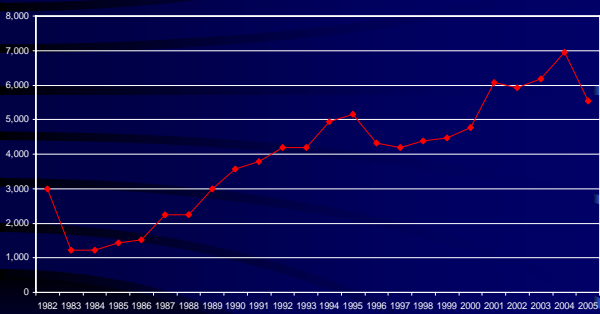


Combined EPA / USCG / DOT Notifications per Region (1982 - 2005)



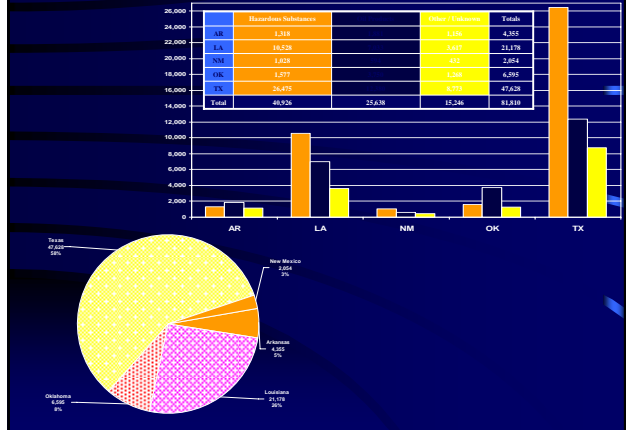
Region 1	Region 2	Region 3	Region 4	Region 5
25,294	28,440	53,683	84,128	47,912
Region 6	Region 7	Region 8	Region 9	Region 10
225,663	18,295	11,819	52,739	25,940

Inland NRC Notifications for Region 6 (1982 - 2005)



1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
2,995	1,214	1,211	1,438	1,529	2,248	2,345	3,000	3,562	3,789	4,184	4,183
1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
4,935	5,151	4,326	4,203	4,380	4,465	4,775	6,076	5,917	6,177	6,942	5,545

Inland NRC Notifications for Region 6 -- by Material Type & State (1987 - 2005)



Construction of the NRP

Guiding Policy: Homeland Security Act & HSPD-5

Supercedes

- FRP
- CONPLAN
- FRERP
- INRP

Integrates

- NCP
- Other national-level contingency plans

National Response Plan



Key Concepts

- NIMS
- HSOC
- IIMG
- PFO
- JFO
- ESFs

National Incident Management System

- Provides national standard for incident management
- Based on the National Interagency Incident Management System (NIIMS) Incident Command System (ICS)
- Concept of INS
 - Incident of National Significance

Incidents of National Significance

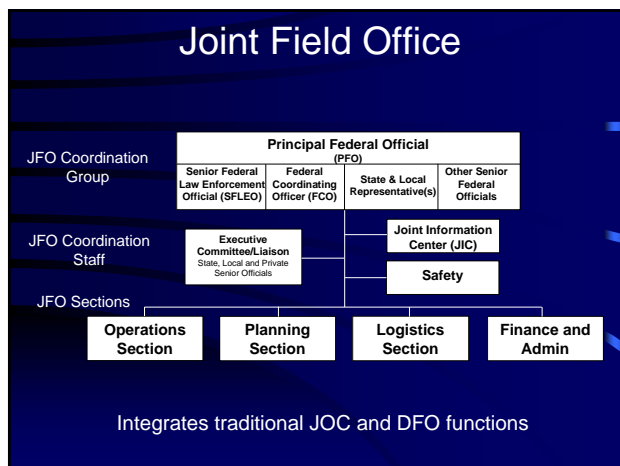
Incidents which require DHS operational coordination and/or resource coordination:

- Credible threats, indications or acts of terrorism within the United States
- Major disasters or emergencies (Stafford Act)
- Catastrophic incidents
- Unique situations that may require DHS to aid in coordination of incident management...

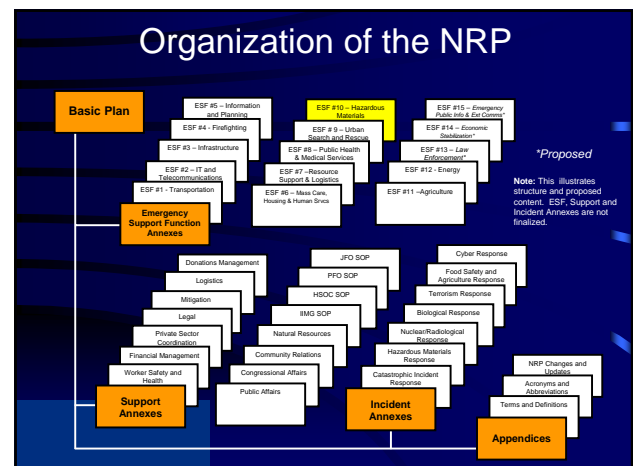
Incidents of National Significance

- Unique situations that may require DHS to aid in coordination:
 - Federal department or agency acting under its own authority requests the assistance of the Secretary
 - The Secretary has been directed by the President to assume responsibility for managing the incident
 - Events exceed the purview of other Federal plans
 - Events of regional or national importance involving one or more Federal agencies (at the discretion of the Secretary of DHS)
 - National Special Security Events

Joint Field Office



Organization of the NRP



The National Contingency Plan

- 40 Code of Federal Regulations (CFR) Part 300
- The NCP is the blueprint which:
 - outlines the structure of the National Response System (NRS)
 - defines the responsibilities for each component of the NRS
 - provides the mechanism for successful responses to oil and hazardous substance releases

The National Contingency Plan

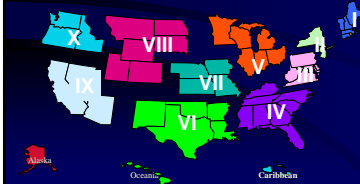
- Applies to:
 - discharges of oil into navigable waters
 - releases into the environment of hazardous substances, pollutants or contaminants
- Provides for efficient, coordinated and effective response



The National Contingency Plan

Requires three fundamental activities:

- preparedness, planning and coordination for response
- notification and communication
- response operations

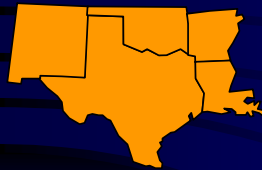


National Response Team



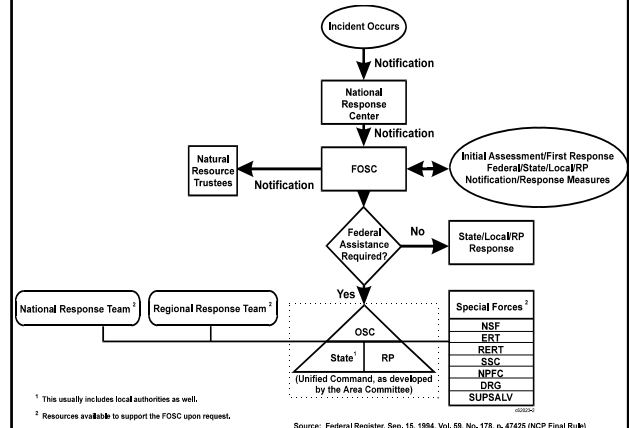
- Consists of 16 Federal agencies: EPA, USCG, FEMA, HHS, GSA, DOD, DOE, DOI, DOT, USDA, DOJ, DOS, NRC, DOT, DOA, NOAA
- EPA chair, USCG vice-chair
- Primary responsibilities are planning and preparedness
- May participate in large, multi-region responses

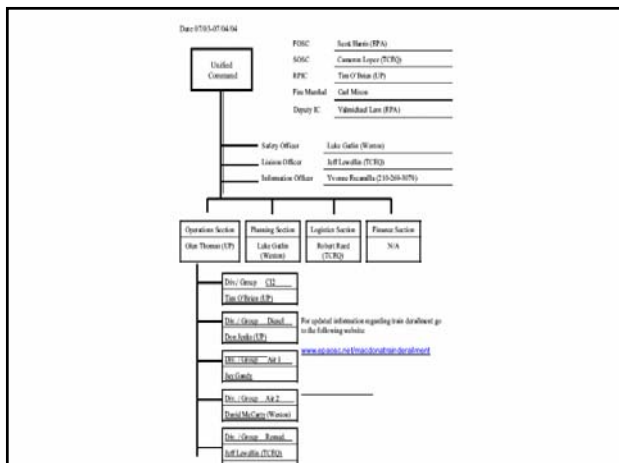
Regional Response Teams



- Consists of State and 15 Federal agencies of the National Response Team
- Co-Chaired by United States Coast Guard (USCG) and EPA
- Primary responsibilities are planning and preparedness
- Provide response support as requested by FOSC

National Response System Concept of Operations





Federal On-Scene Coordinator

- Only EPA, USCG, DOD and DOE provide FOSCs for responses
- ~225 EPA FOSCs at 17 U.S. locations
- 46 USCG Marine Safety Offices across 9 USCG Districts, each headed by a Captain of the Port (COTP), who acts as an FOSC

FOSC

- Planning responsibilities include:
 - Regional Contingency Plans (RCPs)
 - Area Contingency Plans (ACPs)
- Preparedness responsibilities include:
 - exercises (industry, LEPC, RRT and NRT, other)
- Directs and/or coordinates response activities, resources

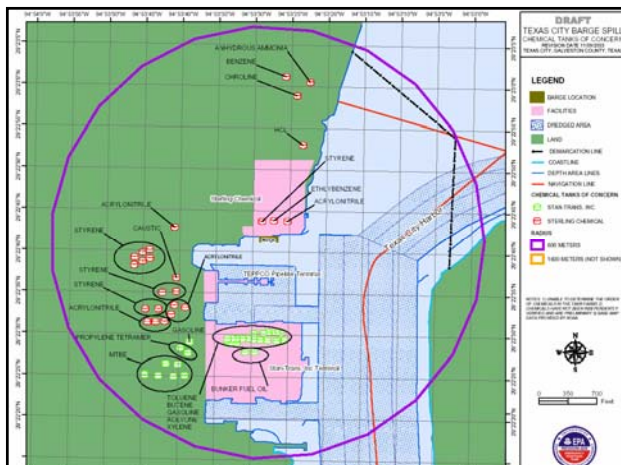
FOSC Authorities

- National Contingency Plan
- Clean Water Act
 - Oil Pollution Act of 1990
- CERCLA (aka Superfund)
 - Emergency Planning and Community RTK Act
- Resource Conservation and Recovery Act
 - Hazardous wastes and USTs
- Enforcement to promote RP action
- SUPERFUND and Oil Spill Liability Trust Fund
- Emergency spending to \$200K / 2M
 - Federal Contracting Officers

FOSC Authorities

- Remove or arrange for the removal of a discharge, and mitigate or prevent a substantial threat of a discharge at any time
- Direct or monitor all federal, state, and private actions to remove a discharge
- Remove and, if necessary, destroy a vessel discharging, or threatening to discharge by whatever means are available





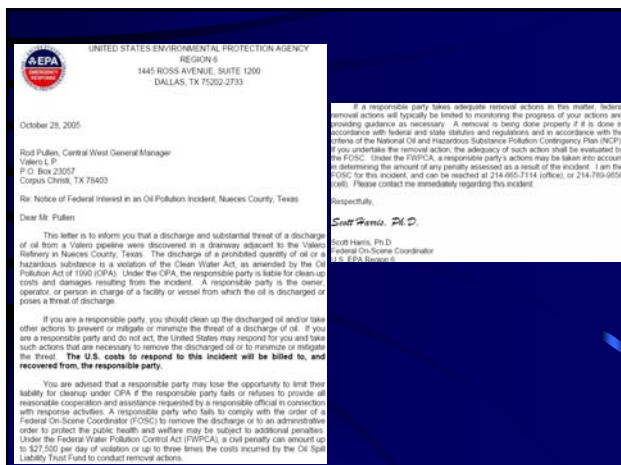
Assess RP Response

- The OSC may allow the responsible party to voluntarily and promptly perform removal actions, provided the OSC determines such actions will ensure an effective and immediate removal of the discharge or mitigation or prevention of a substantial threat of a discharge



Plan B

- If effective actions are not being taken to eliminate the threat, or if removal is not being properly done, the OSC should, to the extent practicable under the circumstances, so advise the responsible party
- If the responsible party does not respond properly the OSC shall take appropriate response actions and should notify the responsible party of the potential liability for federal response costs incurred by the OSC pursuant to the OPA and CWA



Start / ERRS Contractors

Superfund Technical
Assessment and Response
Team (START)

- Emergency Response
- Planning/Prevention
- Site Characterization
- Removal Action Support



Emergency Response and Removal Services

- Rapid Deployment
- Removal and Remediation



Requesting Support

- Call NRC
 - 800.424.8802
 - Request EPA callback and support
- Call R6 Hotline
 - 866.372.7745 (866.EPA SPIL)
- No costs to requesting parties
- Response role may vary

Discussion?

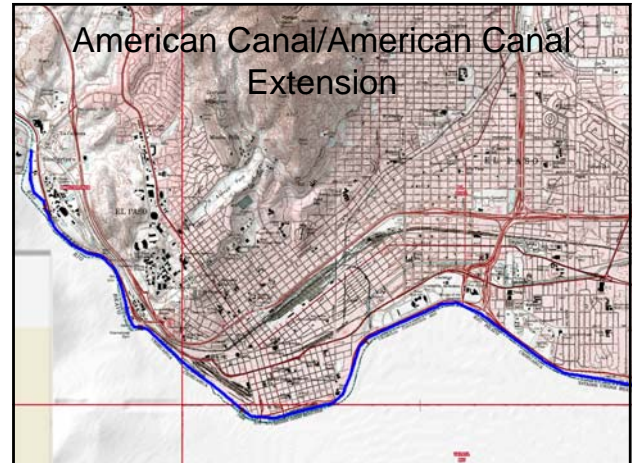
214-665-7114
harris.scott@epa.gov



EL PASO COUNTY WATER IMPROVEMENT DISTRICT No. 1
294 CANDELARIA • EL PASO, TEXAS 79907-5599 • (915) 859-4186 • FAX (915) 858-4183
TAX OFFICE (915) 859-0819 • DISPATCHER (915) 859-9128

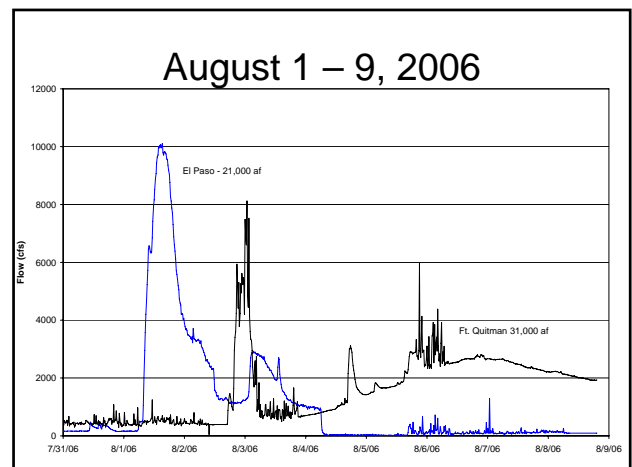
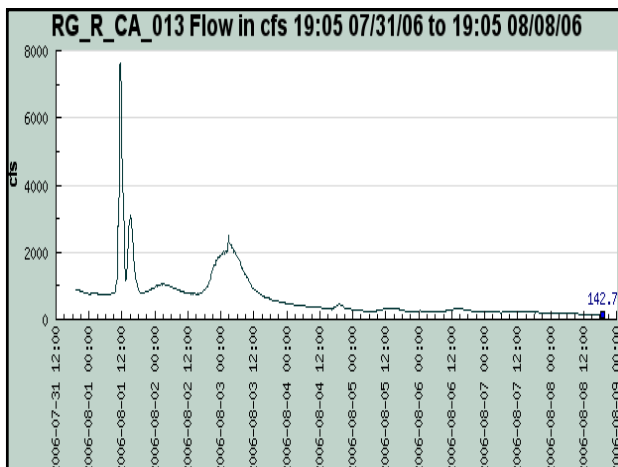
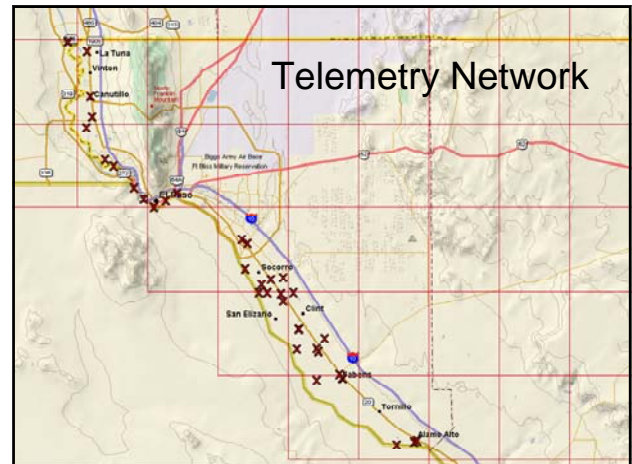
Flood of Aug. 2006

1. 24x7 Operation of American Canal System
2. Real Time Flood Flow Monitoring
3. Levee Breach Repair and Control
4. Storm Water Impact on Agricultural Drainage System



Flood Flow Monitoring

- Real Time Telemetry (<15 minute latency)
- Rio Grande and Drainage System
- Internet Access and VPN Access
- Aerial Survey (Jobe Concrete)
- Boots on the Ground via cell phone
- Extensive Contact List (employees, farmers, etc.)



Aerial Survey



Levee Breach and Control

- 3 Levee Problems
 - Ascarate Waste Way
 - Faben's Waste Channel
 - El Paso – Hudspeth County Line
- Control with Excavators and RipRap
- Minimum of 12 Locations need repairs
- Overtopping of American Canal possible









Agricultural Drainage System

- Extensive system of over 200 miles of drains
- Provides Drainage for Upper and Lower Valley
- Several Arroyos flow directly into drains or canals
- Used by City to Relieve Feather Lake and Local Flooding at Bustamante WWTP
- Used by 100's of sites to dispose of ponded water
- No tax or fee funds available for disposal of non-agricultural storm water

Summary

- System almost had catastrophic failure
- Actual flow much less than design flow
- Without Agricultural Drains damage to City would have been much greater
- American Canal is between River and Downtown El Paso
- Telemetry system needs upgrading
- Communications need improvement

What Worked Right

- US IBWC, TXDOT, Hudspeth County
 - Excavator, dump trucks, material
- USBR
 - provide critically needed pumps
- Private Entities
 - Aerial survey, dump trucks, material