

The Need for Regional Stormwater Management In Southern New Mexico

Presented by Cliff Terry

on behalf of the

South Central New Mexico Stormwater Management Coalition

Background

- These parties have duties, responsibilities, and ownership of flood control facilities :
 - *Elephant Butte Irrigation District*
 - *Dona Ana Soil and Water Conservation District*
 - *Caballo Soil and Water Conservation District*
 - *Dona Ana County Flood Commission*
 - *Sierra Flood Control Commission*
- Have evaluated the impact of major flood events in 2006 and 2008, and ongoing stormwater and flood control issues or concerns throughout the area

Background Continued

- Having realized the need for stormwater management from a regional perspective;
- A group was established in January 2010, known as the Lower Rio Grande Stormwater Watershed Infrastructure Management (SWIM) Task Force, recently changed to the **South Central New Mexico Stormwater Management Coalition** (Stormwater Coalition)
- Agencies with similar mandates were invited to collaborate and work toward the goal of implementing regional watershed management
- A *statement of interest* to work toward the formation of a formal agreement has been formed

Stormwater Management from a Regional Perspective

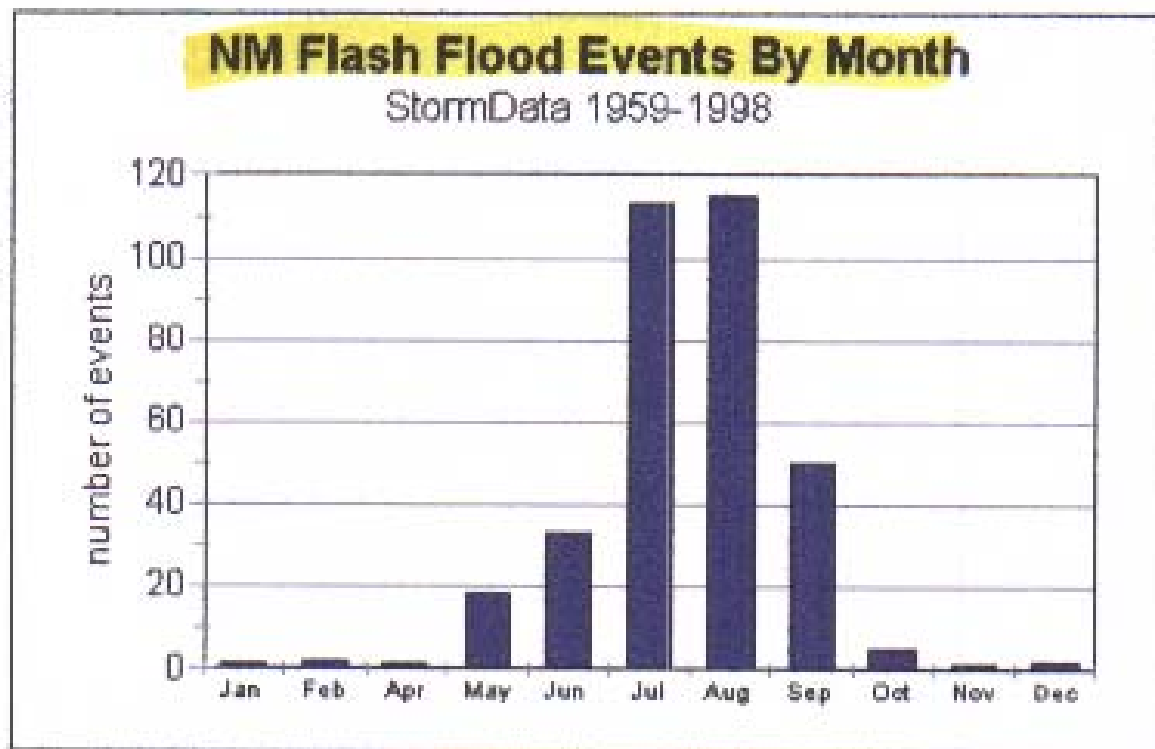
Proposal

Existing flood control and stormwater management agencies jointly and cooperatively

collaborate to identify, prioritize, plan, and implement programs and projects that improve the ability to manage stormwater

through the utilization of best practices for Regional Watershed Management.

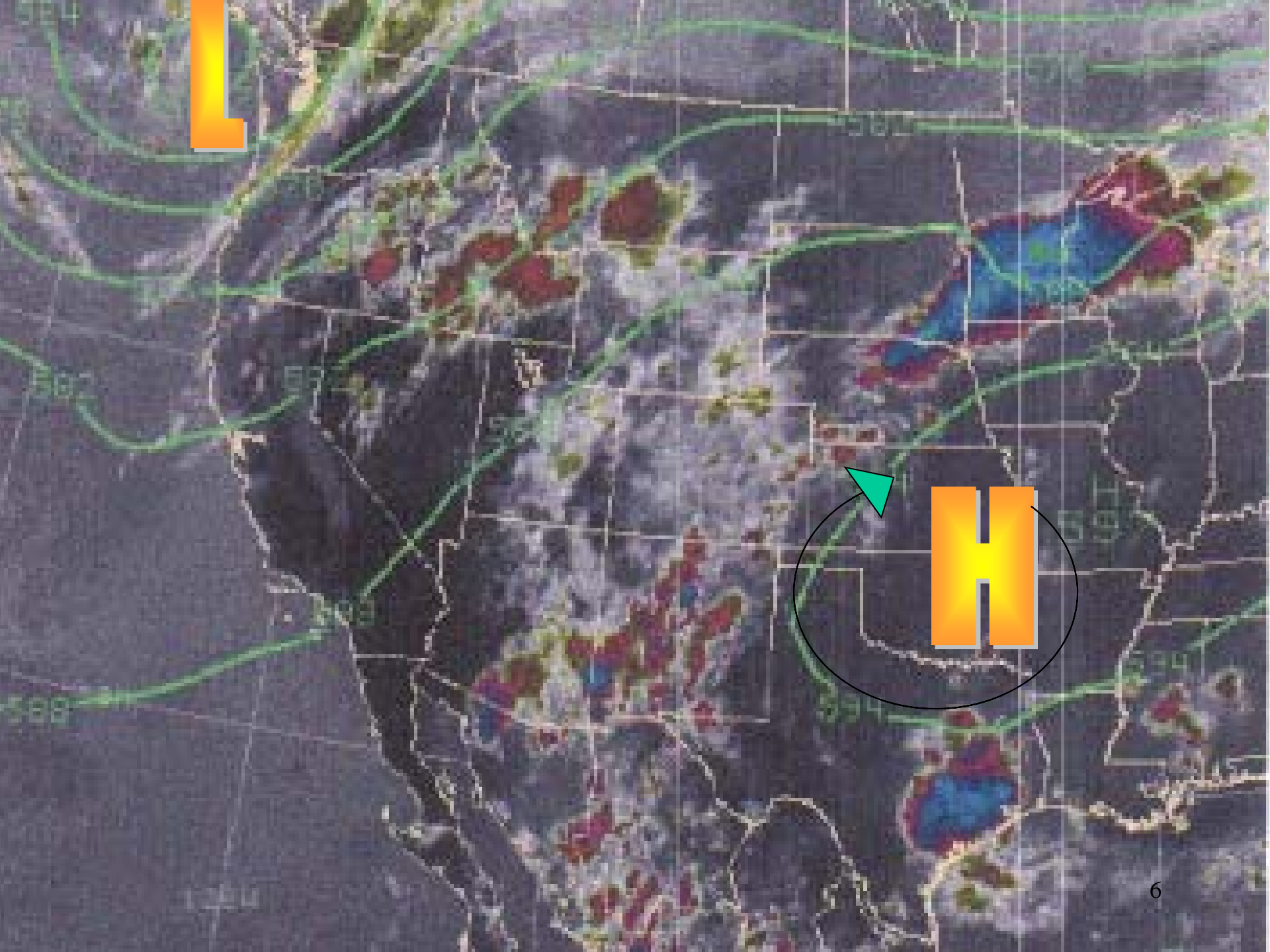
Flash floods across New Mexico are associated with the NAMS. The heart of thunderstorm season is generally from July 20 through August 20, and flash floods peak the last week of July and first week of August. The return of the dry westerlies occurs first near the Four Corners region, bringing an abrupt end to thunderstorm season at the beginning of September. The southwest monsoon lasts longest over southern New Mexico, usually dissipating more slowly during mid September.



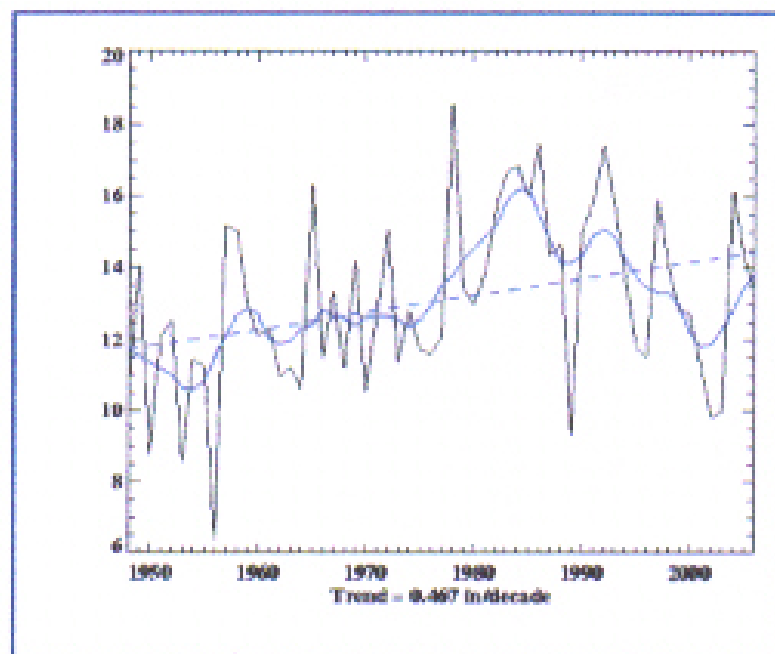
The thunderstorm season that develops over New Mexico and Arizona during July and August is generally a result in changes in the circulations associated with the NAMS, but other features and circulations can support summer thunderstorms across the state. Many of the storms are fueled by moisture that surges northward from the southwest monsoon. On other days, the storms may be related to tropical waves that move from east to west across the region. At times the storms are fueled by east winds that are created when atmospheric waves move from west to east across the central Rockies and push surges of cooler, wetter air southward that end up moving

<http://www.srh.noaa.gov/abq/climate/Monthlyreports/July/nams.htm>

3/15/2008







From this data, I am not sure how one concludes that there has been a decrease in the rainfall in the Southwest. The SPI shows that we are not in a drought - at least for the last 4 years. The precipitation has not decreased.

There have been model studies which show that precipitation will decrease in the Southwest due to global warming, such as Seager et.al. [2007], but as yet, these models do not seem to reproduce the conditions seen in the Southwest. The Seager paper does not even mention the word "monsoon" which is responsible for approximately half of the precipitation in the Tucson area. As one moves southward from Tucson, the percent precipitation from the monsoon increases, and as one moves northward, the percent precipitation from the monsoon decreases.

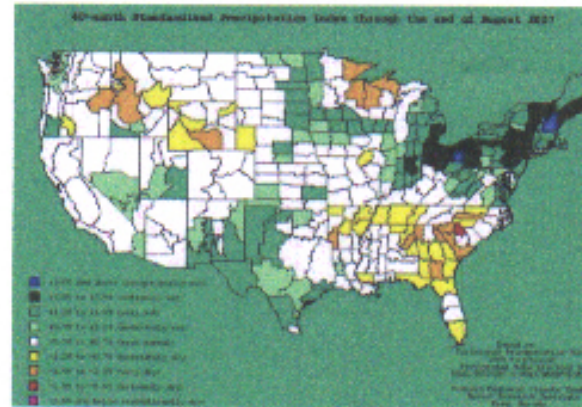
References:

Seager, R., M. Ting, I. Held, Y. Kushnir, J. Lu, G. Vecchi, H.-P. Huang, N. Harnik, A. Leetmaa, N.-C. Lau, C. Li, J. Velez, and N. Naik, 2007, A collection of 19 climate models predict that southwestern North America will dry significantly in the coming century, a transition that may already be under way, *Science* 316 (5828), 1181. DOI: 10.1126/science.1139601

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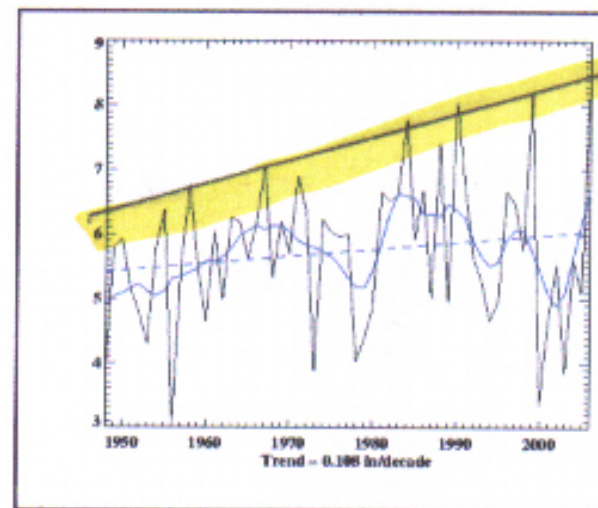
Related Posts:

• [Precipitation and Temperature Trends in Tucson, Arizona](#)

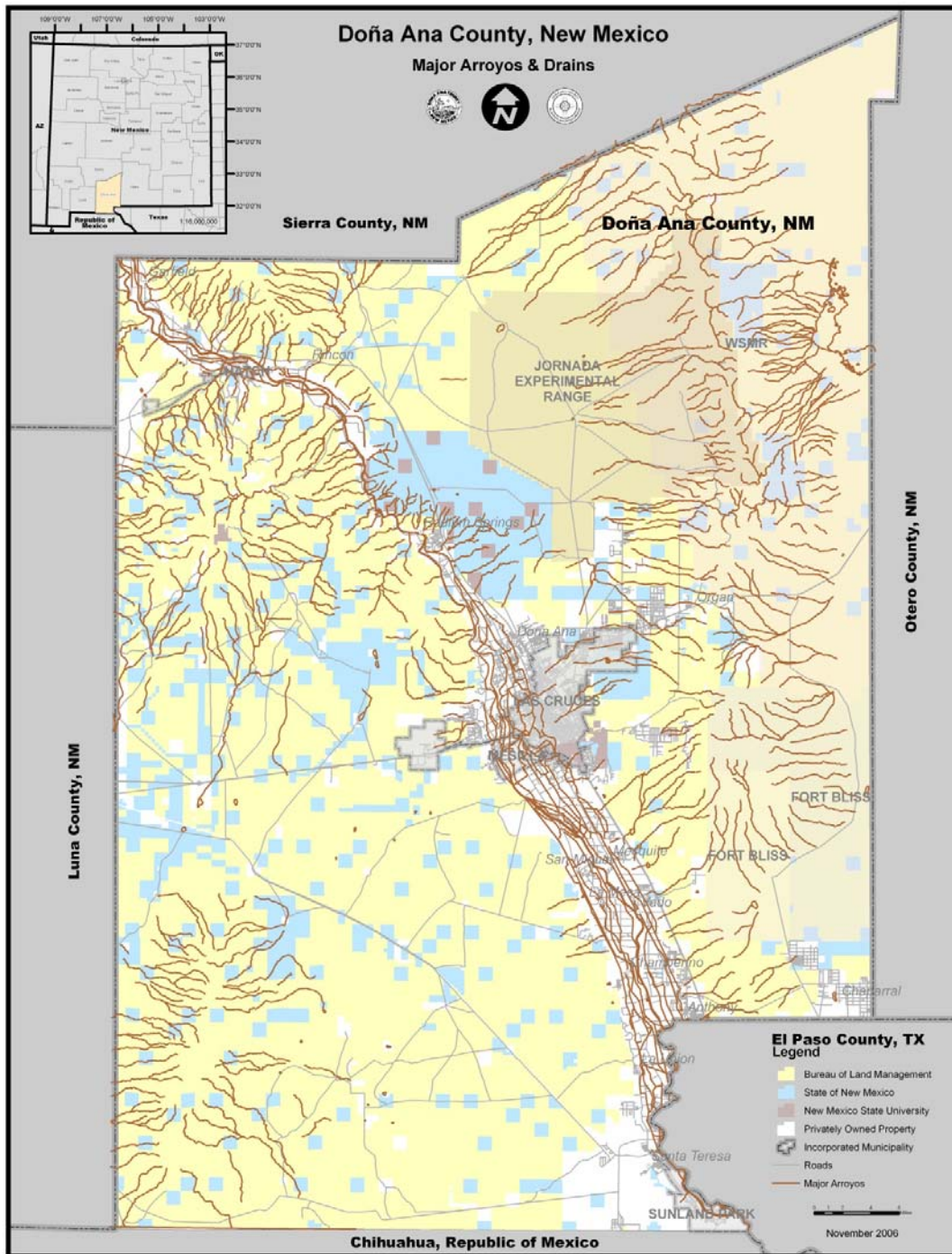


But that's not all. There is also something called the [SW Monsoon Region rainfall index](#) from [Earth Systems Research Laboratory](#), formerly the Climate Diagnostics Center. It is described as "Area averaged precipitation for Arizona and New Mexico: Calculated using NCDC's climate division dataset. Monthly precipitation values for each of the climate divisions in Arizona and New Mexico are averaged to produce a single monthly value."

First the time series of accumulated precipitation in the months of July, August, and September is plotted. That is the black line in the plot below. The solid blue line is a moving Gaussian average with a FWHM of slightly more than 1 month. This just smooths out the precipitation, so we can view the long-term trends. The dashed blue line is a linear fit to the precipitation data. As can be seen, the trend is upward; lately the Southwest is receiving more precipitation. There is an obvious jump around 1999, and a less obvious jump at 2006. This monsoon has been above average for rainfall, so the monsoon precipitation if calculated for 2007 would be near the value of 2006. It is not shown because the September data was not yet in the file from ESRL.



We can also plot the total yearly precipitation values. The lines are the same as above, and there is the same overall pattern.







North break (100')

Radium Springs



Middle break (20')

Radium Springs





Radium Springs

South break (100')

Picacho Hills



Barcelona Ridge Estates

NO MEANS OF
EVACUATION

**ABOUT 100 FEET WIDE
RAGING FLOW**



26



Apply Safety factors

For computing
watershed and runoff

Rasaaf Hills



Tres Sendas Flooded



Vado





Chaparral

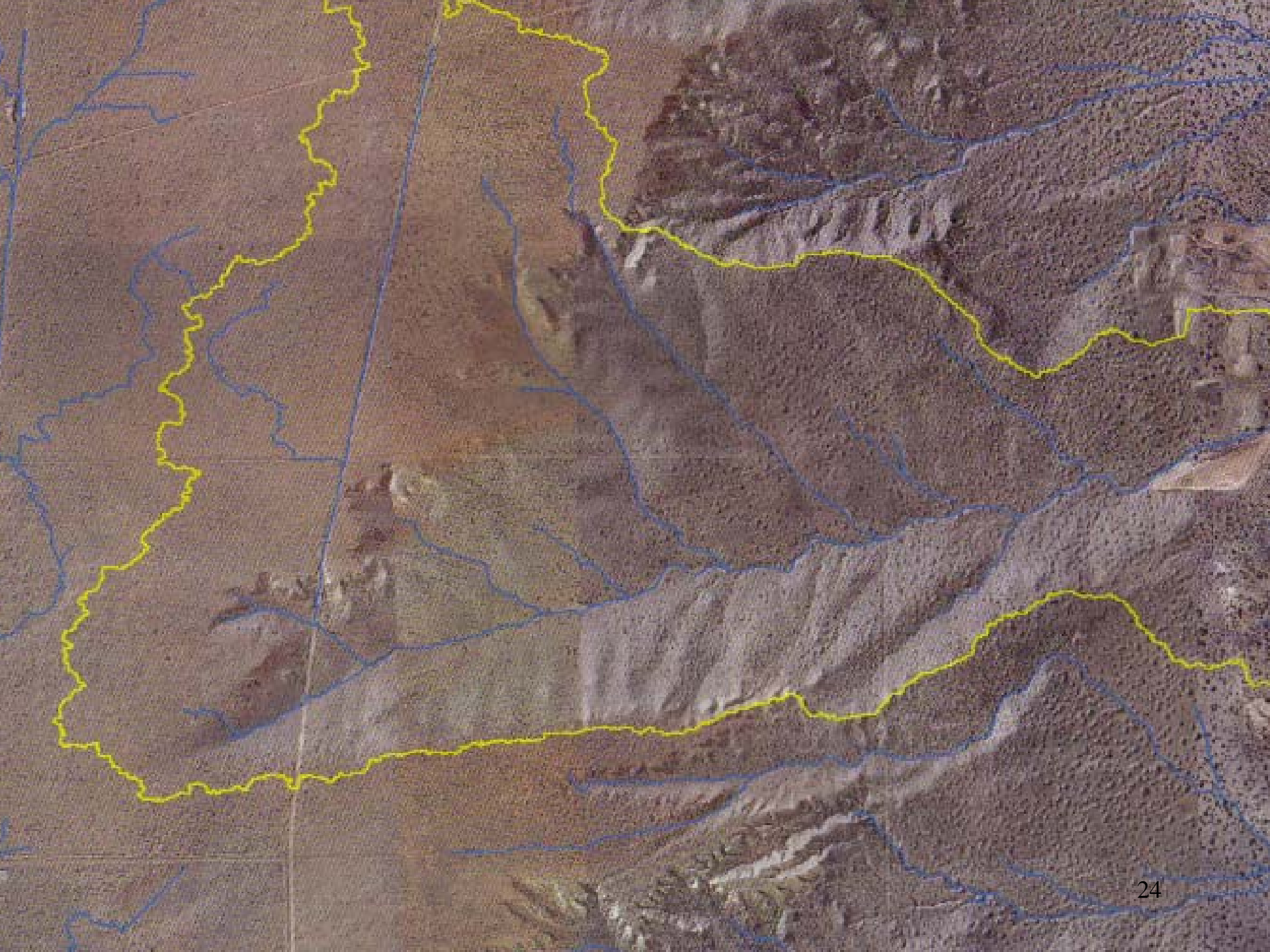




Santa Teresa

How did we get here?

- Available funding is insufficient for required planning
- How we determine flood plans / plains
- Calculated size of watersheds
- Determining upstream/downstream impact
- Lack of coordination between government agencies (and needs of private citizens)
- Jurisdictional boundaries have nothing to do with hydrologic boundaries





Land use where Arroyos exist

Basic Rules

- Historical Arroyos need to be defined as open space
- Do not plat lots into them
- Do not redirect Arroyos or send them over roads
- Provide large flow areas with bridges etc. at road crossings *Do not restrict with culverts*
- Collect surface runoff into storm drains







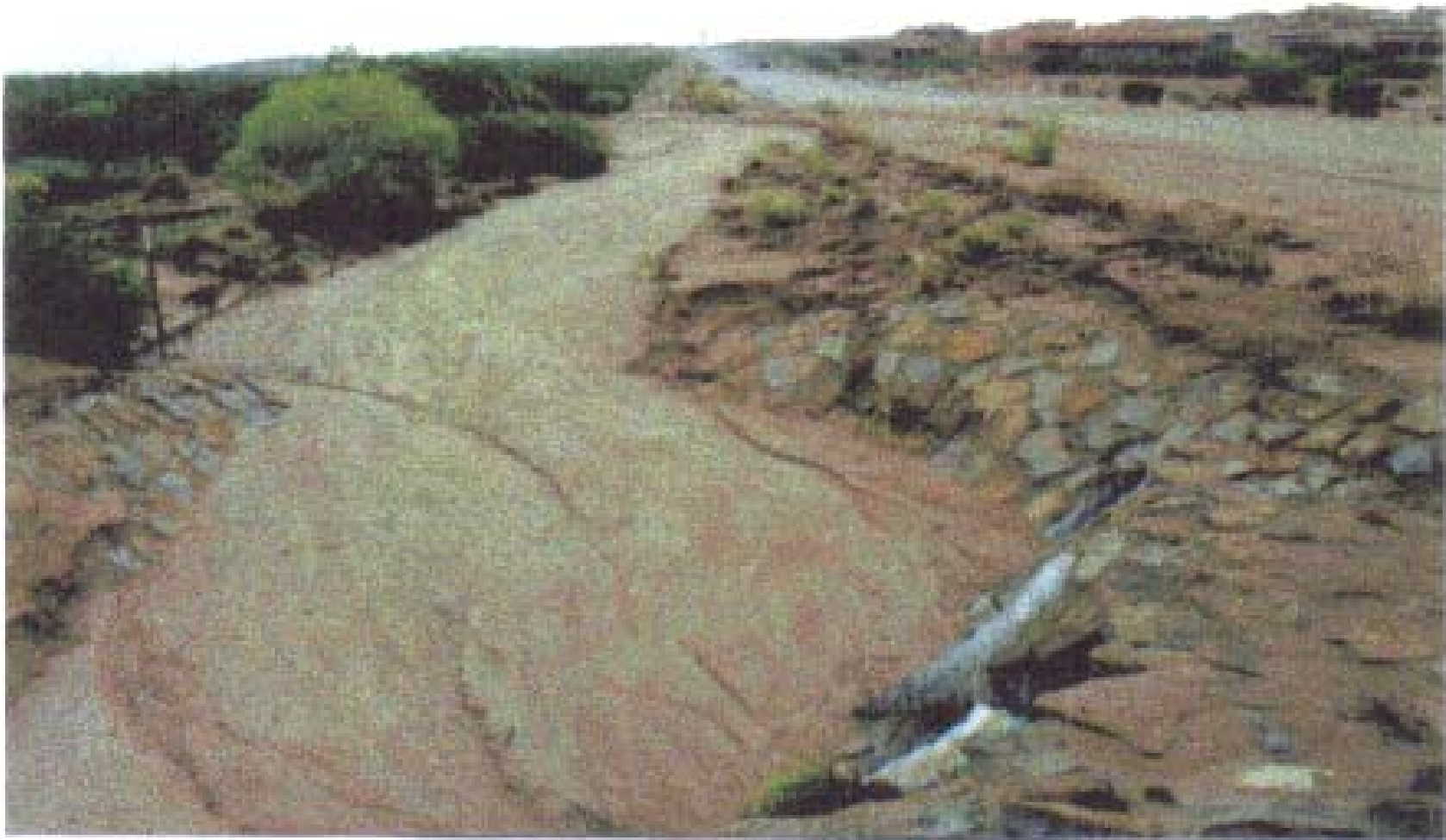
SONO











11

THE THREE CULVERTS ARE 30% FILLED WITH SEDIMENT AND DISTANCE FROM THE BOTTOM TO THE CURB IS 5 FEET (THIS SUMP IS FAR TOO SMALL)







Arnold D Mc Millan 4200 El Camino Real





Existing Structures

Were designed to protect agricultural lands and crops

- They Have reached or exceeded their 50-year design plan
 - Are in need of costly rehabilitating in order to protect urban land uses, roads, general public safety, communities (as much as \$1 – 3 Million per dam)
 - Communities have been developed below them
- *New flood control and stormwater management technologies, methods, and techniques are available that should be developed and installed*
- *While the needs are large; the funds are small*

Government Maintained Drainage Facilities 2006 Budgets

Doña Ana County

- 25 Structures - \$53,000 annual, minor maintenance

NRCS

- 13 Structures - \$27,000 annual, minor maintenance

EBID

- 29 Structures - \$61,000 annual, minor maintenance

2006 Flood Task Force

Recommended:

- 6” curbing with down drops
- Off road sump systems
- Lined channels
- Bridges at arroyo/road crossings
- Regional authority for watershed management









Recent City and County Stormwater Improvements

- Dripping springs
- Vado
- Butterfield
- East Mesa
- Picacho

East Mesa – bridge over arroyo at Dripping Springs Road





East Mesa – master planned lined channel

DONA ANA COUNTY



ENGINEERING

EXPLORER



Vado – storm drain infrastructure

Vado – footing for off road sump systems





Vado – 1500' reinforced concrete wall alongside arroyo, banked with rip-rap



Vado - New roads over infrastructure

Butterfield – roads with curbing
to safely transport watershed





Pichacho Hills – controlling erosion with lined channel



Pichacho Hills – removing water from hillside road with many enlarged inlets

Identified Regional Needs

- Develop Regional Master Plans
- Updating and Maintenance of Flood Control Structures
- Design Flood Control Infrastructure from a watershed perspective
- Construction of Branch Aquifer Recharge Systems
- Construct Canals and Storm Drain Culverts
- Pumping Systems
- Safe Water Storage Reservoirs



Regional Watershed Management

1. Infrastructure needs - street water Storm Drains

- Prevent water from entering the River during storms to keep flood conveyance capacity available in the river channel
- Build Regulating Reservoirs to store water during runoff events and release it afterward, when it can be beneficially used
- Combination of large and small reservoirs
- Pumping systems
- Large precast culverts to carry storm water
- Lined storm drainage channels
- Watershed restoration, starting at the top

CONCRETE PIPE

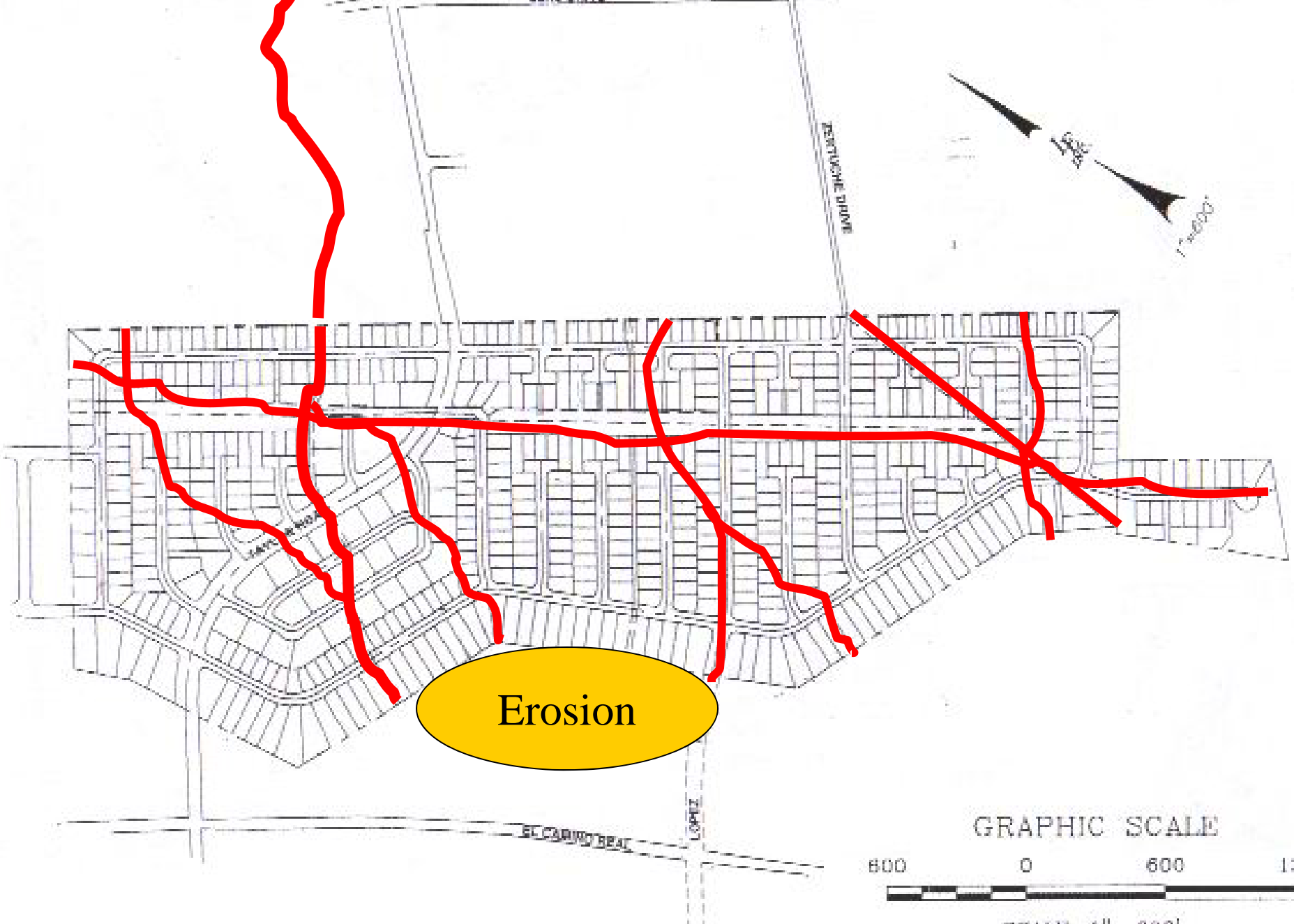




Regional Watershed Management

2. Infrastructure Needs – Arroyo Water

- Build Artificial Re-charge systems to carry good arroyo water to underground storage for later use.
- Branched Aquifer Recharge Systems (BARS)
- Runoff and Zone Collectors of surface Runoff
- Hill slope Collectors and Transmission Lines
- Reduce heavy Losses to Evaporation
- Groundwater extraction system already in place

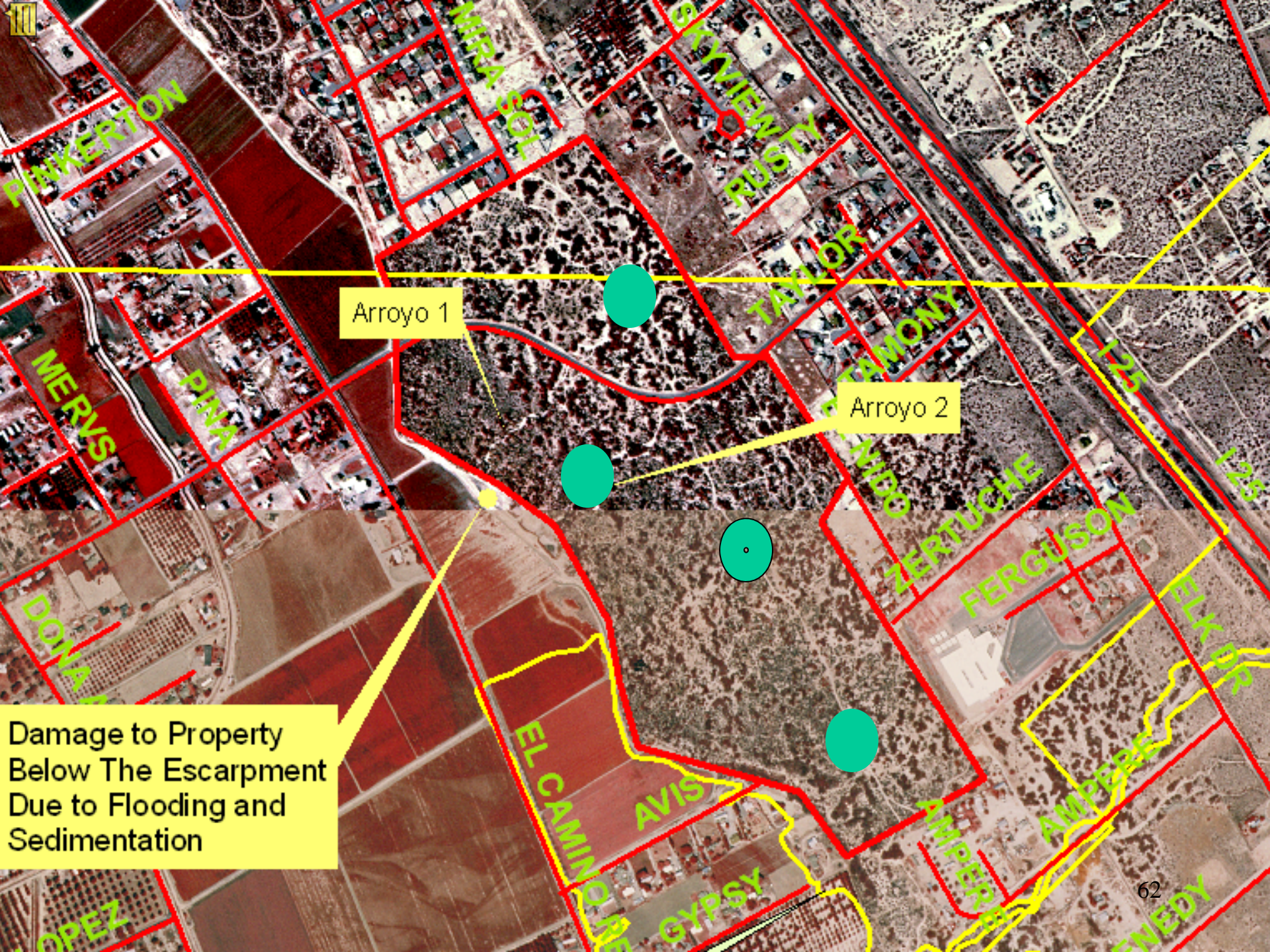


Erosion

GRAPHIC SCALE



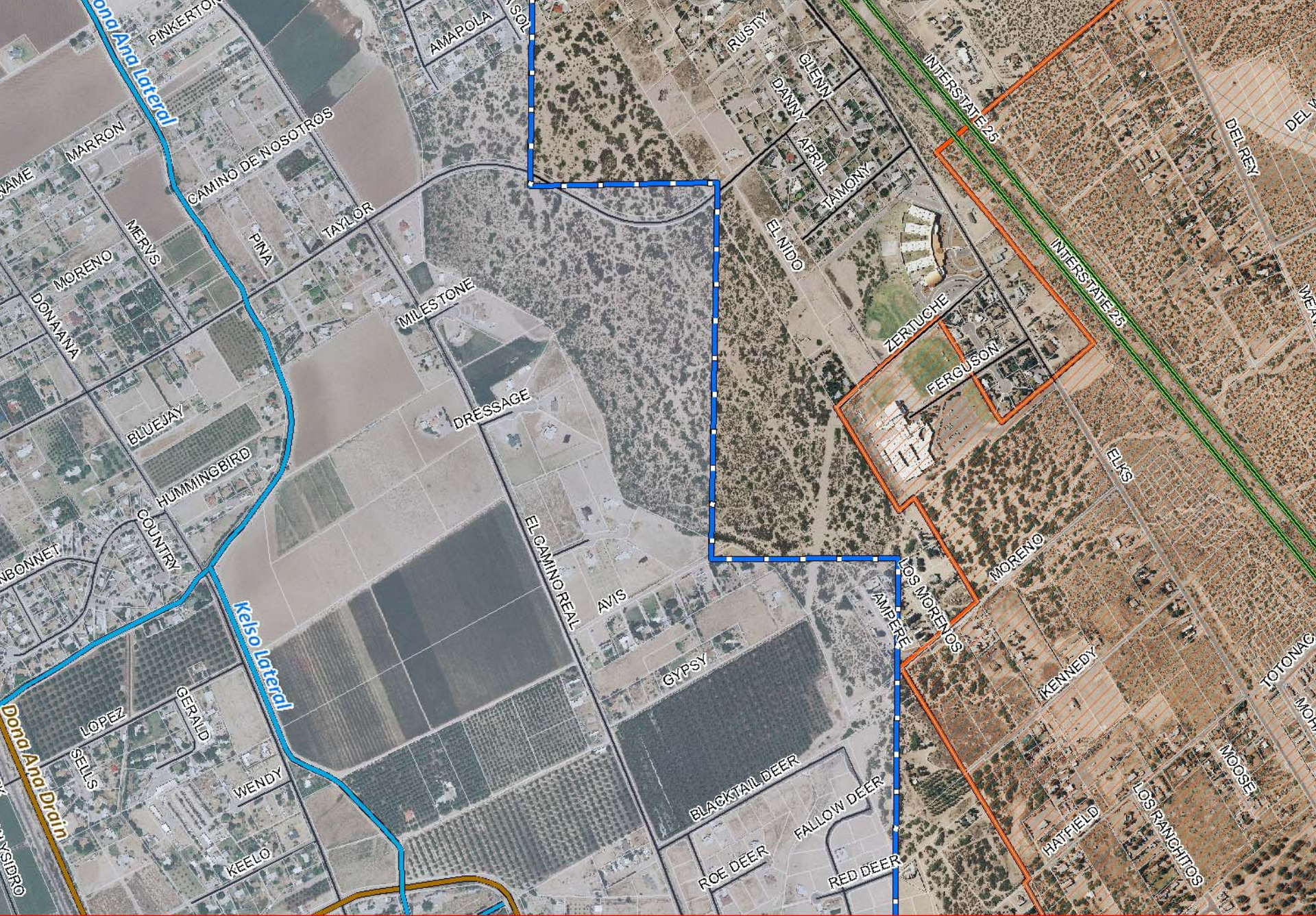
SCALE: 1" = 600'



Arroyo 1

Arroyo 2

Damage to Property
Below The Escarpment
Due to Flooding and
Sedimentation





Regional Watershed Management

3. Maintenance of Infrastructure

- Maintain all arroyos
- Apply recharge systems to arroyos
- Upgrade/retrofit roads/bridges where needed
- Apply maintenance to new recharge systems
- Maintain and rebuild old structures, dams and levees
- Sediment management/disposal



Regional Watershed Management

Open Invitation

- Participate in the development of a formal MOU
 - Next Stormwater Coalition meeting scheduled July 30, 2010 at EBID (9:00 AM)
- Work toward the development of legislation that will create a regional watershed management entity

Stormwater Management from a Regional Perspective

Proposal

Existing flood control and stormwater management agencies jointly and cooperatively

collaborate to identify, prioritize, plan, and implement programs and projects that improve the ability to manage stormwater

through the utilization of best practices for Regional Watershed Management.

SOUTH-CENTRAL NEW MEXICO STORMWATER MANAGEMENT COALITION

STATEMENT OF INTEREST

This following Statement of Interest is made and entered into by and among the Elephant Butte Irrigation District (EBID), the Doña Ana Soil and Water Conservation District (DASWCD), the Caballo Soil and Water Conservation District (CSWCD), the Doña Ana County Flood Commission (DACFC), and the Sierra Flood Control Commission (SFCC). Other entities interested in participating include Sierra County, Sierra SWCD, Village of Hatch, City of Anthony, Town of Mesilla, City of Las Cruces, City of Sunland Park, Dona Ana County, and other State and Federal agencies.

Preface:

Each of the parties to this Statement of Interest has a regional interest and are charged with management of stormwater as part of their responsibilities to the public; and

The legal, financial, technical, social and environmental conditions under which these parties operate have changed or are in the process of changing; and

The management of stormwater is critical for the protection of life, property and public infrastructure, supports agriculture and natural systems, and may contribute to the enhancement of public recreation; and

All of the parties agree that their efforts to manage stormwater may be enhanced in part or whole through sharing of the information and ideas, coordinated planning, consolidation of funding requests, and sharing of staff resources and equipment; and input of stakeholders; and

Each of the parties is dealing with one or more aspects of stormwater management which is of an urgent nature.

Purpose: The coalition is to share resources, staff time and documents in order to encourage and facilitate the exploration and development of collaborative efforts to improve the efficiency and effectiveness of stormwater management in south-central New Mexico.

Agreement Between the Parties:

1. Designation of a representative from each party who shall serve as the single point of contact.
2. Representatives will attend meetings as necessary and act as liaison with their respective agency.
3. Each party shall share data and information.
4. Representatives will present issues, needs, concerns for discussion and/or resolution.
5. The representatives will work toward the formation of a formal Agreement.