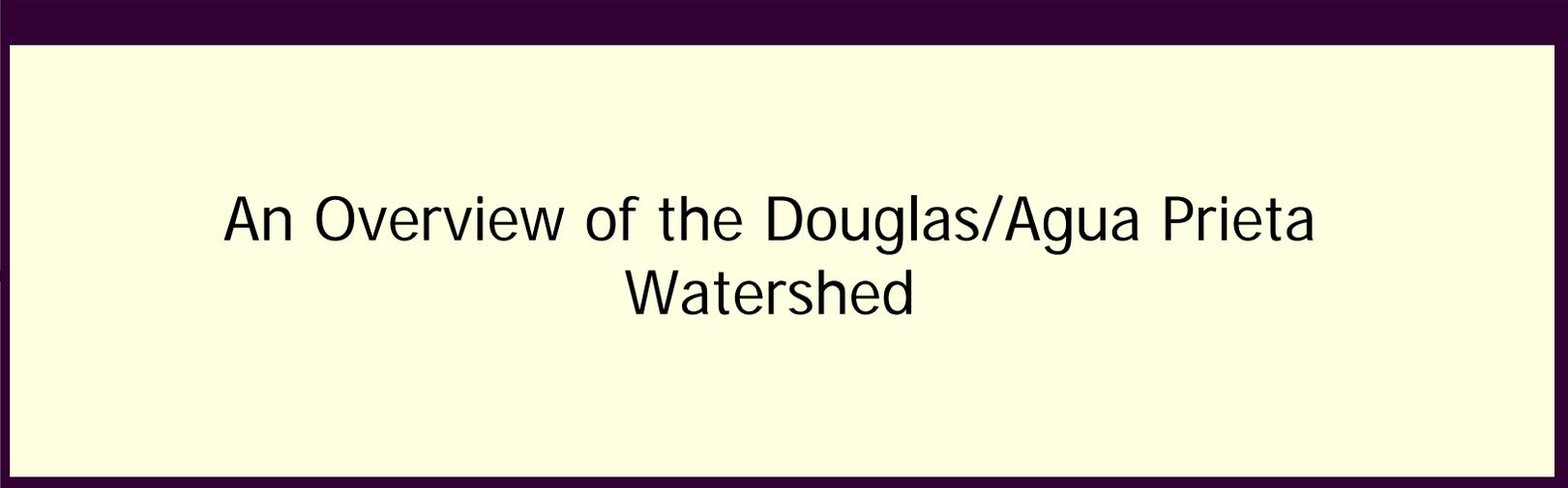




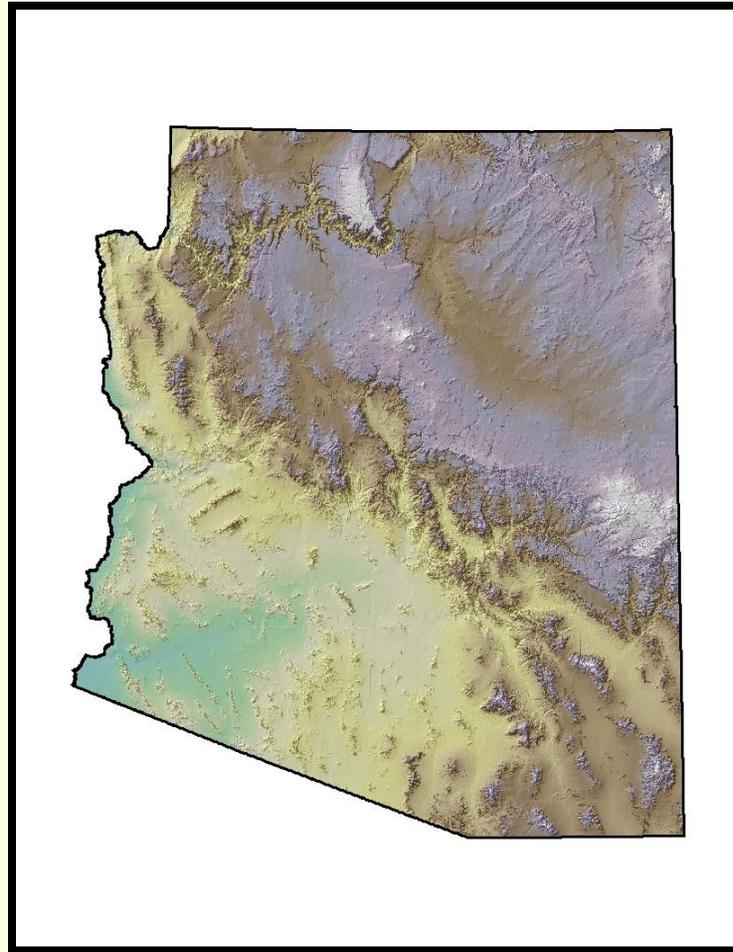
Estudio de la Cuenca Douglas-Agua Prieta  
Junio 28, 2004



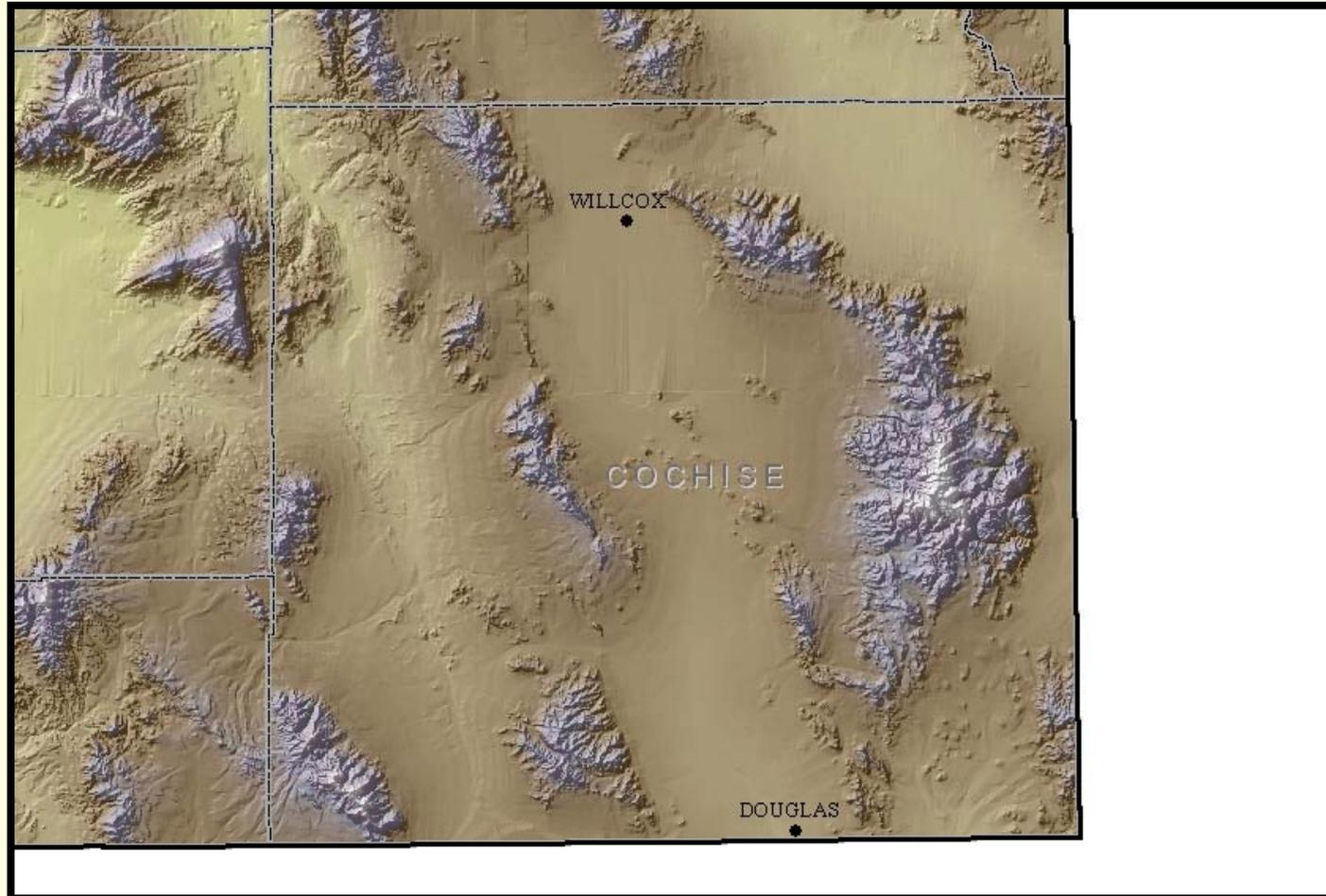
An Overview of the Douglas/Agua Prieta  
Watershed

# ARIZONA

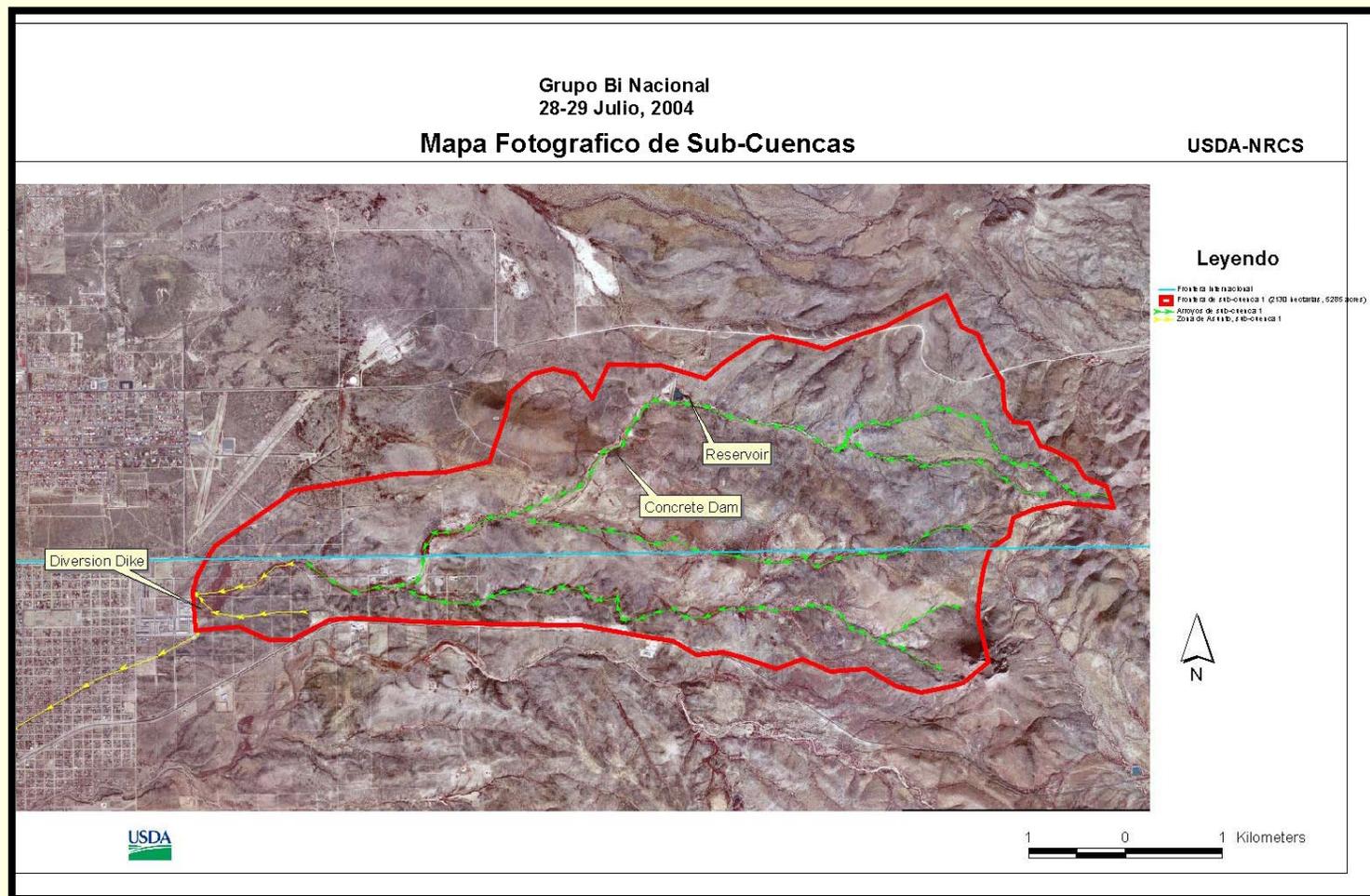
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# COCHISE COUNTY

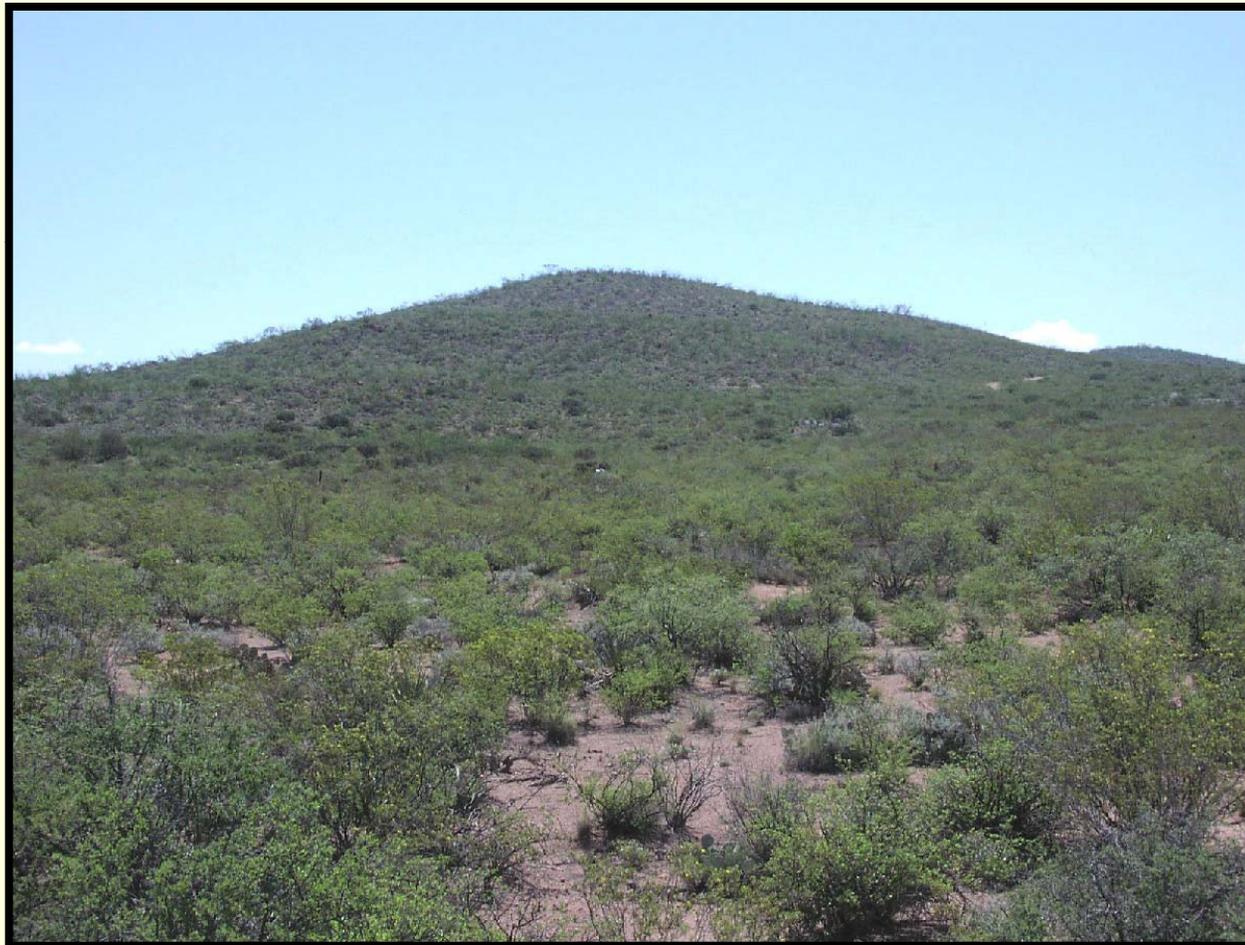


# Douglas-Agua Prieta Watershed



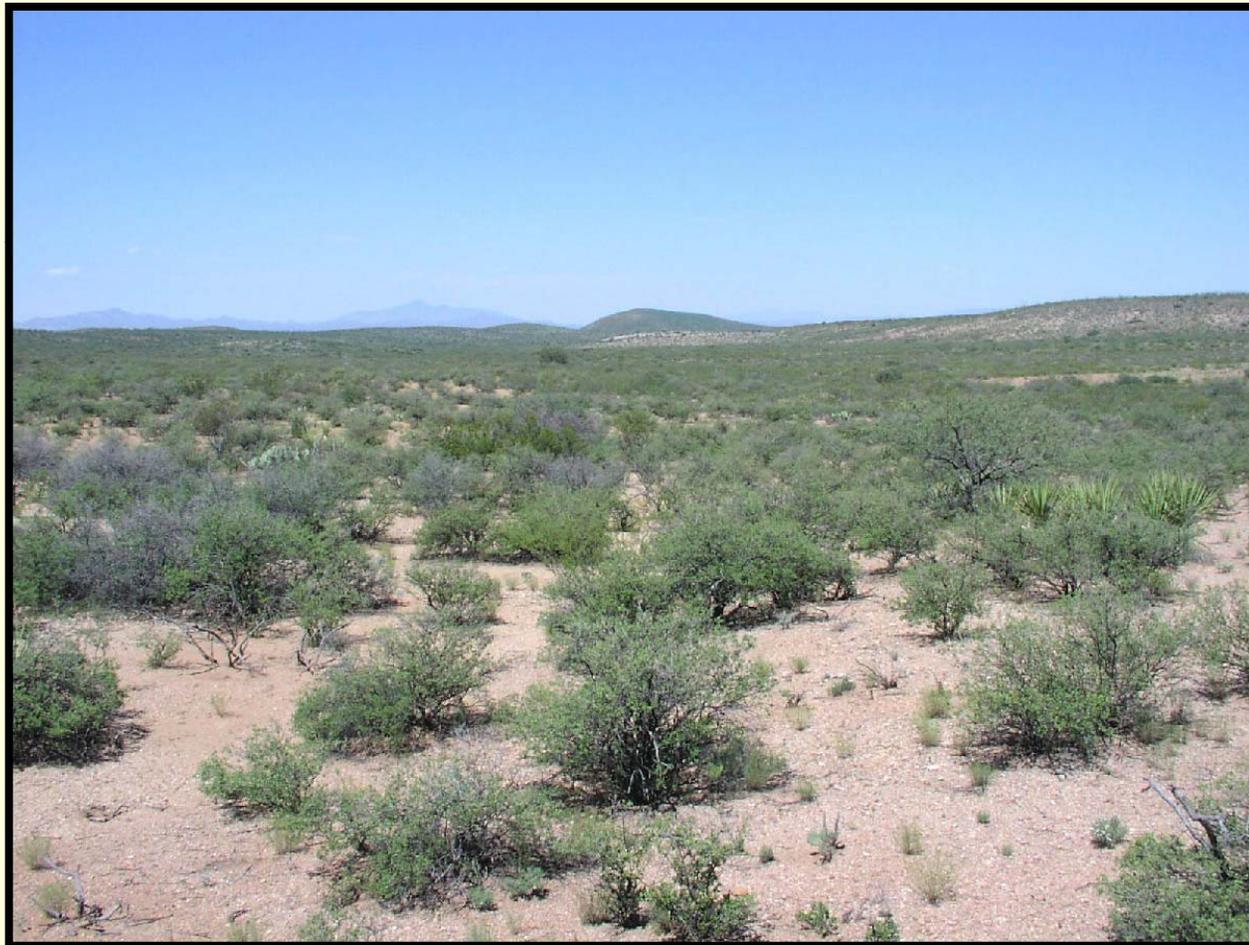
Looking east toward the upper end of the watershed on U.S. side

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Upper end of watershed – Looking west toward lower end of U.S.  
portion of watershed

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## Reservoir (Charco)

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# Reservoir – Height of dike on downstream side

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# Concrete Dam

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# Concrete Dam – Spillway area

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## Lower part of watershed approaching the U.S./Mexico Border

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## Watershed drainage area just north of the border

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# THE U.S.-Mexico Border Fence

## Head Cutting on U.S. side

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Erosion – Head cutting resulting from concentrated flows immediately south of the border fence on the Mexican side

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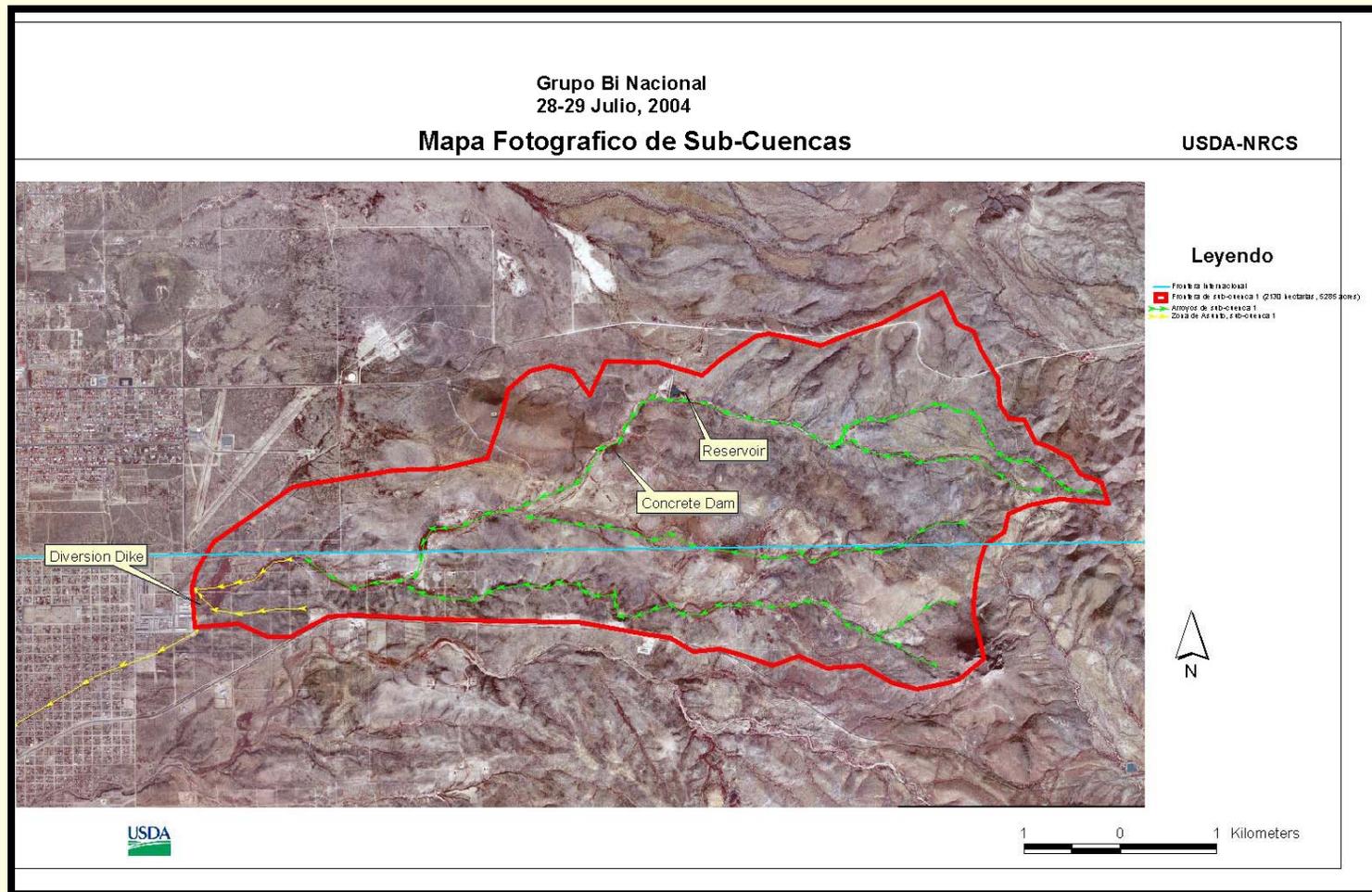


# Cuenca Agua Prieta - Alamito Wash

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# Douglas-Agua Prieta Watershed



# WATERSHED PHYSICAL CHARACTERISTICS

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- 5285 ACRES (2130 HECTARES)
  - 65% IN THE UNITED STATES
  - 35% IN MEXICO
- APPROXIMATELY 2/3 OF THE SOILS ARE SHALLOW TO BEDROCK (WILL NOT ABSORB AND HOLD A LOT OF MOISTURE)
- SLOPES OF THE HILLS ARE OFTEN STEEP
- MOST OF THE WATERSHED IS VERY BRUSHY, WITH LITTLE HERBACEOUS GROUND COVER TO SLOW DOWN THE WATER

## WATERSHED HYDROLOGIC CHARACTERISTICS

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- 2-YEAR, 24-HOUR STORM EVENT IS 1.8 INCHES
- 10-YEAR, 24-HOUR STORM EVENT IS 2.8 INCHES
- 50-YEAR, 24-HOUR STORM EVENT IS 3.8 INCHES

# WATERSHED HYDROLOGIC CHARACTERISTICS

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- A 2-YEAR STORM EVENT ON THIS WATERSHED PRODUCES 356 CUBIC FEET PER SECOND (PIES CUBICOS POR CADA SEGUNDO), OR AROUND 160,000 GALLONS PER MINUTE
- A 10-YEAR STORM EVENT PRODUCES 681 CFS, OR MORE THAN 306,000 GALLONS PER MINUTE
- A 50-YEAR STORM EVENT PRODUCES 1302 CFS, OR ALMOST 586,000 GALLONS PER MINUTE

# 2-YEAR STORM FLOODING

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- 356 CFS
  - THIS AMOUNT OF WATER WILL SPREAD OUT 230 FEET WIDE, 6 INCHES DEEP
  - IF THIS FLOW IS ONLY 50 FEET WIDE, IT WILL BE ABOUT 2 ½ FEET DEEP

# 2-YEAR STORM FLOODING

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# 2-YEAR STORM FLOODING

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# 10-YEAR STORM FLOODING

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- 681 CFS
  - THIS AMOUNT OF WATER WILL SPREAD OUT 450 FEET WIDE, 6 INCHES DEEP
  - AT 100 FEET WIDE, IT IS NOW 4 FEET DEEP
    - ACTUALLY, THIS MUCH WATER WILL FLOW A LITTLE LESS DEEP BECAUSE IT WILL BEGIN TO FLOW MUCH QUICKER
    - FAST ENOUGH TO MOVE LARGE OBJECTS SUCH AS VEHICLES AND HOUSES

# 10-YEAR STORM FLOODING

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# 50-YEAR STORM FLOODING

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- 1302 CFS
  - THIS AMOUNT OF WATER, AT 6 INCHES DEPTH, WILL FLOW ACROSS AN AREA MORE THAN 850 FEET WIDE
  - AT 4 FEET DEEP, IT NOW COVERS AN AREA 325 FEET WIDE
    - ABOUT AS WIDE AS A FOOTBALL FIELD IS LONG (AMERICAN FOOTBALL, OF COURSE)

## Street Flooding in Agua Prieta - 2002

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# Concentrated Flows through Agua Prieta

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# Downtown Agua Prieta

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# Downtown Agua Prieta

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## Street flooding in Agua Prieta

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## Providing assistance to flood victims

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# Floating debris

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# Rio Agua Prieta

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# Agua Prieta, Sonora 2012 Flood

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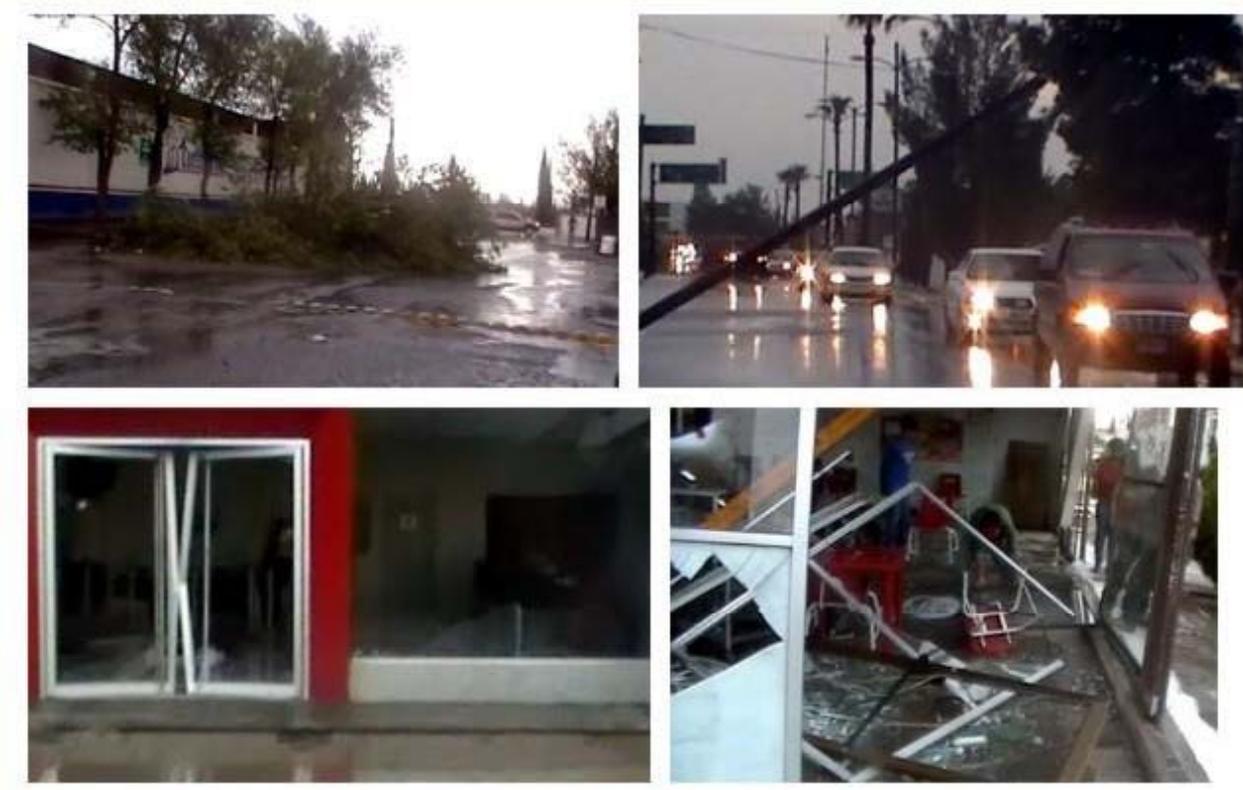
# Agua Prieta, Sonora 2012

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# Agua Prieta, Sonora 2012

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# Agua Prieta, Sonora 2012



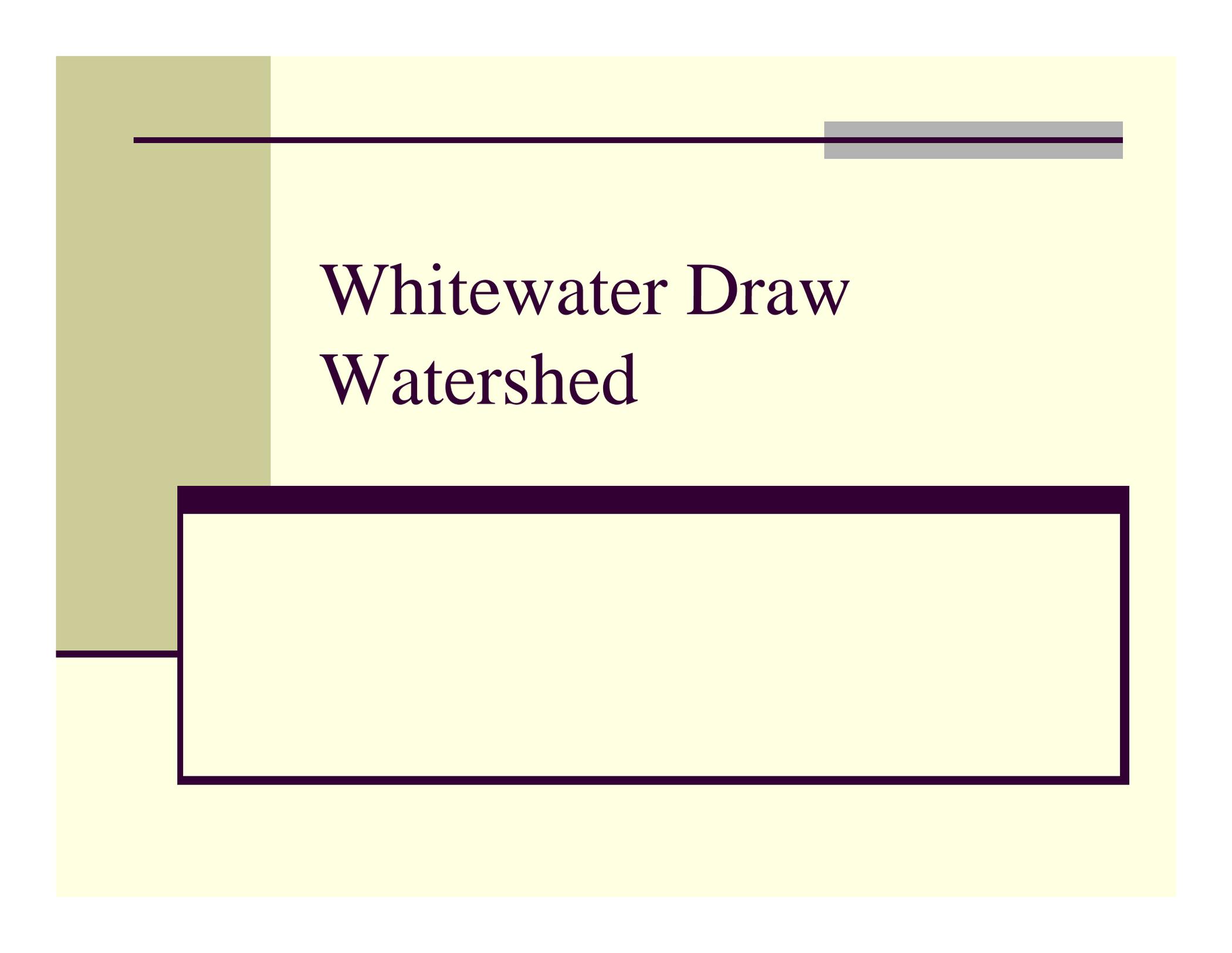
# Agua Prieta, Sonora 2012



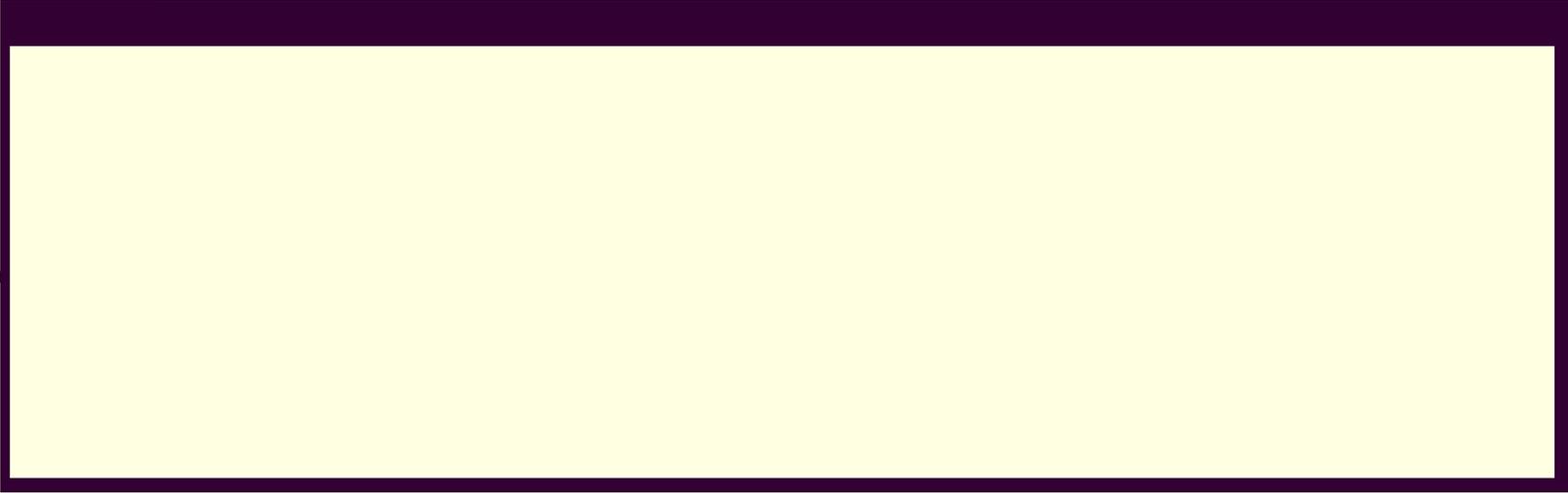
# Agua Prieta, Sonora 2012

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# Whitewater Draw Watershed



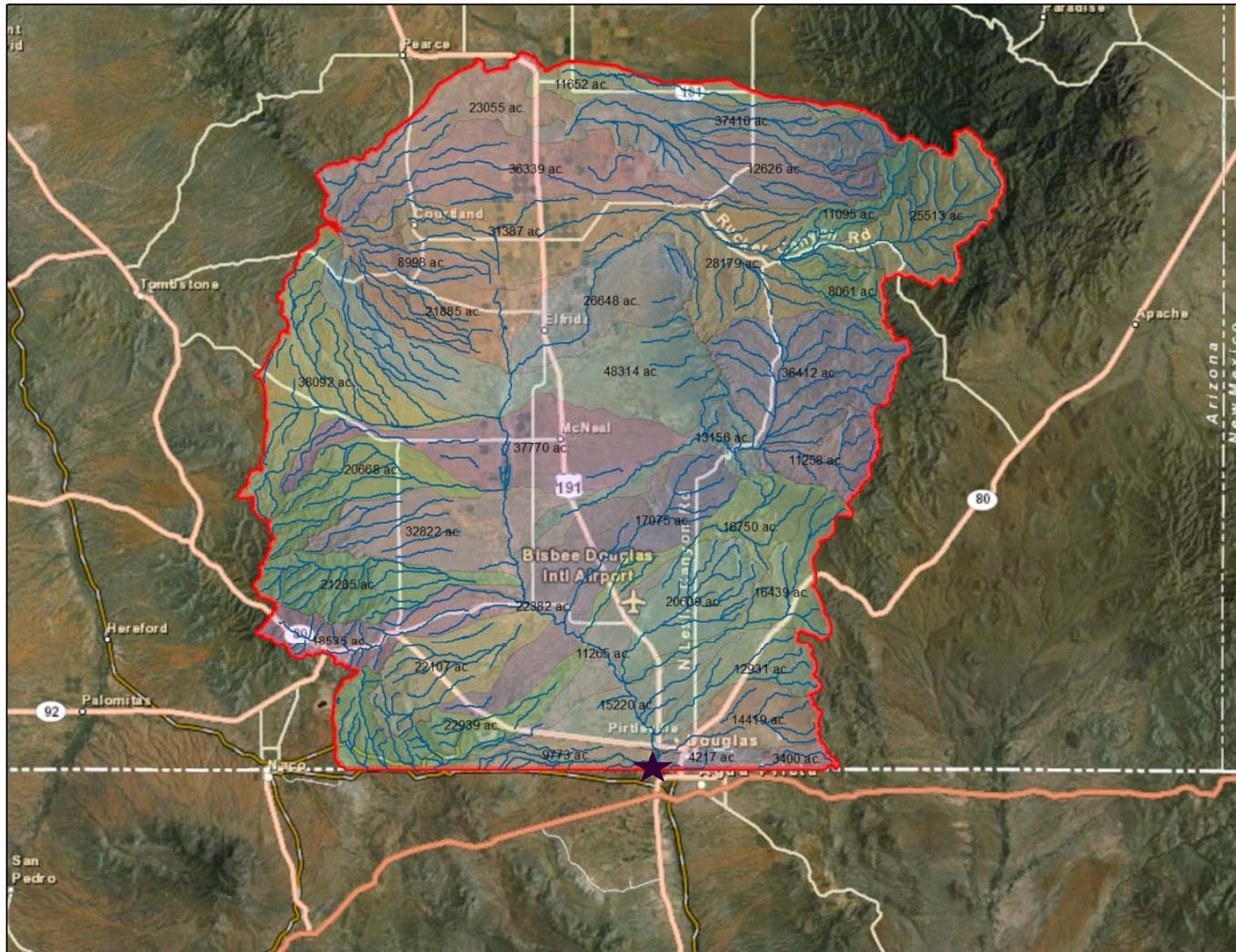
# Whitewater Draw Watershed

Approximately 770,664 Acres



# Sub-Watersheds of Whitewater Draw

32 Sub-Watersheds between 3,400 Acres and 38,000 Acres



# 2013 Summer Floods

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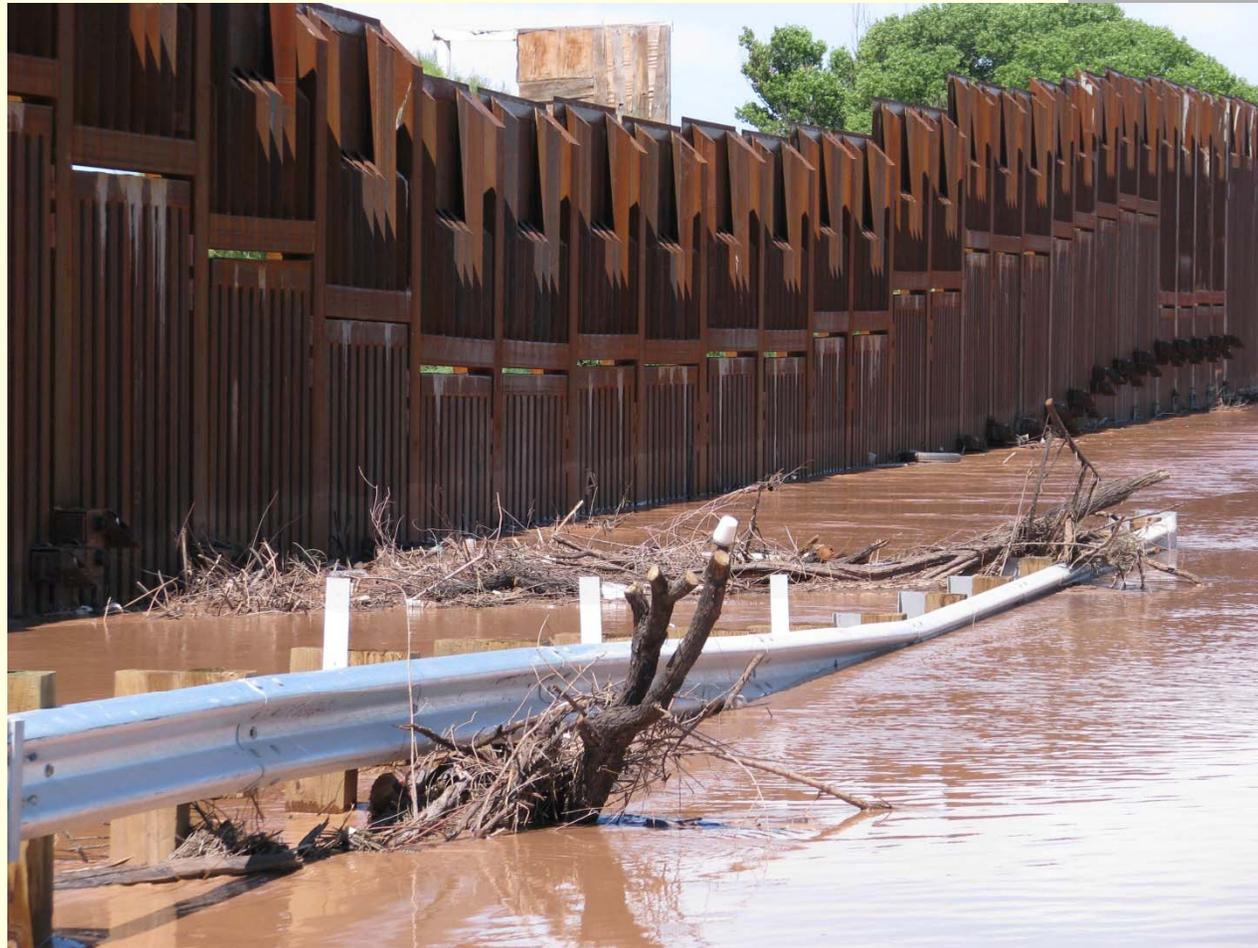
# Douglas Hospital Parking lot

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# 2013 Floods at Border Fence

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# 2013 Floods at Border Fence

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# 2013 Floods at Border Fence

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# 2013 Flooding South of the Border Fence



# 2013 Flooding Agua Prieta, Sonora

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# 2013 Flooding of farm land in Agua Prieta, Sonora

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# 2013 Flooding Agua Prieta, Sonora

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# Proposed Douglas Lake Project

Approximately 5 Acres



# Flood Control in Mexico

Approximately 550 Acres



# Potential Project Site

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# Flood water retention site

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# Benefits of the Douglas Lake Project

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- Replenishment Aquifer of both Douglas and Agua Prieta
- Provide flood control for Agua Prieta
- Provide Recreational Potential
- Improve landscape esthetic values
- Improve wildlife

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# ■ Questions ?

- Gerry Gonzalez
- District Conservationist
  - Douglas, AZ
  - 520-364-2001 X101
- [Gerry.Gonzalez@az.usda.gov](mailto:Gerry.Gonzalez@az.usda.gov)



# Flood gates

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# Flood gates

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# Fence removed

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# Fence removed

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# Fence removed

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# Fence removed

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# Eroded ditch

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# Eroded bank

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# Questions?

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