Multi-sectoral Impacts of the Current Drought in Southern Great Plains

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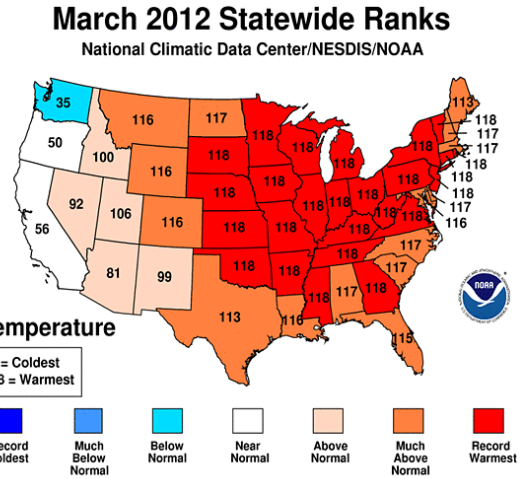
Presented at the Spring 2012 Southern Great Plains Drought Assessment and Outlook Forum
April 26, 2012

Topics

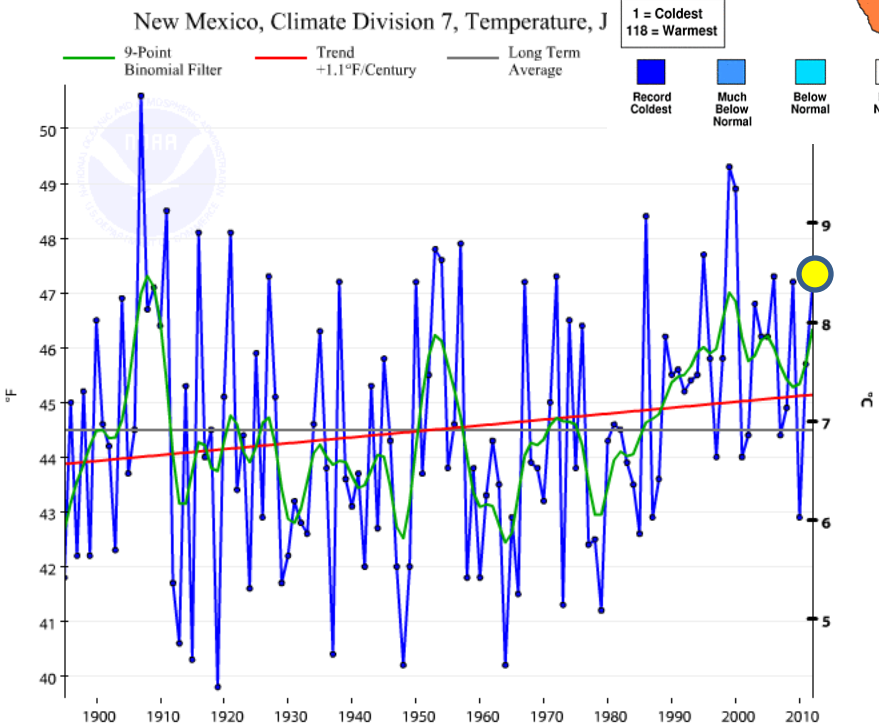
- Snowpack and stream flow
- Reservoir levels
- Agricultural crop impacts
- Cattle production
- Groundwater
- Wildfire
- Health and Air Quality

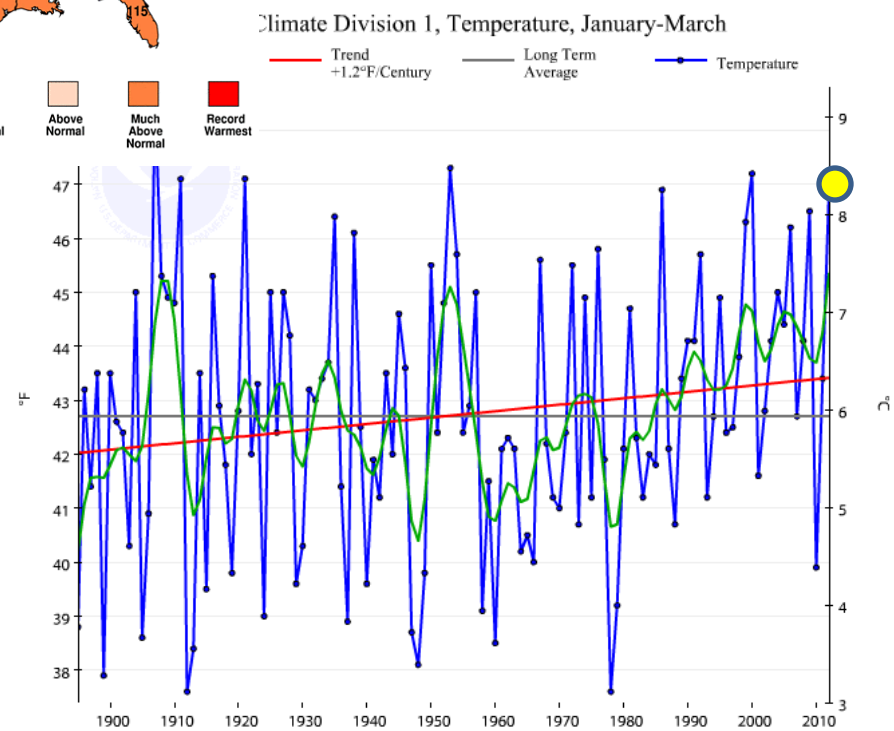
January to March Temperatures

Southeast NM
Climate division 7



Panhandle/West TX
Climate division 1





NM Precipitation Rankings

Last 12 months was the 8th driest on record

The start of 2012 was the 10th driest at 48% of normal precipitation statewide

Period	Amount	20th Century Average	Departure	Rank	Wettest/Driest Since	Record Year
Mar 2012 1-month period	0.23" (5.84 mm)	0.68" (17.27 mm)	-0.45" (-11.43 mm)	**14th Driest** 101st Wettest *Ties: 1904, 1910, 1955, 1959*	Driest since: 2011 Wettest since: 2010	Driest: 1956 Wettest: 1919
Jan - Mar 2012 3-month period	0.87" (22.10 mm)	1.84" (46.74 mm)	-0.97" (-24.64 mm)	**10th Driest** 109th Wettest	Driest since: 2011 Wettest since: 2010	Driest: 1972 Wettest: 2005
Oct 2011 - Mar 2012 6-month period	4.14" (105.16 mm)	4.27" (108.46 mm)	-0.13" (-3.30 mm)	64th Driest **54th Wettest**	Driest since: 2011 Wettest since: 2010	Driest: 1904 Wettest: 2005
Apr 2011 - Mar 2012 12-month period	9.58" (243.33 mm)	13.52" (343.41 mm)	-3.94" (-100.08 mm)	**8th Driest** 110th Wettest	Driest since: 1957 Wettest since: 2011	Driest: 1957 Wettest: 1942

TX Precipitation Rankings

Last 12 months was the 5th driest on record

The start of 2012 was the 12th wettest

Period	Amount	20th Century Average	Departure	Rank	Wettest/Driest Since	Record Year
Mar 2012 1-month period	3.15" (80.01 mm)	1.74" (44.20 mm)	1.41" (35.81 mm)	110th Driest **8th Wettest** *Ties: 1900*	Driest since: 2011 Wettest since: 2007	Driest: 1971 Wettest: 2007
Jan - Mar 2012 3-month period	7.66" (194.56 mm)	4.97" (126.24 mm)	2.69" (68.32 mm)	107th Driest **12nd Wettest**	Driest since: 2011 Wettest since: 2007	Driest: 1996 Wettest: 1903
Oct 2011 - Mar 2012 6-month period	14.16" (359.66 mm)	11.35" (288.29 mm)	2.81" (71.37 mm)	91st Driest **27th Wettest**	Driest since: 2011 Wettest since: 2010	Driest: 1918 Wettest: 1992
Apr 2011 - Mar 2012 12-month period	20.18" (512.57 mm)	28.01" (711.45 mm)	-7.83" (-198.88 mm)	**5th Driest** 113rd Wettest	Driest since: 1971 Wettest since: 2011	Driest: 1918 Wettest: 1992

OK Precipitation Rankings

Last 12 months was the 41st driest on record

The start of 2012 was the 10th wettest

Period	Amount	20th Century Average	Departure	Rank	Wettest/Driest Since	Record Year
Mar 2012 1-month period	4.89" (124.21 mm)	2.48" (62.99 mm)	2.41" (61.22 mm)	113rd Driest **6th Wettest**	Driest since: 2011 Wettest since: 1998	Driest: 1971 Wettest: 1973
Jan - Mar 2012 3-month period	8.70" (220.98 mm)	5.56" (141.22 mm)	3.14" (79.76 mm)	109th Driest **10th Wettest**	Driest since: 2011 Wettest since: 1998	Driest: 1936 Wettest: 1990
Oct 2011 - Mar 2012 6-month period	18.34" (465.84 mm)	12.51" (317.75 mm)	5.83" (148.09 mm)	108th Driest **10th Wettest**	Driest since: 2011 Wettest since: 2005	Driest: 1967 Wettest: 1985
Apr 2011 - Mar 2012 12-month period	31.41" (797.81 mm)	34.01" (863.85 mm)	-2.60" (-66.04 mm)	**41st Driest** 77th Wettest	Driest since: 2011 Wettest since: 2010	Driest: 1911 Wettest: 1958

NRCS Snotel-based Mountain Snowpack Analysis (by River Basin) in NM

NEW MEXICO SNOTEL Snow Water Equivalent Update Graph

As of MONDAY: APRIL 9 , 2012

Basin	Snow Water Equivalent Percent of Average
RIO CHAMA RIVER BASIN	32%
UPPER RIO GRANDE BASIN	48%
SANGRE DE CRISTO MOUNTAIN RANGE BASINS	49%
JEMEZ RIVER BASIN	18%
SAN FRANCISCO RIVER BASIN	2*%
GILA RIVER BASIN	4*%
MIMBRES RIVER BASIN	*
PECOS RIVER BASIN	66%
SAN JUAN RIVER HEADWATERS	50%
ANIMAS RIVER BASIN	49%
CIMARRON RIVER BASIN	23%
ZUNI/BLUEWATER RIVER BASIN	0*%
RIO HONDO BASIN	2%

Legend:	<70%	70-90%	91-110%	111-130%	>130%

* = Data are not available or data may not provide a valid measure of conditions for over half of the sites within the basin.

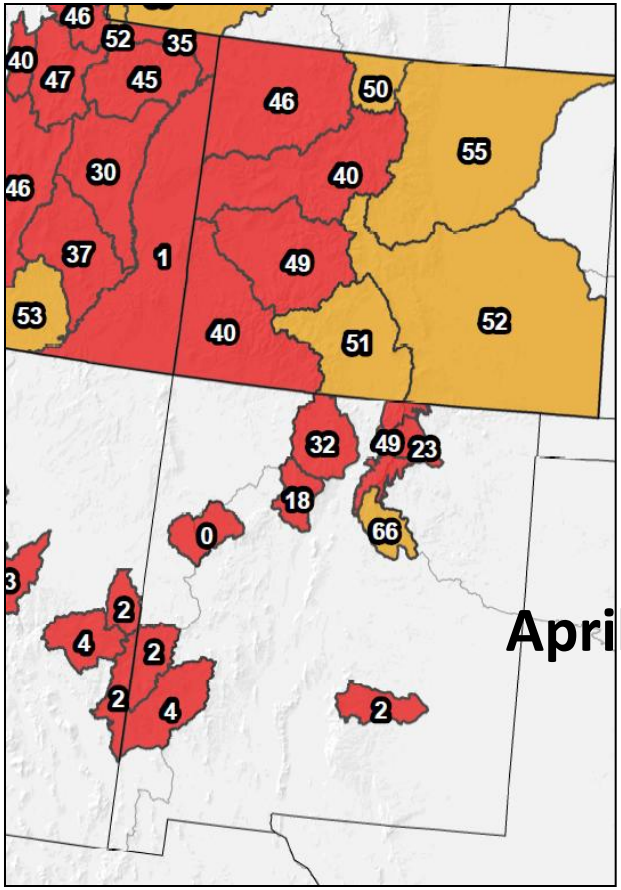
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Seeing significant daily decreases in northern basins
Southern basins already melted out

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1971-2000 Normal

- unavailable *
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >= 150%

* *Data unavailable at time of posting or measurement is not representative at this time of year*



April 9, 2010

Provisional data subject to revision

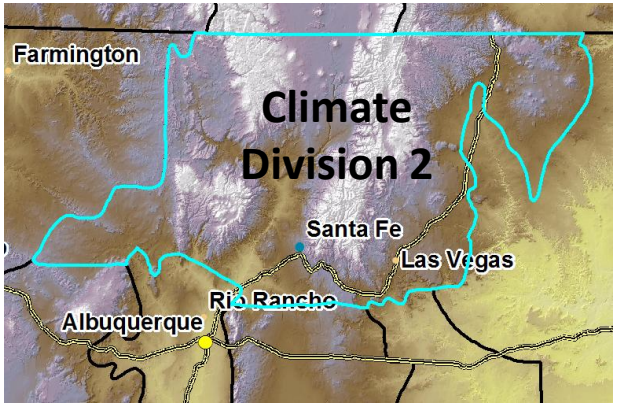
USDA NRCS

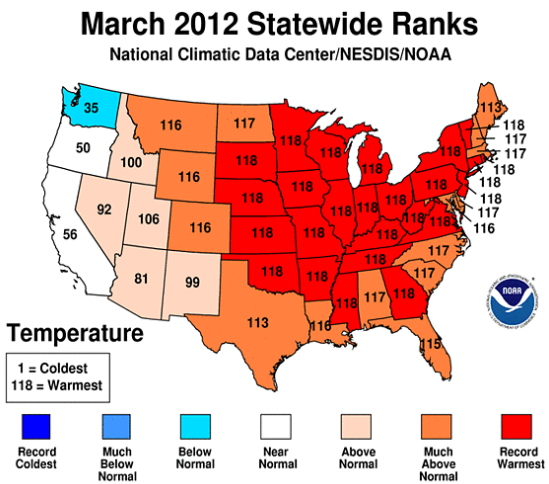
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

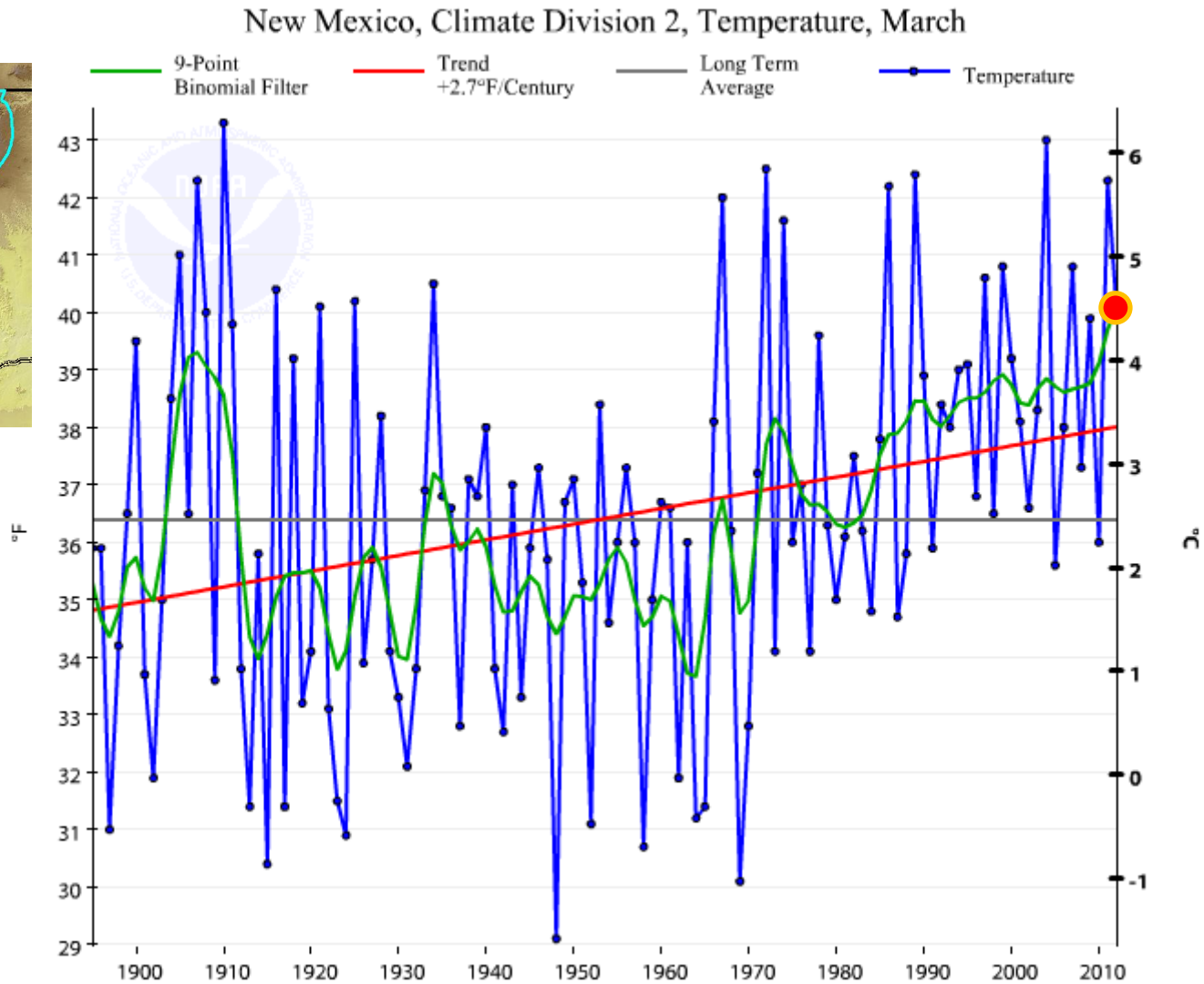
Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

Warm Northern Mountains

Not as warm as last March but this March was the 18th warmest

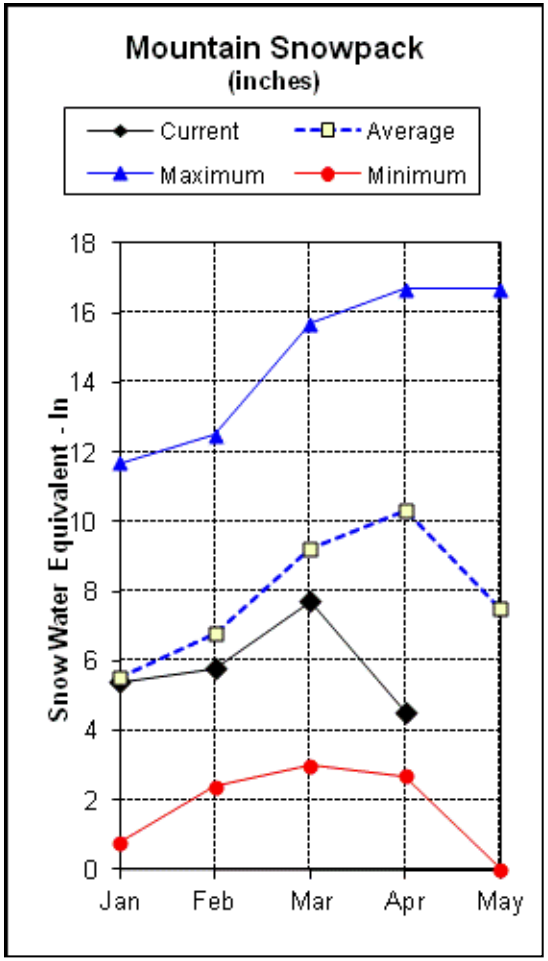






Impacts to the Rio Grande Basin

- Snowpack in the basin is significantly below average at 44 percent, in line with the 39 percent recorded last year at this time
- Much of the low to mid elevation snowpack is already melted out this year, much earlier than average



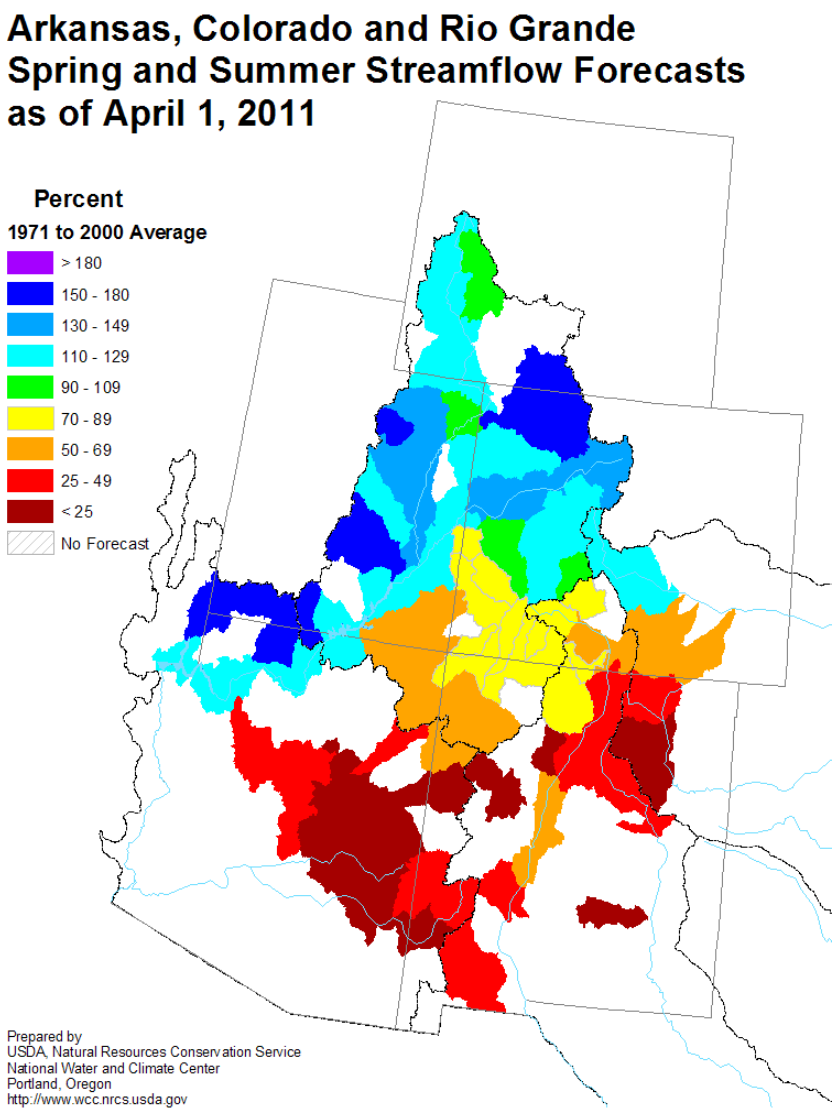
Based on the April 1, 2012 New Mexico Water Supply Outlook Report

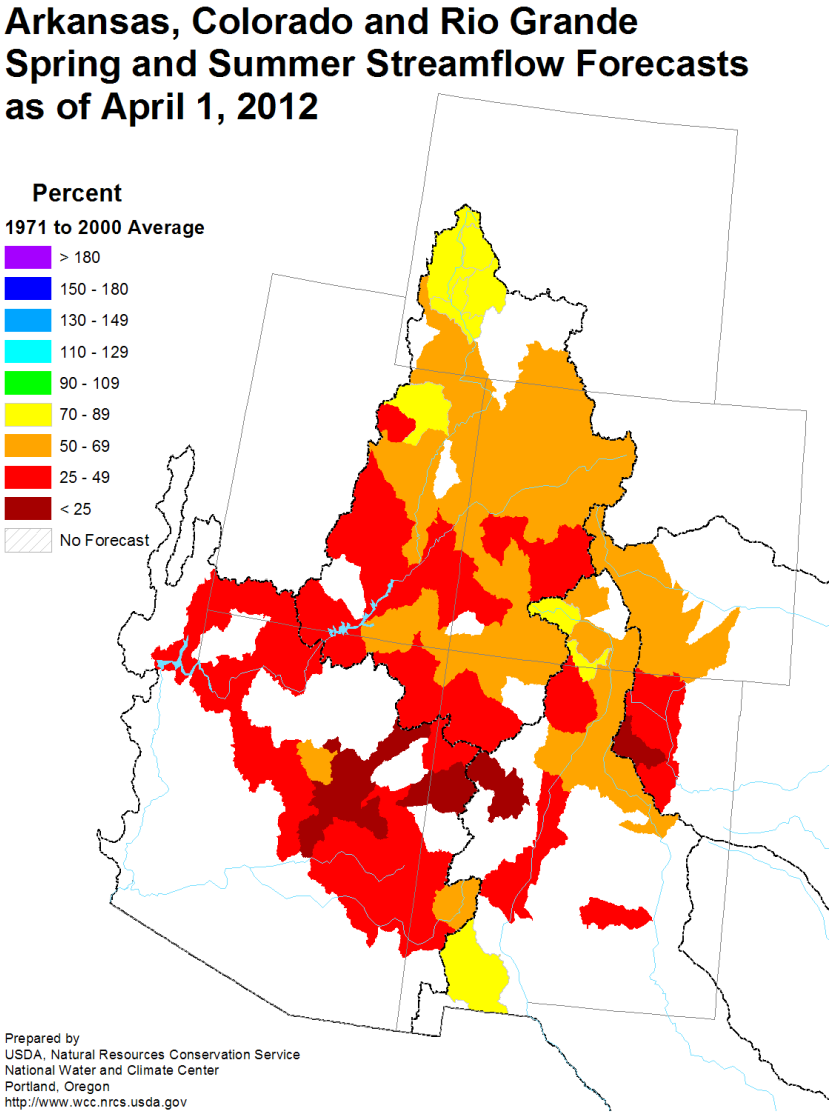
April Streamflow Forecasts

Forecast Point	% of average
NW Rio Grande in Colorado	26 to 74%
NE Rio Grande in Colorado	41 to 58%
Middle Sangre Mtns in NM	39 to 62%
Jemez River	34 to 42%
El Vado reservoir inflow	44%
Rio Grande at Otowi Bridge	39%
Rio Grande at San Marcial	25%
Pecos	55 to 60%

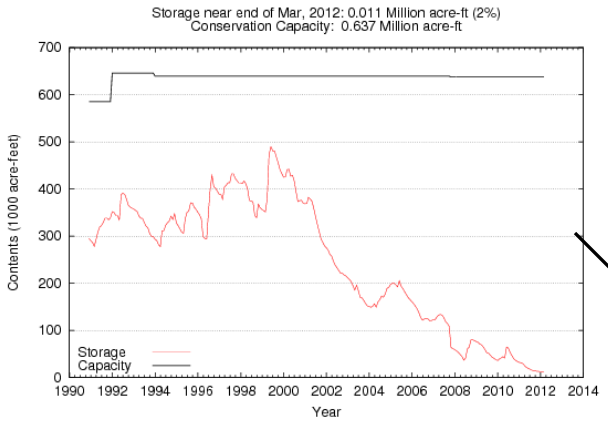
Percent of 1971-2000 average

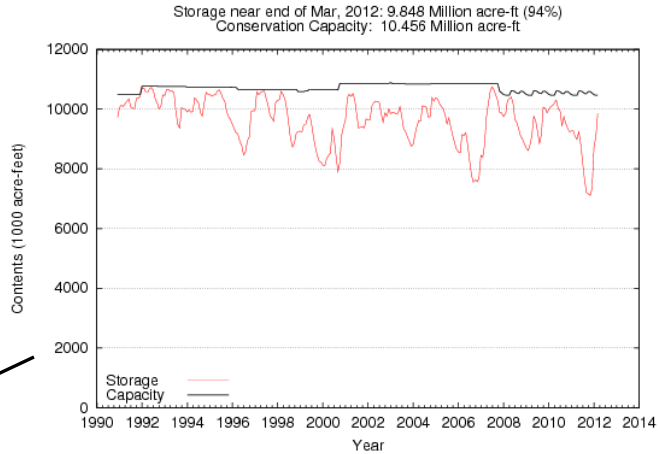
Streamflow Forecasts: 2011 vs 2012

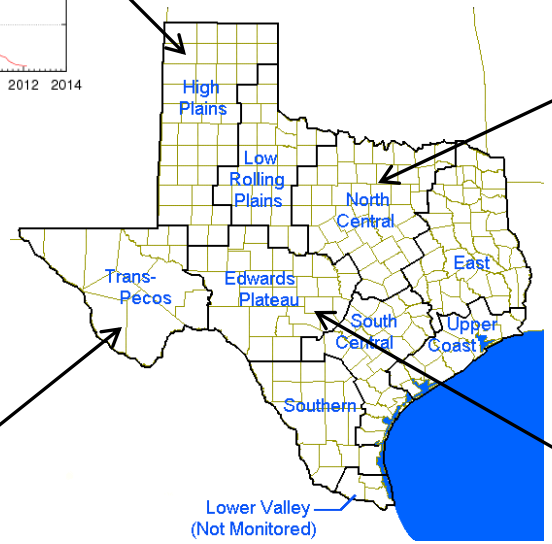


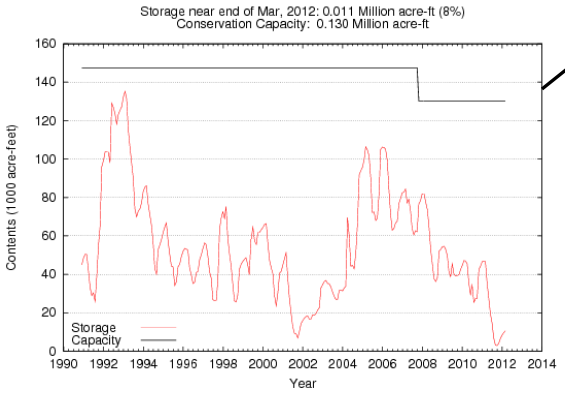


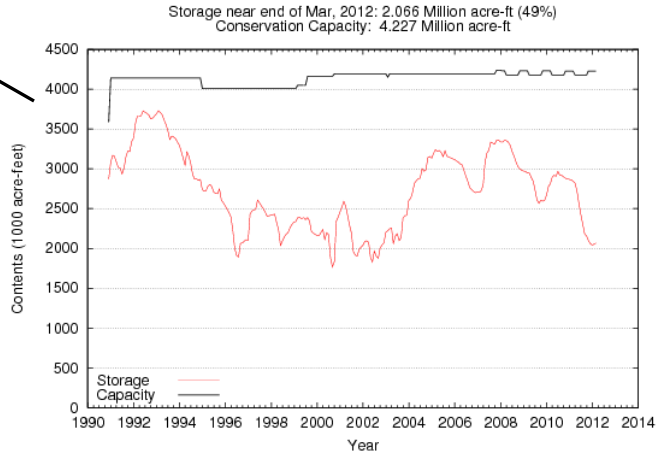
Texas Reservoir Storage











http://midgewater.twdb.texas.gov/Reservoirs/TWC/regnStorg.html

NM Reservoirs

- The southern basins are already mostly melted out and are expected to see well below average runoff, and with no reservoir storage in these basins, the impacts will be immediately evident
- The northern basins, which provide most of the reservoir storage in the state, are also forecast to be significantly below average overall, so the potential for building any reservoir storage during this runoff season is poor
- In addition to the very low runoff forecasts for the year, reservoir storage in New Mexico remains below average for most of the state

Based on the April 1, 2012 New Mexico Water Supply Outlook Report

NM Reservoir Summary

RESERVOIR	CURRENT AS % CAPACITY	LAST YR AS % CAPACITY	AVERAGE AS % CAPACITY	CURRENT AS % AVERAGE	CURRENT AS % LAST YR
HERON	59	56	66	88	104
EL VADO	49	57	57	86	86
COCHITI	10	11	11	94	97
ELEPHANT BUTTE	18	21	58	30	83
CABALLO	8	10	27	29	77
CONCHAS	5	8	75	7	59
COSTILLA	24	56	38	62	43
EAGLE NEST	51	66	63	81	76
LAKE AVALON	73	25	40	181	290
NAVAJO	77	78	73	106	99
SANTA ROSA	1	5	14	10	28
SUMNER	5	17	38	12	28

Based on the April 1, 2012 New Mexico Water Supply Outlook Report

NM Summary and Issues

- It is highly unlikely we will see any improvement in these storage levels this year
- Water managers need to be planning on a well below average runoff and reservoir storage for the most part
- Mexico requested its allotment of water 6 weeks before US was ready

Based on the April 1, 2012 New Mexico Water Supply Outlook Report

Unmanaged Water Bodies

- Burn Lake in Las Cruces
- Created in the 1960s unintentionally from construction; hit water table
- Based on informal interviews, this is first time it has been empty

TX Agricultural Crop Impacts

- Wheat in West Central Texas deteriorated from inadequate rainfall
- Livestock producers in Southeast Texas were able to cut down on supplemental feeding
- Producers drilling wells in South Plains of Texas
- Cattle in Coastal Bend of Texas suffering from bloat
- Livestock producers in Far West Texas continued to give minerals and supplemental feed to their animals
- Livestock producers in the Texas Panhandle continued to give supplemental feed to their cattle

From Texas crop report

Water Stress to Pecans Results in:

- Increased percentage sticktights
- Increased premature germination (vivipary)

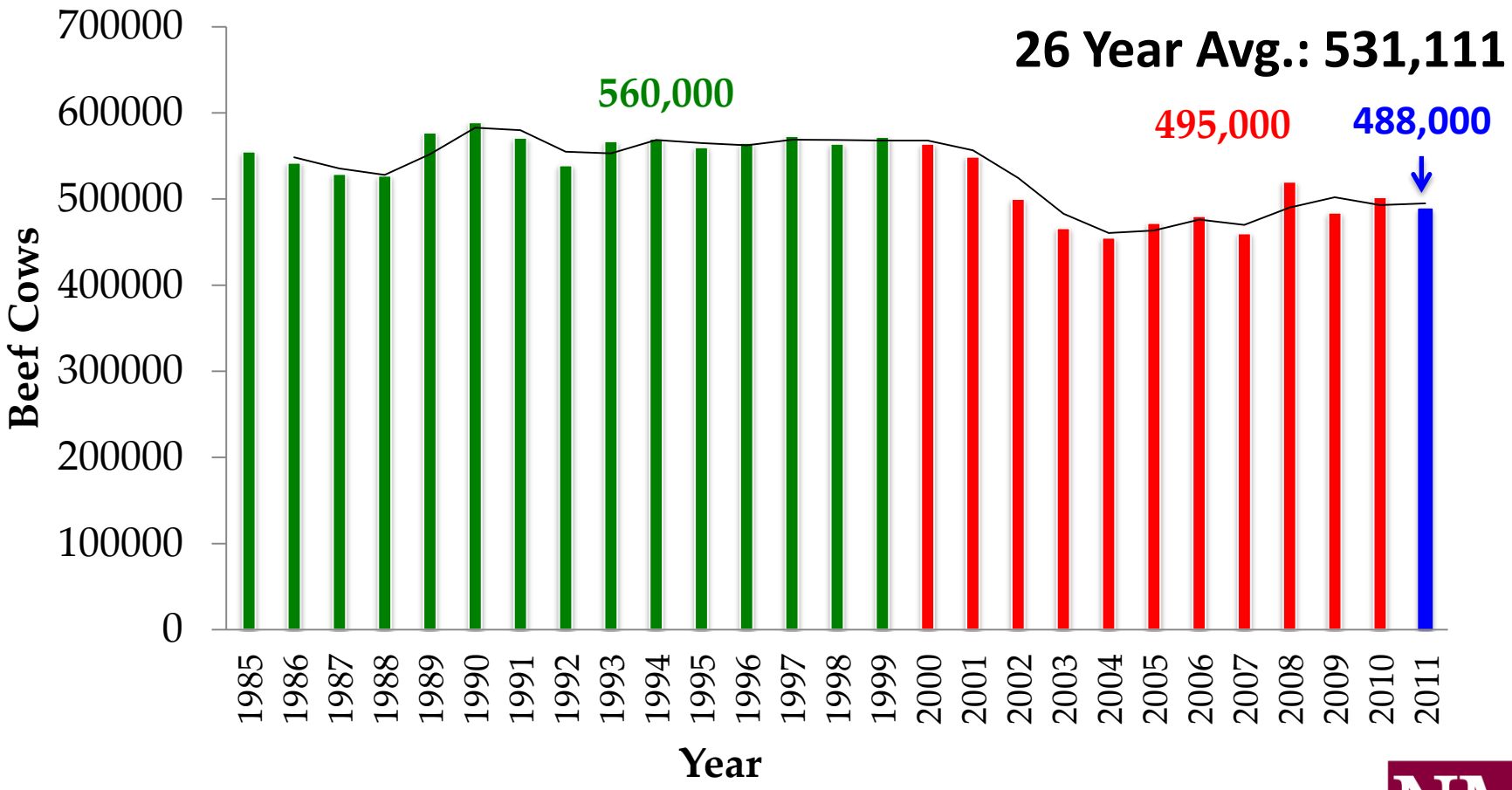
- Increased fruit abortion
- Decreased yield
- Decreased trunk growth
- Decreased nut weight
- Decreased percent kernel
- Pecans sensitive to saline groundwater

Pests: Some good, some bad

- Positive impacts to viticulture: less mold
- Bark beetle impacts in Sacramento Mtns
  - At higher rates than 2010
  - Pine die-offs – adds to dry fuel loading

- Positive impacts: Less weeds

NM Beef Cow Inventory (1985-2011)



Source: www.nass.usda.gov

Courtesy of Dr. Manny Encinias, NMSU

NM Beef Cow Exports

State Totals[a,b]

Year	Pasture	Sold	Harvested	Total	Cows to be Replaced[c]
2010	14,792	6,861	27,392	49,045	34,253
2011	30,397	13,981	38,819	83,197	**52,800**
Total	45,189	20,842	66,211	132,242	87,053

[a]NMLB Export Data Jan. 1 to Dec. 31 – 2010 and 2011

[b]Beef cows exported from NM Ranches; does not include sale barn exports

[c]Estimated cows to be replaced; equal to beef cows sold out of state and harvested

Source: 2011 NMLB

Courtesy of Dr. Manny Encinias, NMSU

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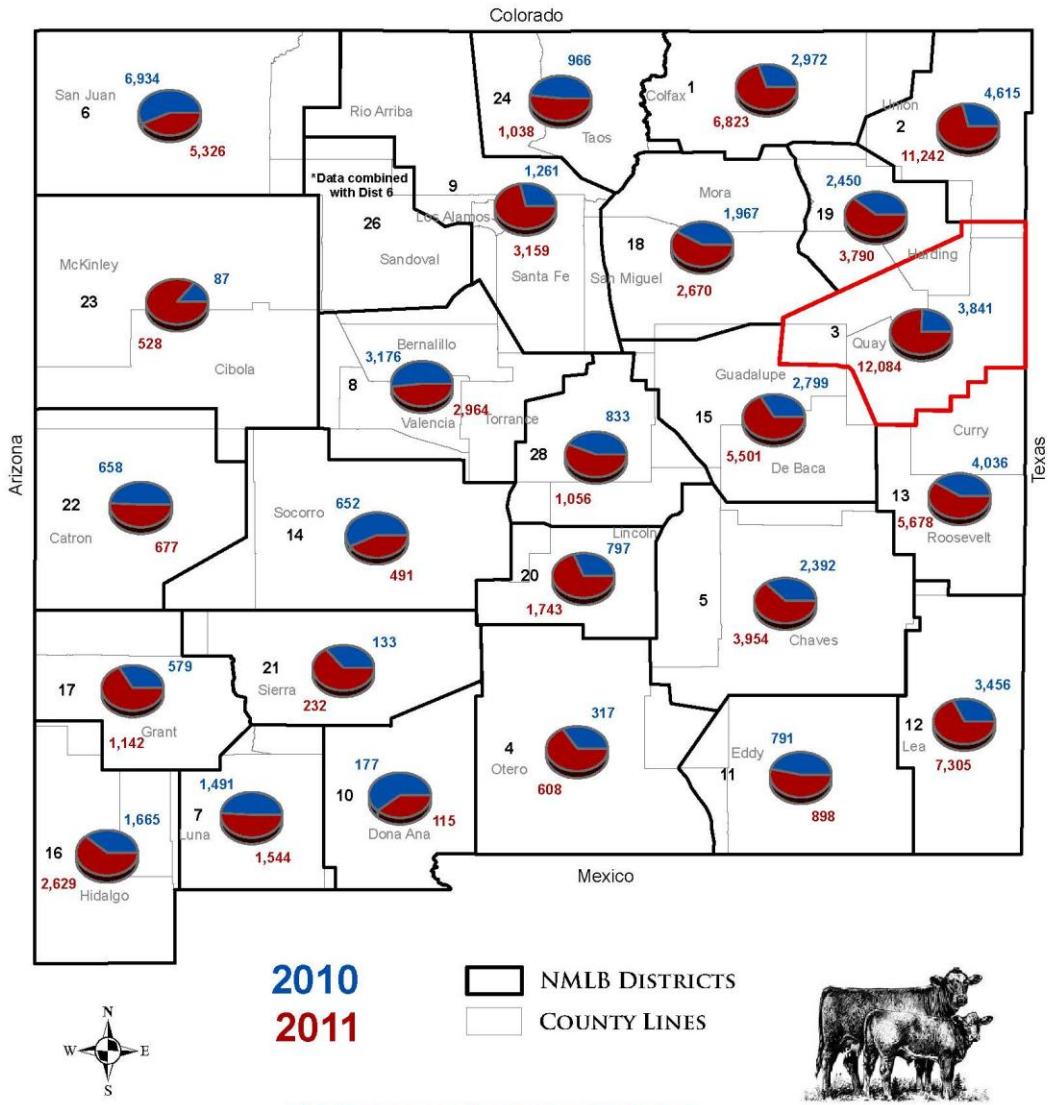
NM Beef Cow Exports
2010 & 2011

Cows inspected from premise to outside of New Mexico



District 3 is noted as having the highest head count increase in exports at 8,243

Beef Cow Exports

- 9 Eastern-most Brand Districts

2010

- 25,428 (51.8%)

2011

- **59,047 (71.0%)**

2010-2011

- 132,242 (state)
- 84,475 (63.9%)

Source: 2011 NMLB

Courtesy of Dr. Manny Encinias, NMSU

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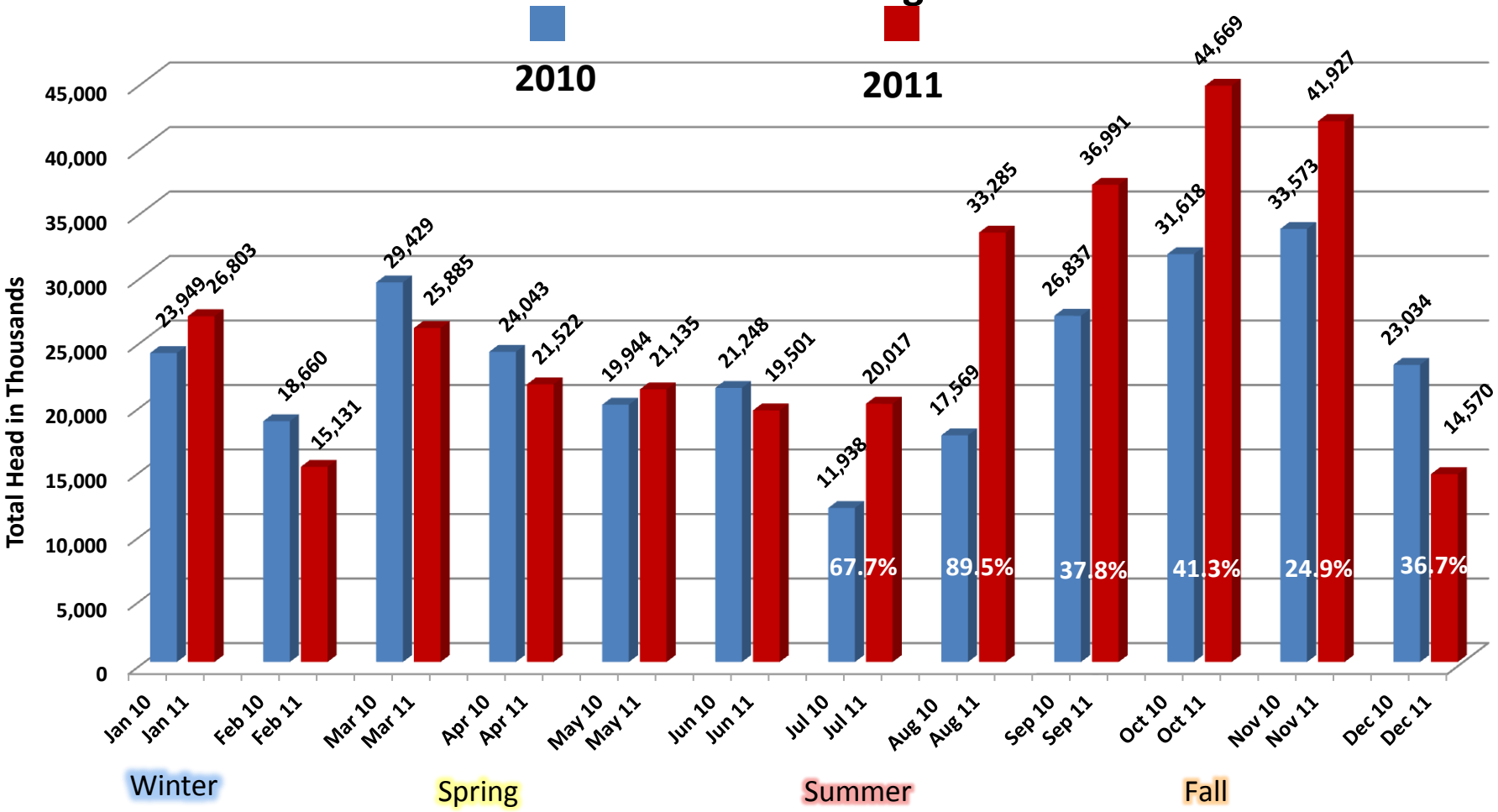
Total # of All Beef Cattle Sold Through NM Auction Markets



Year	NM Auction Market Sales
2010	281,842
2011	321,436
	+ 39,594

Source: 2011 NMLB

Courtesy of Dr. Manny Encinias, NMSU

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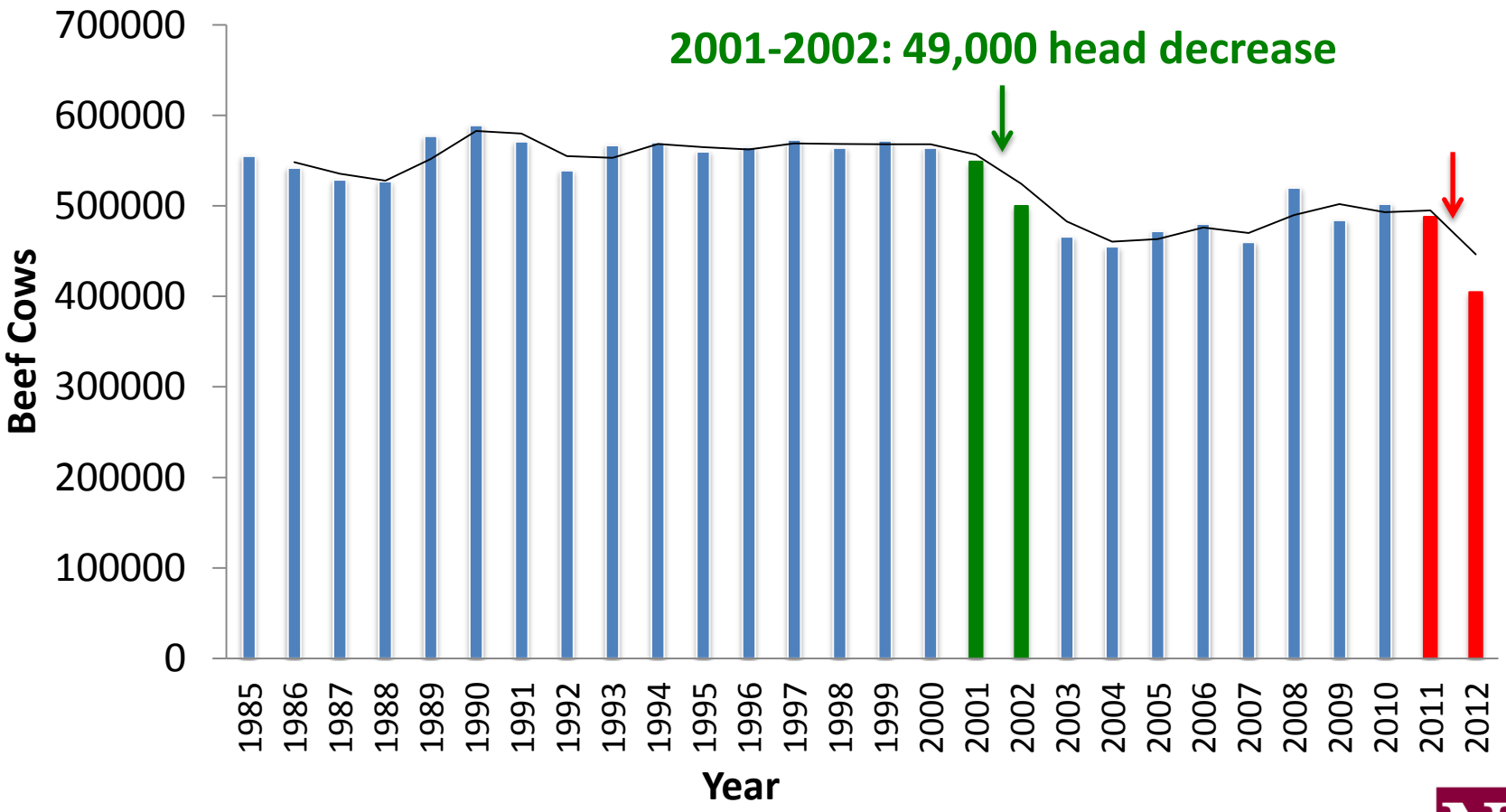
NM Beef Cow Inventory (1985-2011)

***Thru Dec. 31st, 83,197 head is the single largest decline in last 26 years**

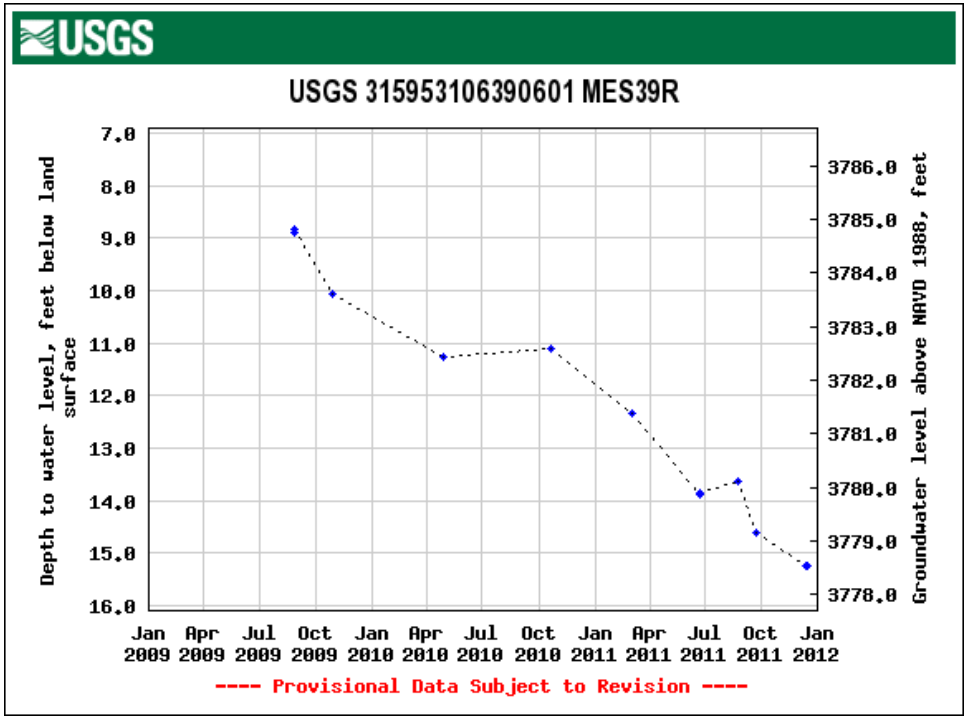


www.nass.usda.gov

Courtesy of Dr. Manny Encinias, NMSU

Impacts to Groundwater

- Salinity has been increasing as high water demand continues
- Groundwater depth has been increasing over time



Example from the Mesilla Valley in southern NM

http://nwis.waterdata.usgs.gov/usa/nwis/gwlevels/?site_no=315953106390601

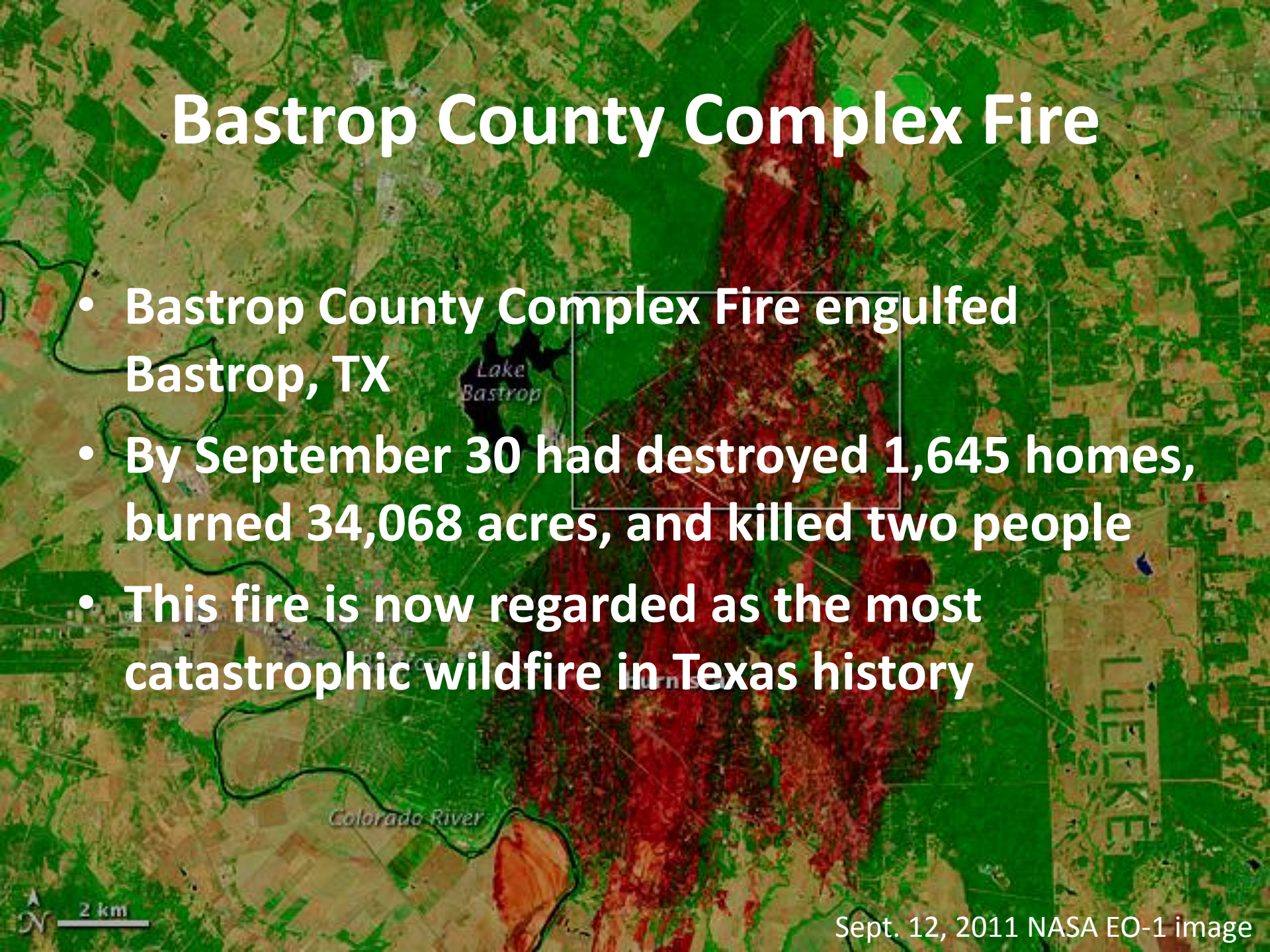
2011 Texas Wildfire Summary

- 2011 fire season statistics (Nov. 15, 2010-Oct. 31, 2011)
  - 30,457 fires
  - 3,993,716 acres
  - 3,017 homes destroyed
  - 2,792 other structures destroyed
  - 16,410 personnel mobilized to fight fires (from all 50 states)

- Southern Plains Outbreaks (as determined by the National Weather Service)
  - Feb. 27
  - March 22
  - April 3, 9, 14, 15, 26
  - May 24
  - June 20

Bastrop County Complex Fire

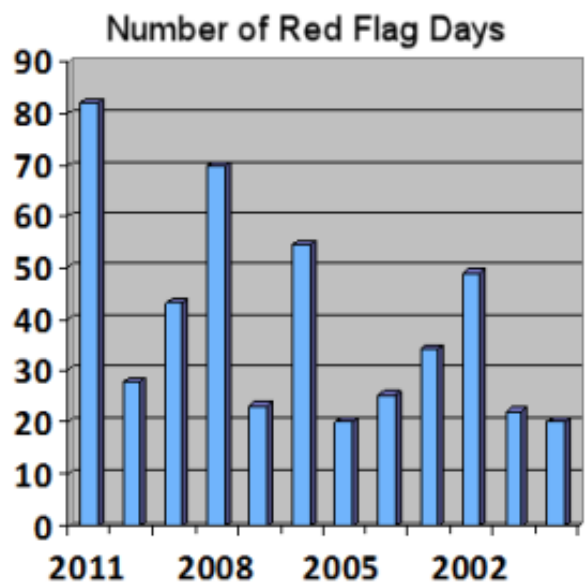
- Bastrop County Complex Fire engulfed Bastrop, TX
- By September 30 had destroyed 1,645 homes, burned 34,068 acres, and killed two people
- This fire is now regarded as the most catastrophic wildfire in Texas history

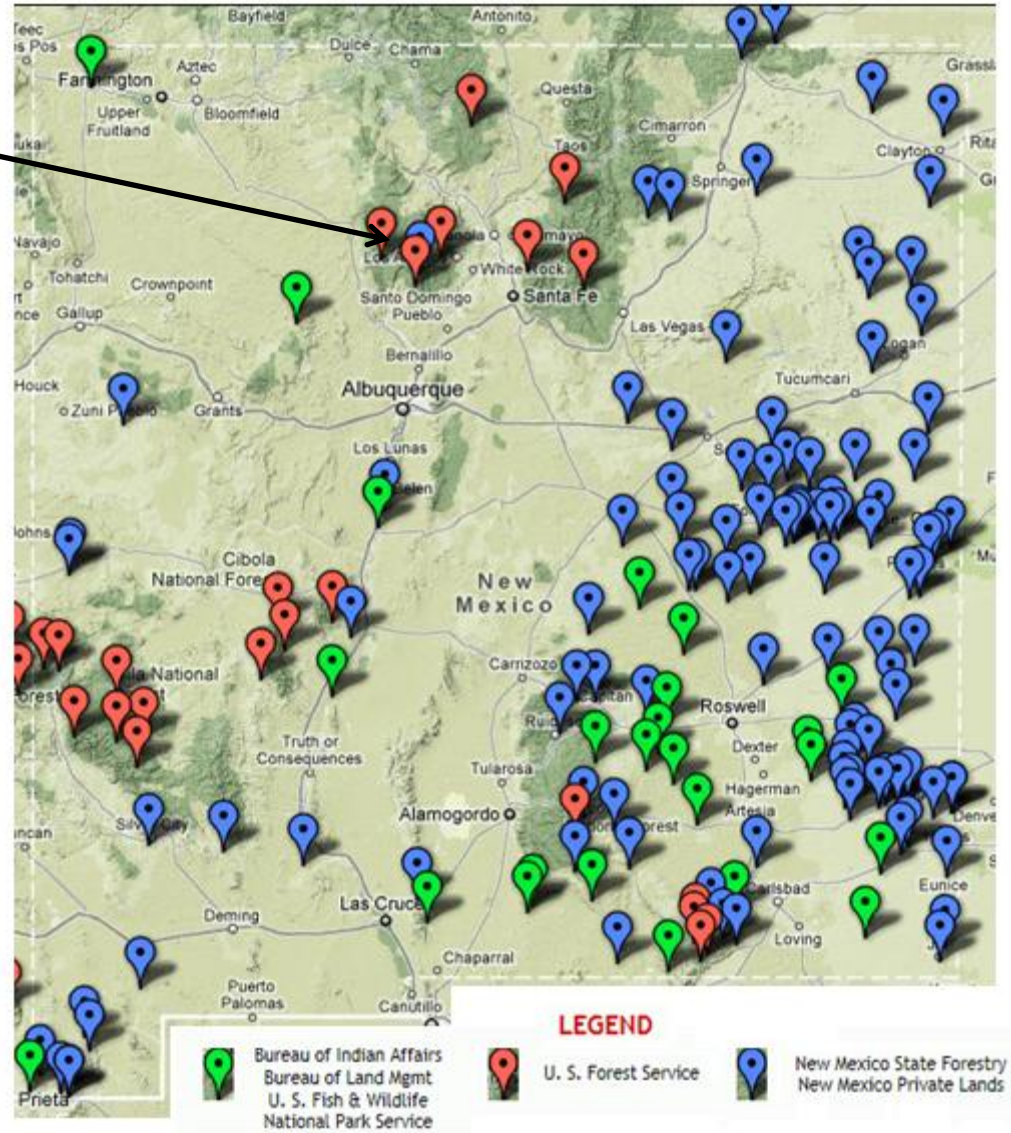


Sept. 12, 2011 NASA EO-1 image

2011 NM Wildfire Summary

- Las Conchas fire was the largest in NM history
  - 156,593 acres





http://www.srh.noaa.gov/abq/?n=climonhigh2011annual-firewx

Health, Safety, and Air Quality

- Smoke
  - 2011 brought major impacts to NM and TX from wildfire smoke
- Dust
  - 2011 and 2012 had above average number of dust storms in southern NM and west TX
  - March 18, 2012 storm was worst since 2003
    - More than 10x EPA standards for 24-hour PM_{10}
  - Similar conditions in West Texas

Worst blowing dust day since 2003

Photo taken in Las Cruces, NM around noon

Visibility decreased to 1/4 mile at times

Resulted in multiple road closures

You know you live in a desert when...

- ...Special Weather Statement...

NWS El Paso, TX/Santa Teresa, NM ..... 704 pm MDT Sun 4/1/12

...**Water returning to the Rio Grande this week...**

On April 1st, the U.S. Bureau of Reclamation began releasing water from Caballo Dam into the Rio Grande. For several months the Rio Grande in parts of Dona Ana County had run dry. Many people have taken advantage of the dry river bed as a walking or horse-back riding trail or a trail for four wheelers...but very soon this option will no longer be available. The water will slowly make its way south, so **people should be aware that the river will once again fill with water**. It is estimated that the water will arrive in Las Cruces around Wednesday April 4th...

Slide from Ed Polasko, NWS ABQ

Thanks

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