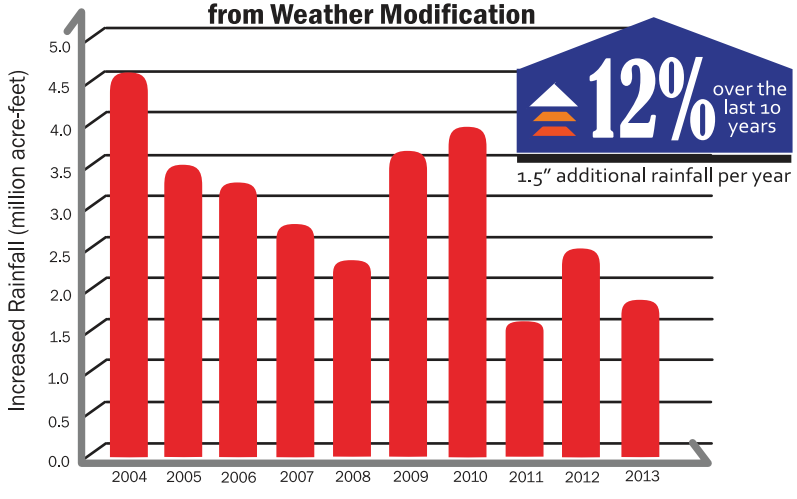
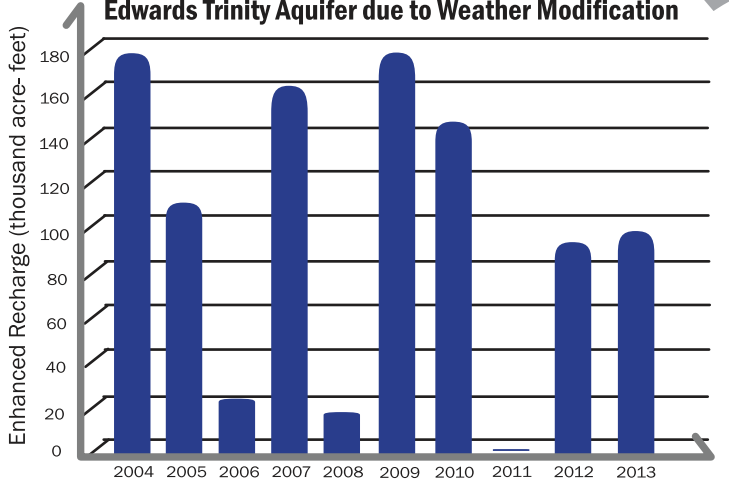
TEXAS WEATHER MODIFICATION ASSOCIATION

10 - Year TWMA Increase from Weather Modification

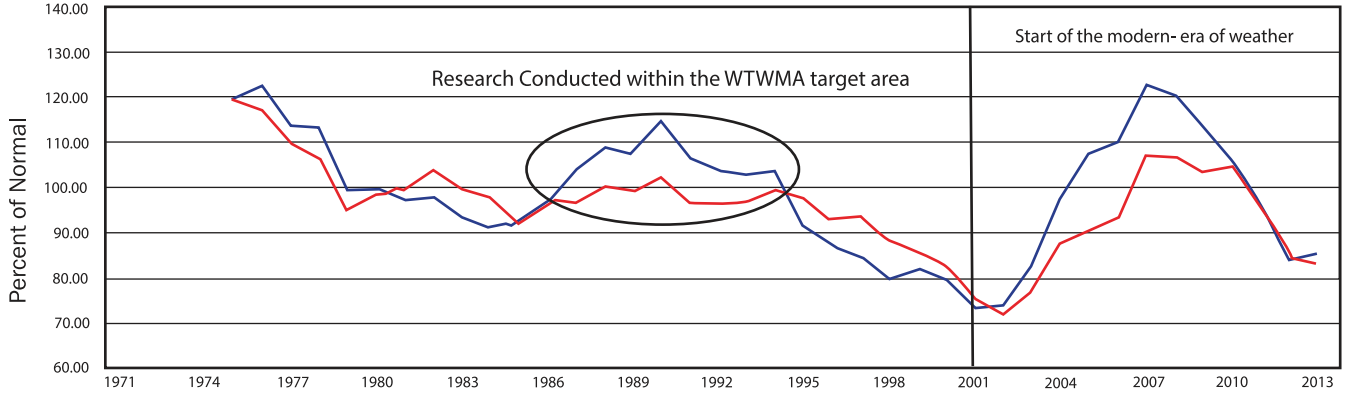


10-Year Enhanced Recharge of the Edwards Trinity Aquifer due to Weather Modification



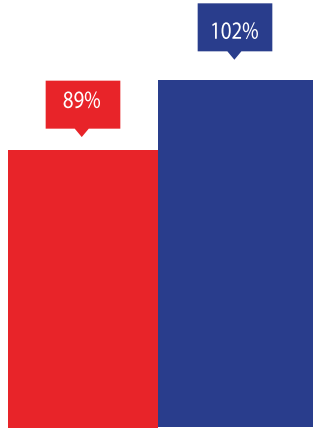
Roughly
100,000
acre-feet
of additional recharge can be expected from weather modification over karst aquifers in a semi - arid climate.

5 - Year Moving Average of Percent of Normal Rainfall within (blue) vs. outside (red) of the WTWMA Target Area



Since 2004, within the target area, percent of normal rainfall was 102%, with only 89% of normal outside of the target area.

13%
DIFFERENCE



1891
Robert Dyrenforth was the first to try rainmaking experiements near Midland.

1910
CW Post attempted to modify the weather along the Caprock using kites and dynamite.

1946
Schaefer and Langmuir discovered that dry ice in a cloud provokes the crystallization of water vapor.

1967
Texas Weather Modification Act of 1967 is introduced.

1971
CRMWD introduces first operational program in Texas

1995
WTWMA becomes second operational program in Texas

1997
STWMA is developed

1999
SWTREA is developed

2000
PGCD is developed

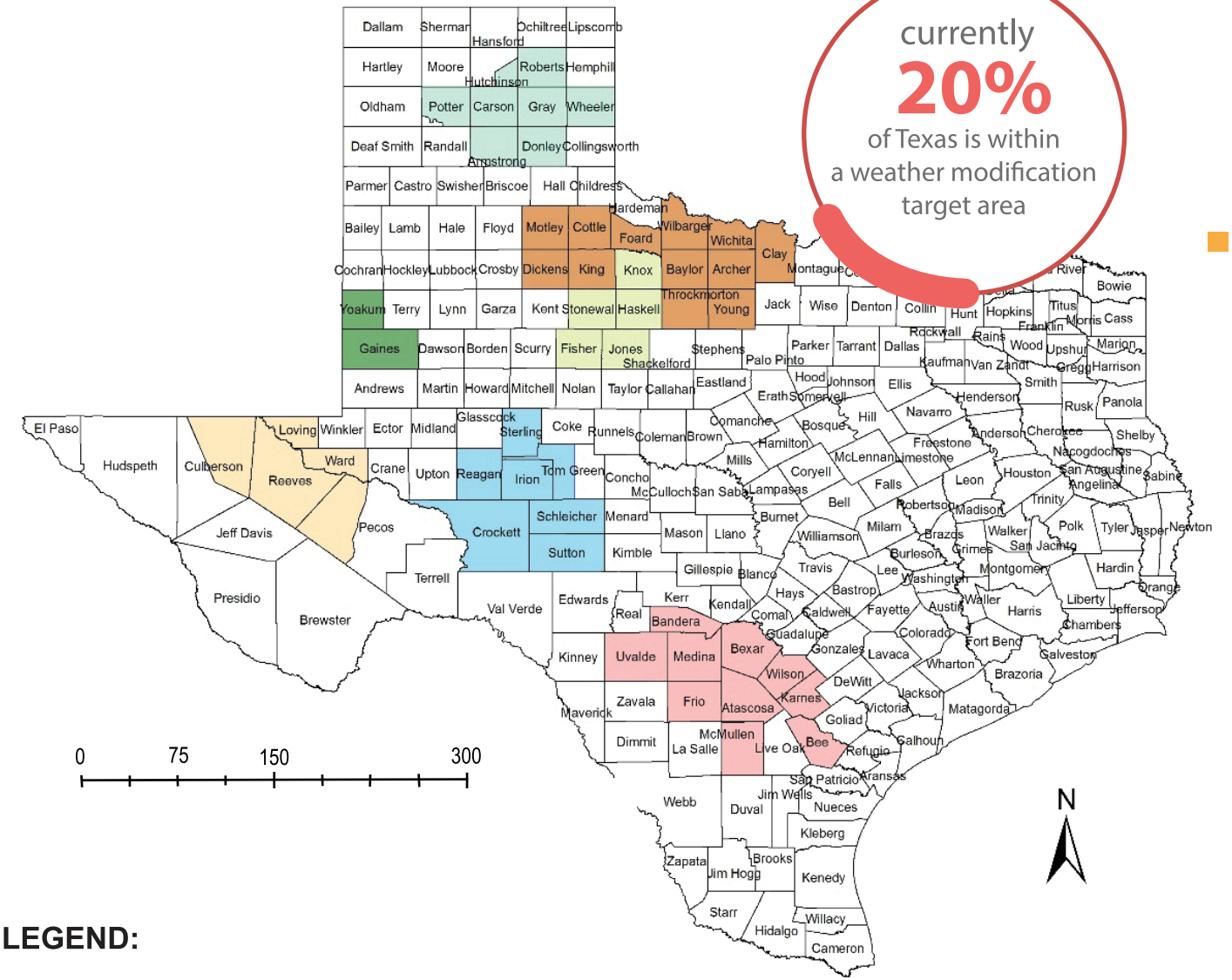
2002
SOAR is developed

2003
TPWMA is developed.
Texas Department of Licensing and Regulation oversees permits and licenses.

2014
Wichita and Rolling Plains weather modification programs are developed.

TEXAS WEATHER MODIFICATION ASSOCIATION PROGRAM TARGET AREAS

currently **20%** of Texas is within a weather modification target area



LEGEND:

- West Texas Weather Modification Association
- Trans-Pecos Weather Modification Association
- Panhandle Groundwater Conservation District
- South Texas Weather Modification Association
- Rolling Plains
- SOAR
- Wichita Falls

TWMA FINANCIAL DATA

For $0.04 / Acre

one additional inch of precipitation can bring benefits of

1in **$3-$6 MILLION** per year

across each target area

(Johnson, 2014)

One additional inch of water can improve the four major crops grown in West Texas by

$10 - $34 / Acre

(Wyatt, Carver, 1997)

For every dollar spent, one additional inch of precipitation from weather medication will have a return of

$19-$38

(Johnson, 2014)

Johnson's (2014) benefit cost analysis are consistent with Wyatt and Carver's (1997) study and Johnson's (2001) study.