

***Sandy Land Underground Water Conservation District
Agricultural Water Conservation Program
Drip Irrigation Project - Watermelons***

TWDB Contract Number: 2004-358-006

Contractor's Vendor Identification: 75-2309394

Address: Sandy Land Underground Water Conservation District
P.O. Box 130
Plains, TX 79355

FINAL
REPORT

***Sandy Land Underground Water Conservation District
Agricultural Water Conservation Program
Drip Irrigation Project***

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Plains, TX 79355

2004 Season

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District

June 23, 2004

Filter System
purchased and used
for drip irrigation on
watermelons in
Yoakum County
2004.

June 23, 2004

Water being put
through filters and
layflat lines so workers
can complete
installation of drip
tubes.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District

June 30, 2004

Workers inserting drip tubes into layflat. Drip lines come out of layflat and go underground.



June 30, 2004

Completed installation of drip lines into layflat.



Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District

July 9, 2004

Transplanting seedless watermelon. Five (5) rows of watermelons have the drip lines beneath them. Eleven (11) rows do not have drip lines beneath them.



July 9, 2004

Close up of machine used to put seedless watermelon transplants into the ground.



Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



July 9, 2004

Shown here are seedless watermelon transplants soon after planting.

July 19, 2004

Filter system with fertilizer tank on red trailer. Fertilizer is being injected into the layflat during a watering cycle. Approximately one-third of the fertilizer was used at this drip site as compared to a conventional center pivot system.



Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



July 28, 2004

Seedless watermelons
about one month after
planting.



August 20, 2004

Seedless watermelons about
fifty (50) days after planting.
Small melons are visible in
foreground of plants. Notice
the lack of weeds which is an
additional benefit to growing
watermelons with drip
irrigation. (a lot less herbicide
is used).

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



August 20, 2004

Closeup of small
seedless watermelons.



September 13, 2004

Truck runs are visible to
the left side of the picture.
These melons have been
picked one time. Melons
are much more plentiful
and will be picked every
other day until frost.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



September 17, 2004

Trucks at the watermelon shed after melons have been picked. Melons will be unloaded and boxed for shipments to markets in other parts of Texas and other states as well.

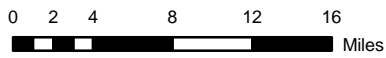
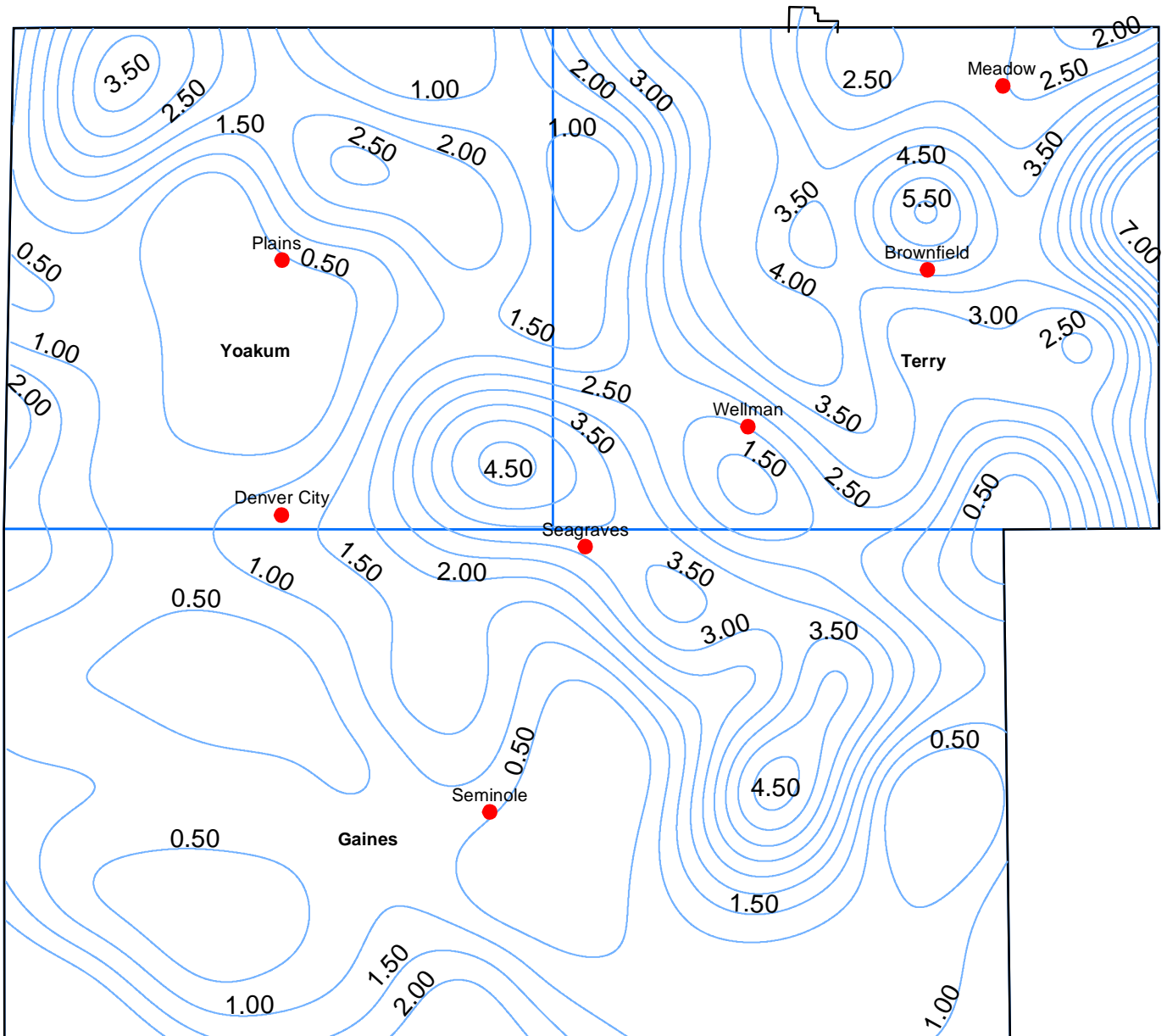


September 23,
2004

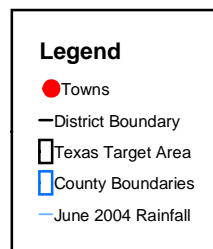
Assorted varieties of watermelons grown in Yoakum County for sale to locals and travelers through Plains, Texas.

Southern Ogallala Rainfall Enhancement Program

June 2004 Rainfall

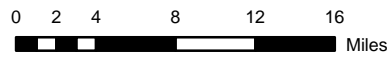
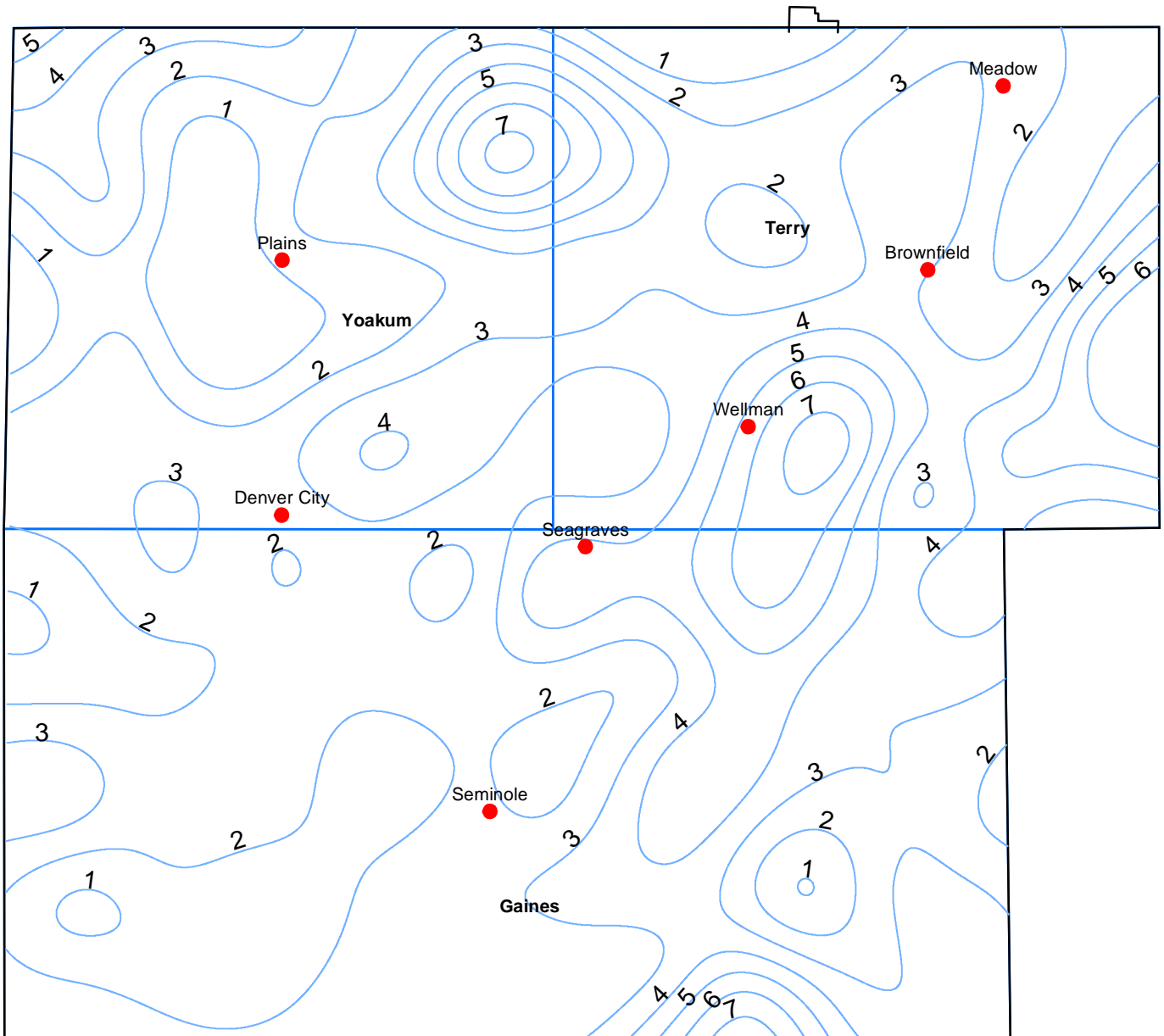


Contour Interval = 0.50 in

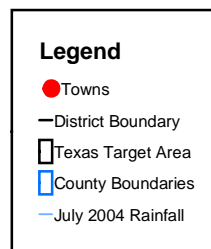


Southern Ogallala Rainfall Enhancement Program

July 2004 Rainfall

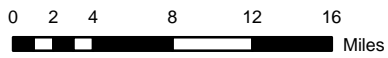
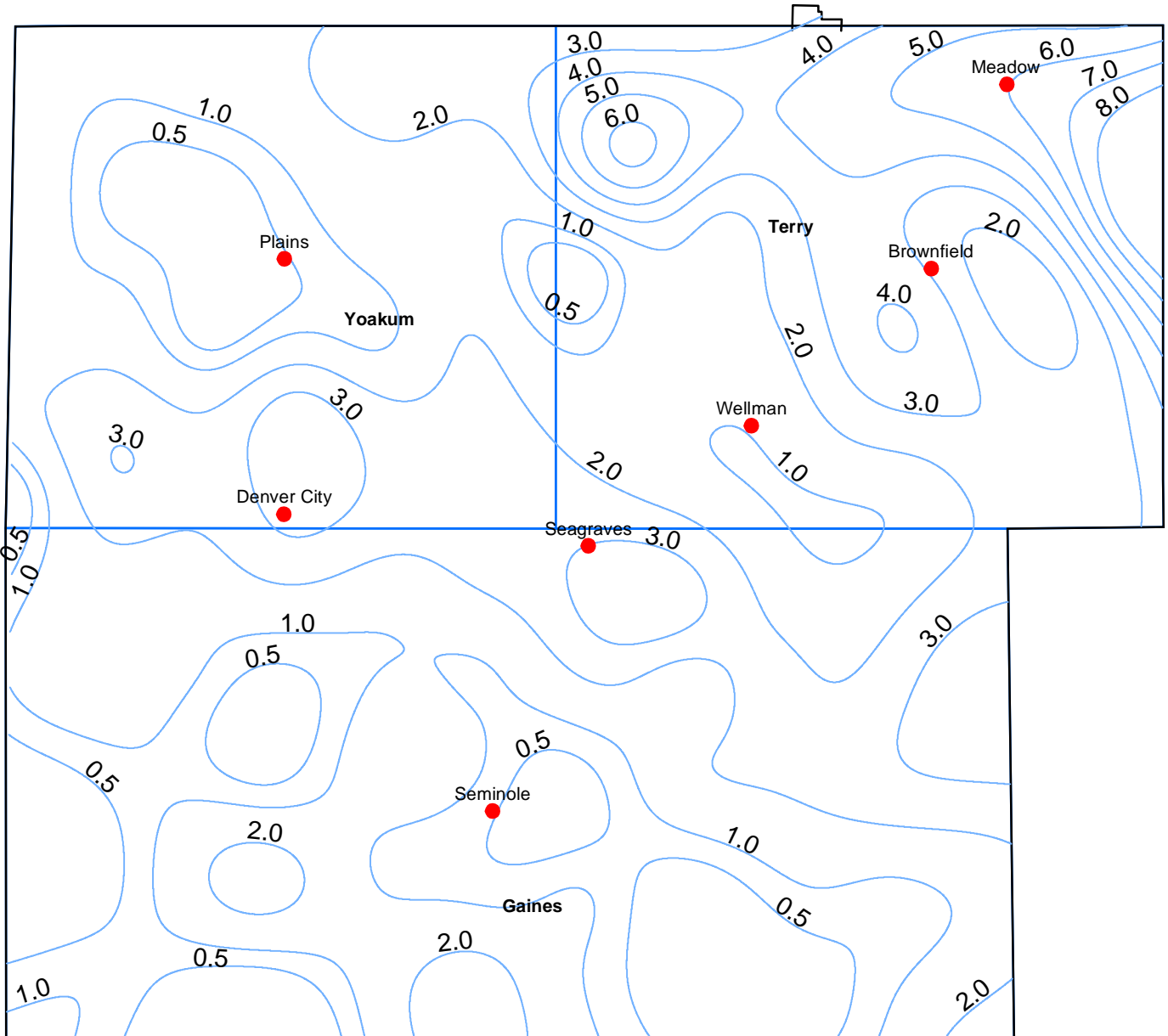


Contour Interval = 1 in



Southern Ogallala Rainfall Enhancement Program

August 2004 Rainfall



Contour Interval = 1 in
*Note: 0.5 in level also shown

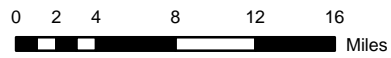
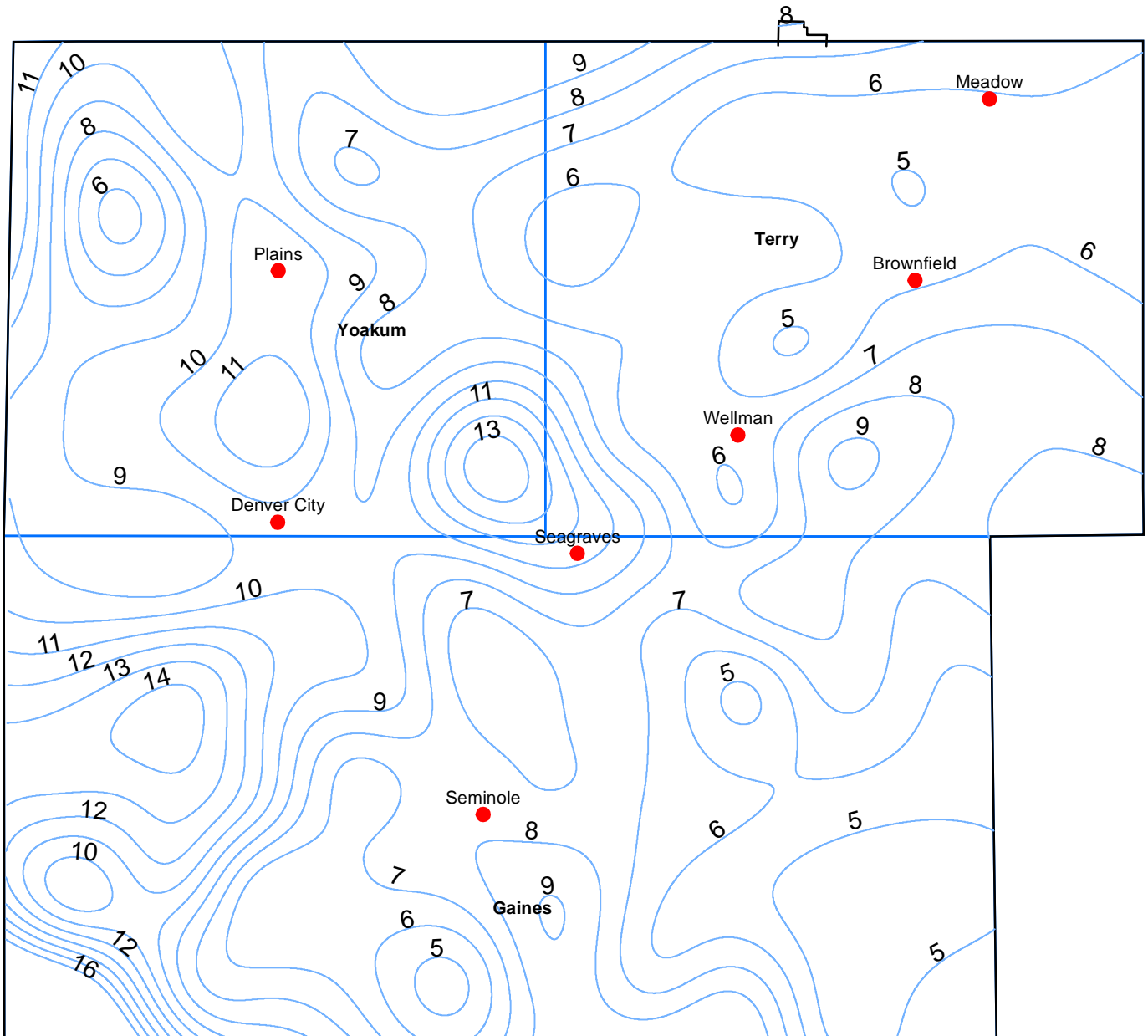
Legend

- Towns
- District Boundary
- Texas Target Area
- County Boundaries
- August 2004 Rainfall



Southern Ogallala Rainfall Enhancement Program

September 2004 Rainfall



Contour Interval = 1 in

Legend

- Towns
- District Boundary
- Texas Target Area
- ▭ County Boundaries
- September 2004 Rainfall



**SANDY LAND UWCD
RAINFALL MEASUREMENTS
YOAKUM COUNTY, TEXAS
2004**

SECTION #	1/31/2004	2/28/2004	3/31/2004	4/30/2004	5/31/2004	6/30/2004	7/31/2004	8/31/2004	9/30/2004	10/31/2004	11/30/2004	12/31/2004	TOTALS
575	0.30	0.20	2.25	2.60	0.00	0.00	0.00	0.35	10.00	2.45	1.70	0.00	19.85
579	0.50	1.80	2.25	6.40	0.00	0.70	2.00	1.40	9.10	1.20	1.00	0.00	26.35
535	0.60	0.40	1.40	4.40	0.00	0.80	0.50	1.20	9.25	1.20	1.55	0.00	21.30
852	0.45	1.80	1.20	4.80	0.60	1.70	2.60	0.40	8.90	1.00	5.00	0.00	28.45
793	0.70	2.20	1.40	4.20	0.70	0.80	2.90	3.00	9.10	0.80	5.50	0.20	31.50
832	0.55	1.90	1.55	5.10	1.00	0.70	2.80	2.40	9.80	0.70	4.95	0.10	31.55
759	0.90	2.20	1.30	3.70	0.00	1.90	4.10	2.80	9.00	4.20	4.20	0.10	34.40
753	0.85	2.00	1.90	2.90	0.20	4.60	3.00	2.40	13.50	1.60	5.00	0.20	38.15
563	0.95	2.60	1.65	3.80	0.00	1.70	2.90	2.00	8.20	0.20	2.55	0.50	27.05
568	0.85	2.00	1.55	3.80	0.00	0.80	1.60	0.80	8.00	2.85	4.80	0.00	27.05
432	0.20	0.80	2.20	3.90	0.00	1.10	1.90	1.30	9.00	5.10	6.10	0.20	31.80
1	0.40	2.70	4.10	4.70	0.10	2.20	2.80	1.40	7.25	7.80	5.85	0.20	39.50
265	0.60	1.80	2.20	4.80	0.00	1.80	7.00	1.40	7.10	3.90	5.30	0.30	36.20
255	0.95	1.30	2.10	3.80	0.40	2.60	2.60	1.60	7.10	3.80	4.65	0.40	31.30
308	2.20	2.10	1.05	3.20	0.00	0.00	0.00	0.00	2.80	3.30	4.25	0.10	19.00
187	0.55	0.70	2.70	3.70	0.00	2.30	1.10	1.05	10.35	3.80	4.40	0.00	30.65
163	0.50	1.20	2.40	4.20	0.00	3.40	3.00	0.95	8.25	3.55	4.35	0.20	32.00
167	0.20	0.90	2.25	3.90	0.00	1.50	4.20	1.40	11.10	2.95	3.90	0.40	32.70
298	0.20	1.40	3.10	5.20	0.00	1.10	2.10	1.65	10.80	3.00	4.65	0.50	33.70
342	0.40	0.90	1.60	5.60	0.00	1.20	2.70	0.20	5.80	3.85	4.30	0.10	26.65
34	0.65	1.20	2.15	3.90	0.00	1.40	2.90	1.85	8.55	2.35	4.35	0.00	29.30
148	0.60	1.40	1.95	3.90	0.00	1.10	2.10	2.60	8.50	3.05	4.80	0.50	30.50
371	0.50	2.70	1.15	3.40	0.00	0.70	1.51	0.54	10.40	4.50	4.20	0.50	30.10
420	0.35	1.80	0.8	4.20	0.00	0.40	0.90	0.60	7.40	5.75	4.75	0.00	26.95
673	0.65	2.40	1.2	3.80	0.70	0.00	2.10	3.30	11.60	1.80	4.70	0.00	32.25
714	0.70	1.80	1.85	4.30	0.20	2.20	1.80	1.55	8.95	0.80	5.25	0.00	29.40
Averages	0.63	1.62	1.89	4.16	0.15	1.41	2.35	1.47	8.84	2.90	4.31	0.17	29.91

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2005 Season

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



These watermelon transplants are sitting in trailers waiting to be planted by hand.



Sticks such as the one shown are used to prepare a hole for watermelon transplants.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



Workers planting
watermelons
by hand.



Watermelons in field
with drip tape showing
at the end of the row.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



This photograph was taken about one week after the watermelons were planted.



Watermelons with drip tape showing at the end of the row.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



Watermelons during the second week of August.



This photograph was taken about six weeks after the watermelons were planted.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



This picture shows watermelon plants with a truck run between. There are five rows of watermelons planted on forty-inch rows in each area for a total of 16.67 feet of watered area with approximately 36 feet that is unwatered between. Watermelon vines can spread a great distance, but only the base of the plant needs water, so the drip system allows the producer to water only area of the plant and not the vine extensions or the truck run between.



In this photo, it can be seen that the truck run has very few weeds. This land is in the 36 feet area of drip irrigation that is not watered.

If this road was under a conventional pivot system it have been watered and it would therefore have more weeds. This would require more herbicide to control the weeds. So, the drip irrigation saves not only water, but also the additional herbicide that the producer would have had to apply.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



This photograph shows the field of watermelons with drip irrigation during the harvest season. The watermelons are picked every few days during the harvest.



Watermelon harvesting is not mechanized, but done by hand. The watermelons are picked by hand and then loaded onto a truck which, in turn, takes the melons to the broker.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



These watermelons are being loaded onto the truck which will take them to town. There are usually at least 2 people in the truck to stack the watermelons.



The picture to the left shows the workers inside the truck who are stacking the watermelons.

Drip Irrigation Project - Watermelons

Sandy Land Underground Water Conservation District



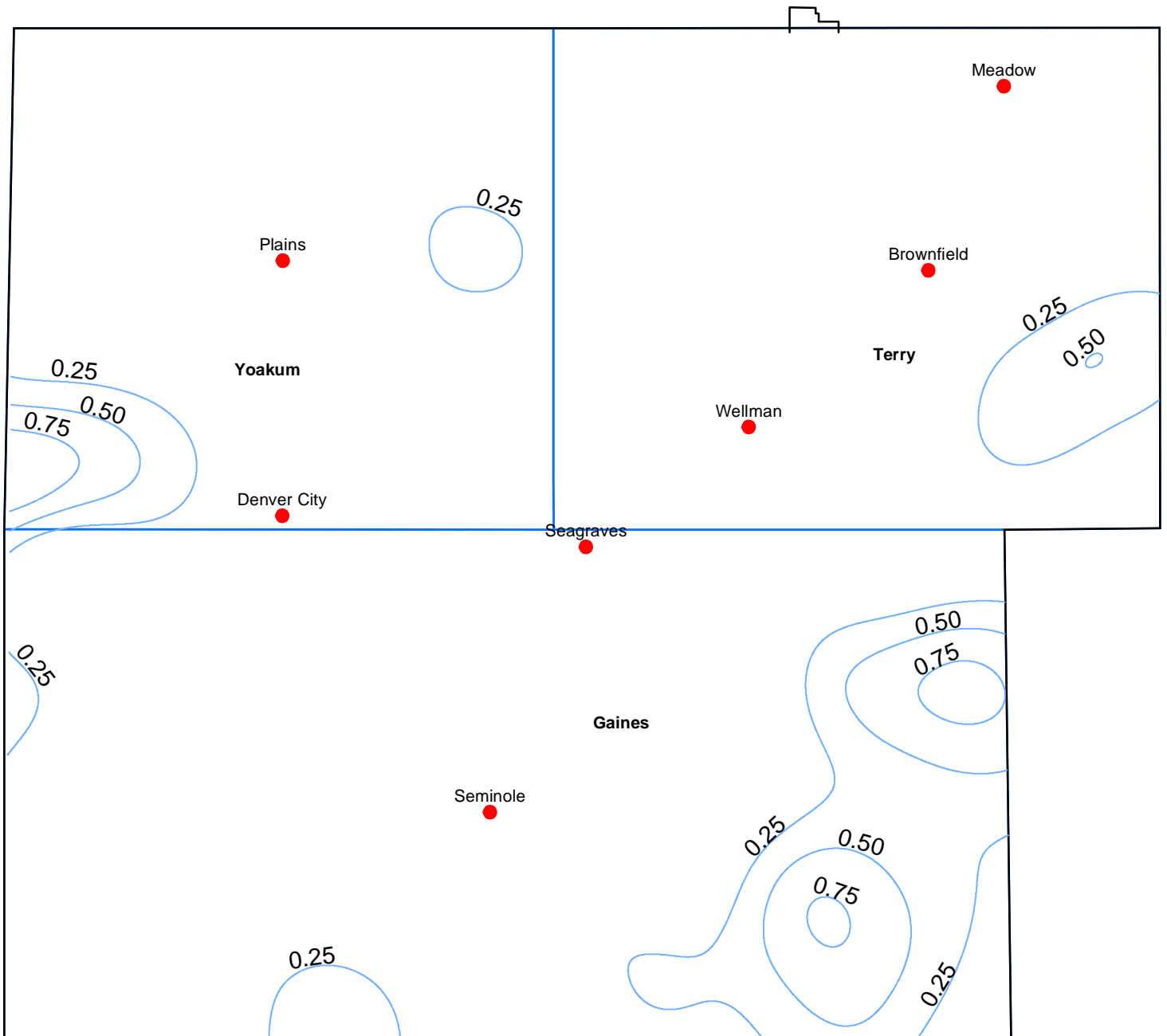
More photographs taken during the harvest season.



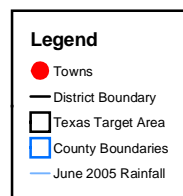
This is a watermelon field toward the end of the harvest. The vines are beginning to look ragged.

Southern Ogallala Rainfall Enhancement Program

June 2005 Rainfall

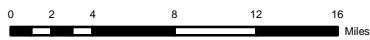
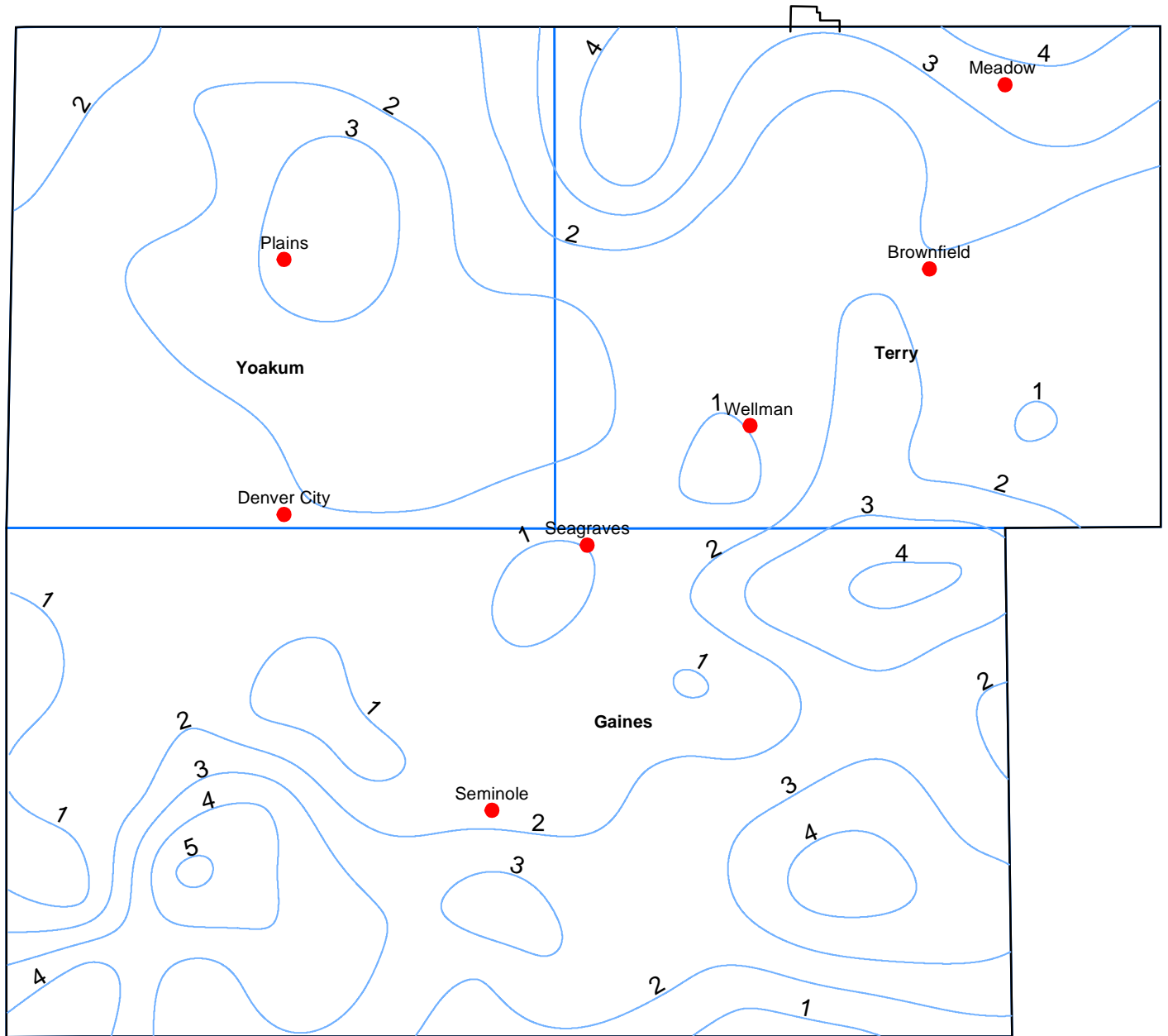


Contour Interval = 0.25 in



Southern Ogallala Rainfall Enhancement Program

July 2005 Rainfall



Contour Interval = 1 in

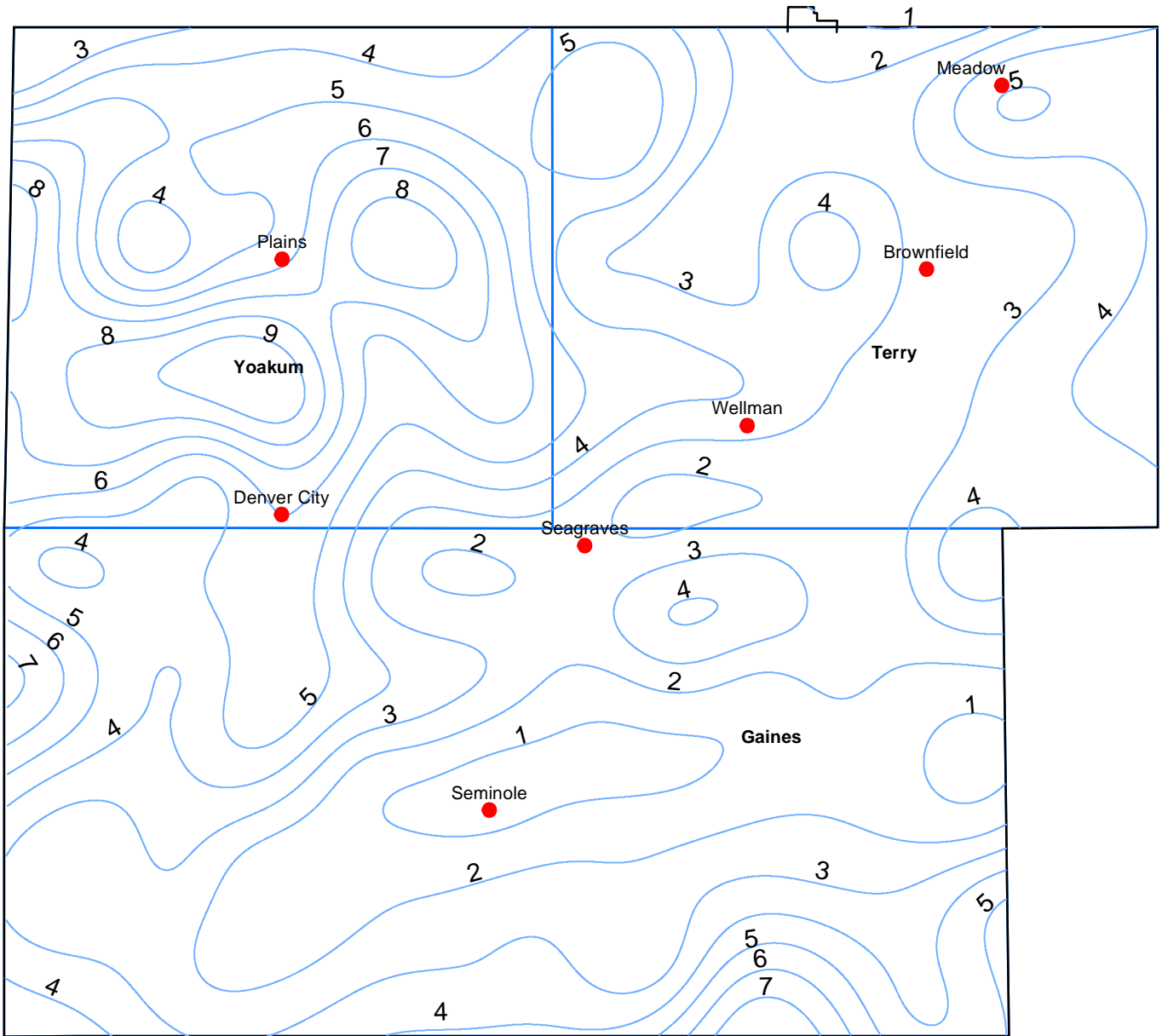
Legend

- Towns
- District Boundary
- Texas Target Area
- County Boundaries
- July 2005 Rainfall



Southern Ogallala Rainfall Enhancement Program

August 2005 Rainfall



0 2 4 8 12 16 Miles

Contour Interval = 1 in

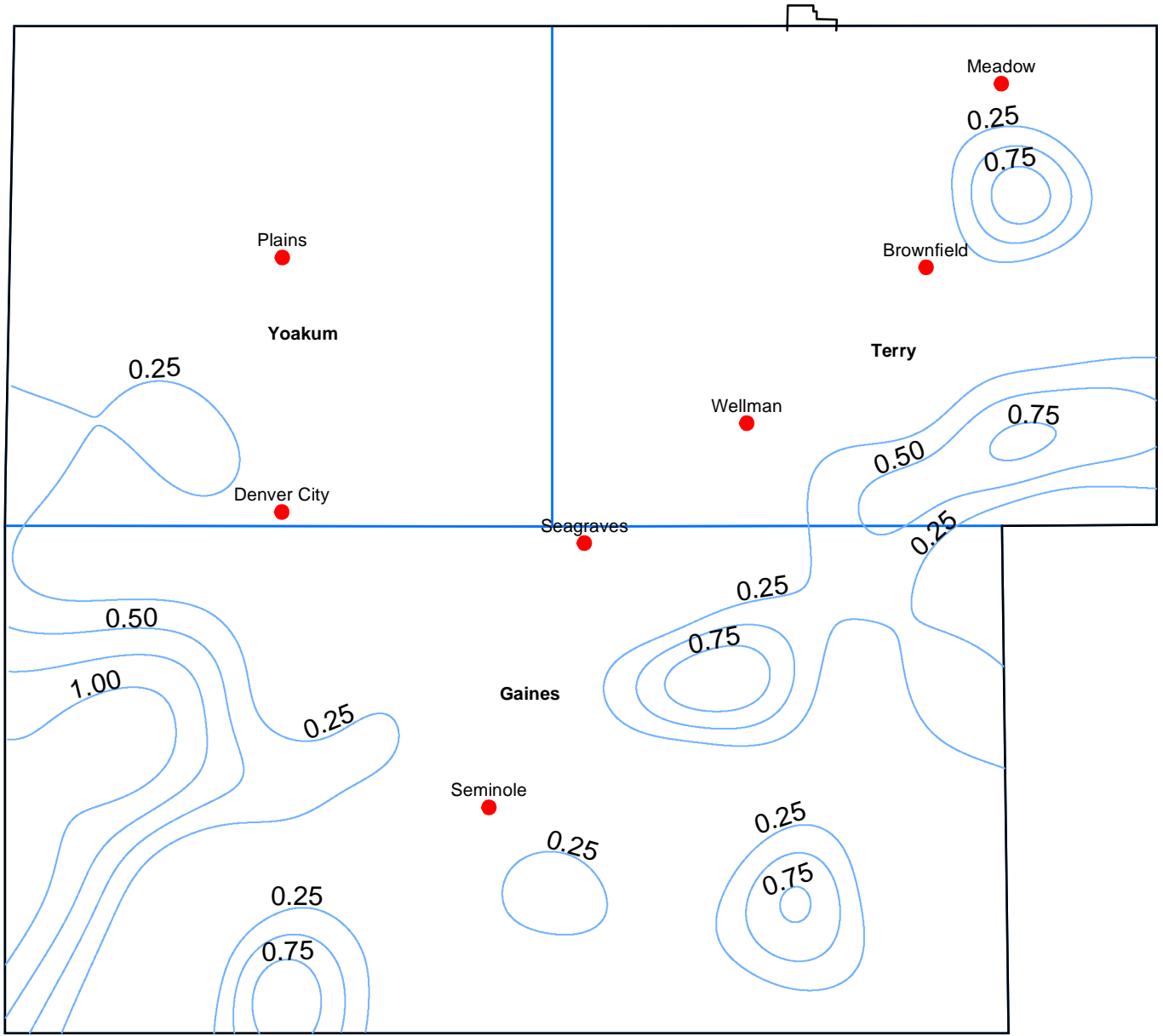
Legend

- Towns
- District Boundary
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- August 2005 Rainfall

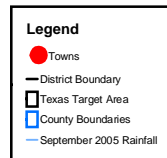


Southern Ogallala Rainfall Enhancement Program

September 2005 Rainfall



Contour Interval = 0.25 in



**SANDY LAND UWCD
RAINFALL MEASUREMENTS
YOAKUM COUNTY, TEXAS
2005**

SECTION #	1/31/2005	2/28/2005	3/31/2005	4/30/2005	5/31/2005	6/30/2005	7/31/2005	8/31/2005	9/30/2005	10/31/2005	11/30/2005	12/31/2005	TOTALS
575	0.70	0.60	0.10	0.20	6.60	0.00	2.40	9.10	0.10	2.25	0.00	0.00	22.05
579	0.00	0.00	0.05	0.10	3.00	0.00	1.80	8.05	0.15	1.15	0.00	0.00	14.30
535	0.25	0.10	0.00	0.25	4.20	0.00	broken	7.80	0.10	1.15	0.00	0.00	13.85
852	0.80	1.55	0.25	0.10	7.00	0.90	1.30	6.35	0.35	1.00	0.00	0.00	19.60
793	0.60	1.50	0.20	0.10	3.30	0.60	1.20	6.70	0.20	0.90	0.00	0.00	15.30
832	0.80	1.55	0.10	0.10	3.40	0.20	1.40	5.20	0.30	0.95	0.00	0.00	14.00
759	1.00	1.10	0.20	0.20	3.20	0.00	2.50	4.95	0.00	1.20	0.00	0.00	14.35
753	1.20	1.50	0.20	0.10	2.00	0.00	2.30	5.30	0.00	0.90	0.00	0.00	13.50
563	0.95	1.15	0.10	0.25	7.40	0.00	2.40	7.05	0.00	3.20	0.00	0.00	22.50
568	0.60	1.35	0.05	0.20	8.00	0.00	2.80	6.00	0.00	1.55	0.00	0.00	20.55
432	1.00	0.60	0.10	0.10	5.30	0.00	3.30	8.60	0.00	2.60	0.00	0.00	21.60
1	1.10	1.60	0.20	0.15	6.60	0.40	1.80	7.50	0.00	2.65	0.00	0.00	22.00
265	1.00	1.20	0.15	0.10	4.20	0.00	1.80	5.25	0.00	1.85	0.00	0.00	15.55
255	1.00	0.85	0.20	0.10	7.40	0.10	3.50	6.60	0.00	1.40	0.00	0.00	21.15
308	0.00	0.00	0.00	0.20	1.20	0.00	2.00	4.90	0.00	1.65	0.00	0.00	9.95
187	1.75	1.50	0.20	0.20	2.70	0.00	2.00	4.80	0.00	1.20	0.00	0.00	14.35
163	2.30	1.20	0.25	0.20	3.80	0.20	1.90	5.35	0.00	1.40	0.00	0.00	16.60
167	1.65	0.70	0.15	0.20	3.20	0.00	2.60	3.55	0.00	0.30	0.00	0.00	12.35
298	2.20	1.25	0.15	0.10	4.00	0.20	2.00	8.10	0.00	1.90	0.00	0.00	19.90
342	1.30	1.60	0.10	0.10	5.10	0.00	1.60	4.35	0.00	1.00	0.00	0.00	15.15
34	1.30	0.60	0.1	0.10	2.80	0.00	1.60	3.95	0.00	0.95	0.00	0.00	11.40
148	1.00	1.00	0.05	0.15	4.50	0.00	1.60	4.65	0.00	0.75	0.00	0.00	13.70
371	----	1.25	0.1	0.15	4.60	0.12	3.20	5.00	0.00	1.95	0.00	0.00	16.37
420	1.80	0.80	0.1	0.10	4.60	0.00	2.20	3.80	0.00	1.20	0.00	0.00	14.60
673	0.25	1.35	0.1	0.25	3.20	0.00	2.30	9.40	0.00	0.70	0.00	0.00	17.55
714	1.10	1.60	0.15	0.30	4.40	0.50	1.00	6.90	0.30	0.55	0.00	0.00	16.80

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Conclusions

**Sandy Land Underground Water Conservation District
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2004 Production Benefits

Drip Irrigation 54,441 lbs/acre x 60 acres = 3,266,460
Conventional Irrigation 40,706 lbs/acre x 60 acres = 2,442,360

Drip Benefit in Pounds **824,100 lbs.**

2004 Water Savings Comparison

Center Pivot

432 hours at 600 gpm
432 hours x 60 minute/hour = 25,920 minute
25,920 minutes x 600 gpm = 15,552,000 gallons
15,552,000 divided by 325,851 = **47.73 acre feet**

Drip

266 hours at 350 gpm
266 hours x 60 minute/hour = 15,960 minutes
15,960 minutes x 350 gpm = 5,586,000 gallons
5,586,000 divided by 325,851 = **- 17.14 acre feet**

Savings **47.73 acre feet minus 17.14 acre feet =** **30.59 acre feet**

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2005 Production Benefits

Drip Irrigation 58,982 lbs/acre x 60 acres = 3,538,920
Conventional Irrigation 42,184 lbs/acre x 60 acres = 2,531,040

Drip Benefit in Pounds **1,007,880 lbs.**

2005 Water Savings Comparison

Center Pivot

293 hours at 600 gpm

293 hours x 60 minute/hour = 17,580 minute

17,580 minutes x 600 gpm = 10,548,000 gallons

10,548,000 divided by 325,851 =

32.37 acre feet

Drip

156 hours at 330 gpm

156 hours x 60 minute/hour = 9,360 minutes

9,360 minutes x 330 gpm = 3,088,800 gallons

3,088,800 divided by 325,851 =

- 9.48 acre feet

Savings **32.37 acre feet minus 9.48 acre feet =** **22.89 acre feet**

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Total Water Savings and Benefits

Total Water Savings Over Two Years 53.48 acre feet

Additional Production Benefit Over Two Years 1,831,980 lbs.