SOUTHEAST ARIZONA CROP WATER USE REPORT

April 28, 2013

Paul W. Brown
University of Arizona

Weather Update

Warm and very dry conditions returned to southeast Arizona last week. Temperatures averaged 2 degrees (Fig. 1) under clear skies and light to moderate winds. Evaporative demand totaled slightly below normal (Fig. 2) due to generally low wind flow. No precipitation was reported in the region leaving precipitation totals far below normal for the calendar year. Year to date totals now stand at 0.98", 0.77", 0.60" and 0.92" for Bonita, Bowie, Kansas Settlement and San Simon, respectively. Precipitation since 1 January at the long-term Bonita station is now 35% of normal (Fig. 3).

High pressure will hold sway over the region through mid-week, resulting in hot days and mild nights. Windy and slightly cooler weather is expected Thursday as a storm system moves across the Great Basin. This is not expected to be a cold storm and temperatures are expected to remain slightly above normal late in the week. Longer term forecasts suggest the possibility of another storm system and increased moisture by early next week. It is too early to tell if this system will produce any precipitation in the area. The Climate Prediction Center forecast for May carries a moderate bias for above normal temperatures, but no bias relative to precipitation.

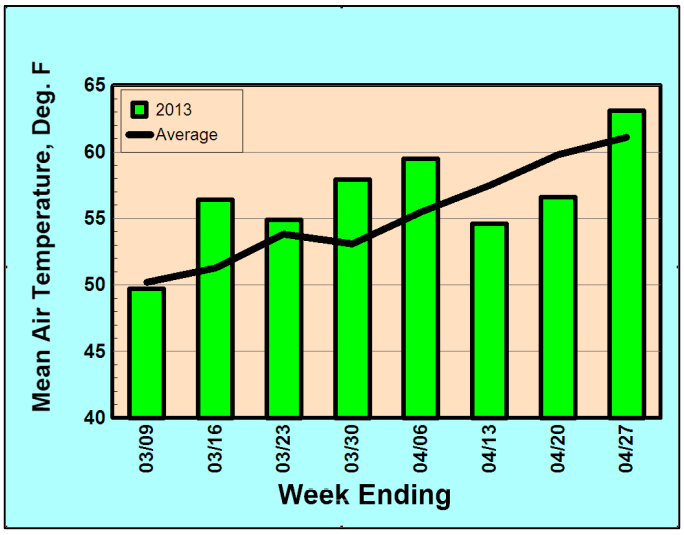

Figure 1. Average weekly air temperature for the period 9 March through 27 April 2012. The black line provides the long term average value for each period.

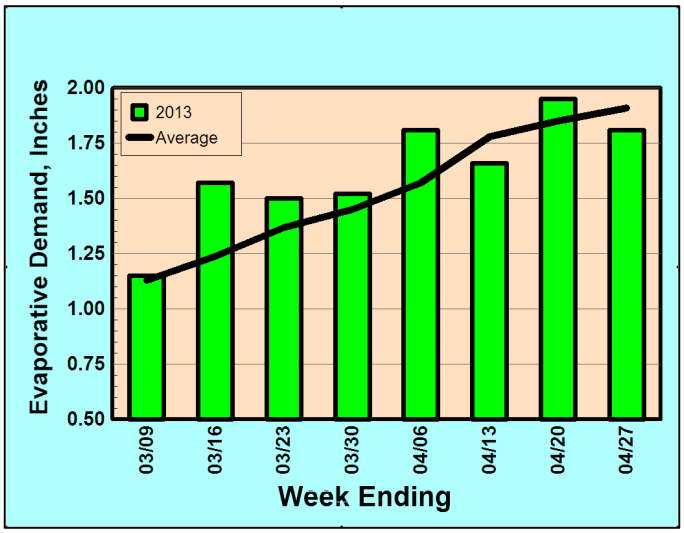

Figure 2. Total weekly evaporative demand for the period 9 March through 27 April 2012. The black line provides the long term average value for each period.

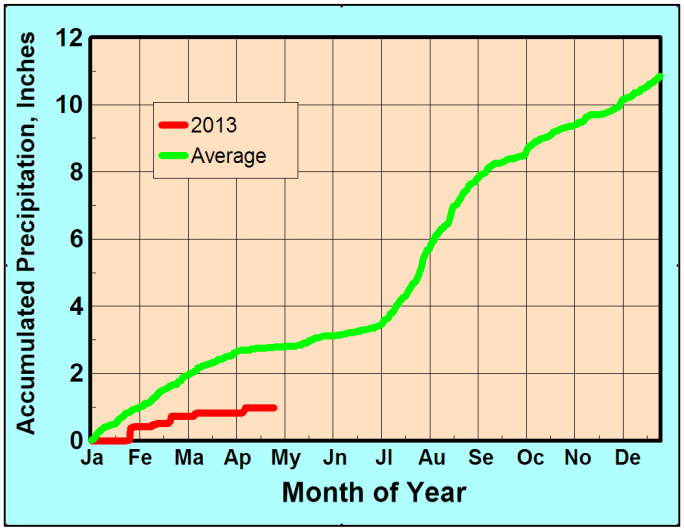

Figure 3. Cumulative precipitation for Bonita since 1 January 2013 (red line). The green line shows the normal cumulative precipitation trend for Bonita.

Crop Water Use Update

The tables below provide estimates of crop water use for the past and upcoming week for selected crops in southeast Arizona. Water use was estimated by applying crop-specific coefficients (Kc) to values of reference evapotranspiration (ETo) generated by local AZMET weather stations. Estimates for the upcoming week were computed using historical averages of ETo for this time of year. See table at the end of this report to translate inches of water into pivot run times.

CORN

Corn Water Use By Planting Date: Bonita								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.6	1.6	0	0	1.9	1.9	1.4	0
2 Days	1.3	1.3	0	0	1.5	1.4	1.2	0
3 Days	1.1	1.1	0	0	1.4	0.6	0.5	0

Corn Water Use By Planting Date: Bowie								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.7	1.7	0	0	1.7	1.6	0.7	0
2 Days	1.4	1.3	0	0	1.5	1.3	0.6	0
3 Days	1.2	1.2	0	0	1.4	1.1	0.5	0

Corn Water Use By Planting Date: Kansas Settlement								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.7	1.7	0	0	2.0	1.9	0.8	0
2 Days	1.3	1.3	0	0	1.6	1.5	0.6	0
3 Days	1.1	1.1	0	0	1.5	1.3	0.6	0

Corn Water Use By Planting Date: San Simon								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.9	1.9	0	0	2.0	1.9	0.8	0
2 Days	1.5	1.5	0	0	1.7	1.5	0.6	0
3 Days	1.3	1.3	0	0	1.6	1.3	0.6	0

*** Pivot rotation impacts water use at this time of year because the crops are young and the foliage does not completely shade the ground. Slower pivot rotations rates allow exposed soil surfaces to dry some between irrigations which lowers overall water use.**

CHILES

Chile Water Use By Planting Date: Bonita								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.6	1.6	0	0	1.9	1.9	0.8	0
2 Days	1.3	1.3	0	0	1.4	1.4	0.6	0
3 Days	1.1	1.1	0	0	1.2	1.2	0.5	0

Chile Water Use By Planting Date: Bowie								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.7	1.7	0	0	1.6	1.6	0.7	0
2 Days	1.3	1.3	0	0	1.3	1.3	0.6	0
3 Days	1.2	1.2	0	0	1.1	1.1	0.5	0

Chile Water Use By Planting Date: Kansas Settlement								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.7	1.7	0	0	1.9	1.9	0.8	0
2 Days	1.3	1.3	0	0	1.5	1.5	0.6	0
3 Days	1.1	1.1	0	0	1.3	1.3	0.6	0

Chile Water Use By Planting Date: San Simon								
Pivot Rotation*	Water Use Last Week, Inches				Water Use This Week, Inches			
	Apr 1	Apr 15	May 1	May 15	Apr 1	Apr 15	May 1	May 15
Daily	1.9	1.9	0	0	1.9	1.9	0.8	0
2 Days	1.5	1.5	0	0	1.5	1.5	0.6	0
3 Days	1.3	1.3	0	0	1.3	1.3	0.6	0

*** Pivot rotation impact water use at this time of year because the crops are young and the foliage does not completely shade the ground. Slower pivot rotations rates allow exposed soil surfaces to dry some between irrigations which lowers overall water use.**

ALFALFA

Alfalfa Water Use By Cutting Date								
	Water Use Last Week, Inches				Water Use This Week, Inches			
Cut On >>	Apr 1	Apr 8	Apr 15	Apr 22	Apr 8	Apr 15	Apr 22	Apr 29
Bonita	2.1	2.1	1.4	0.6	2.5	2.4	1.7	1.1
Bowie	2.3	2.2	1.5	0.7	2.2	2.1	1.4	0.9
Kansas Set.	2.2	2.2	1.5	0.7	2.5	2.5	1.7	1.1
San Simon	2.5	2.5	1.6	0.7	2.6	2.5	1.7	1.1

NUTS & APPLES

Location	Pecan		Pistachio		Apples	
	Last Wk	This Wk	Last Wk	This Wk	Last Wk	This Wk
Bonita	0.7"	0.8"	0.7"	1.0"	1.0”	1.1”
Bowie	1.1"	1.2"	0.7"	0.9"	1.2”	1.1”
Kansas Set.	0.7"	0.8"	0.7"	1.0"	1.0”	1.1”
San Simon	1.1"	1.2"	0.8"	1.1"	1.3”	1.2”

WINE GRAPES

Location	Wine Grapes					
	6' Rows		8' Rows		10' Rows	
	Last Wk	This Wk	Last Wk	This Wk	Last Wk	This Wk
Bonita	0.6"	0.8"	0.4"	0.6"	0.4"	0.5"
Bowie	0.8"	0.9"	0.6"	0.7"	0.5"	0.6"
Kansas Set.	0.6"	0.8"	0.5"	0.6"	0.4"	0.5"
San Simon	0.8"	1.0"	0.6"	0.8"	0.5"	0.6"

PIVOT RUN TIMES (Days/Week) FOR VARIOUS RATES OF CROP WATER USE

Crop Use	Pumping Days Per Week				
Inches/Week	500 GPM	600 GPM	700 GPM	800 GPM	900 GPM
0.35	1.9	1.6	1.3	1.2	1.0
0.70	3.7	3.1	2.7	2.3	2.1
1.05	5.6	4.7	4.0	3.5	3.1
1.40	*7.0*	6.2	5.3	4.7	4.1
1.75	*7.0*	*7.0*	6.7	5.8	5.2
2.10	*7.0*	*7.0*	*7.0*	7.0	6.2
2.45	*7.0*	*7.0*	*7.0*	*7.0*	*7.0*
2.80	*7.0*	*7.0*	*7.0*	*7.0*	*7.0*

Example: assume crop water use is 1.4"/week and your well supplies 900 GPM. Pivot would need to run 4.1 days during the week. Numbers in italics indicate system capacity is insufficient to offset crop water use and the crop must make up the deficit by using stored soil moisture.