



## TAWC ET

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**The TAWC Solutions Irrigation Scheduling Tool** is intended as an aid to producers in determining a more refined irrigation schedule. This program utilizes weather information collected from the Texas Tech Mesonet along with specific producer input information to automatically calculate and update the soil water balance for a specific crop based on information provided by the user. Some key inputs include: crop type, planting date, site rainfall, irrigation, and other environmental and producer information. This provides a checkbook-style water balance register with which a producer can determine when and how much water to apply for an irrigation event based on tracking of the soil water balance available to the crop at any given growth stage during the growing season. The TAWC Solutions Irrigation Scheduling Tool is designed to help producers make the most out of their irrigation regime while being conscious of this precious natural resource.

To utilize the **TAWC Solutions ET program** you must first create a User ID and Password by selecting **Request User ID/New Password** from the top of the TAWC Solutions homepage banner next to the logon prompts. Once this is completed, log into the site and place your mouse cursor over **TAWC Tools** from the Navigation menu at top and a drop down menu will appear with the following selections:

**TAWC ET – Irrigation Scheduling Tool**

**Resource Allocation – Economic Decision Aid Tool**

To begin, move your cursor over **TAWC Tools** then over **TAWC ET** on the main navigation menu and select **Manage Production Sites** from the side menu. A **Site** is considered a location and field is the irrigated field or crop for that location. There can be multiple fields per location (ie. pivot 1, pivot 2, drip 1 etc...).

Illustrations and instructions for use of the program are presented on the following pages.

Screen1

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**TAWC ET**

**Manage Production Sites**

**Resource Allocation**

**Manage Water Balance Crops**

**Water Balance Tables**

**Welcome to TAWC Beta Website**

The Texas Alliance for Water Conservation (TAWC) is a demonstration project funded by the State of Texas through the Texas Water Conservation Demonstration Act. Initial funding for this demonstration came through Senate Bill 1100, signed by Governor Rick Perry in 2009. The TAWC, partnered with the Texas Tech University (TTU) Center for Water Resources (CWR) and the Texas A&M University (TAMU) Center for Applied Hydrogeology (CAH), provides for research, demonstration, and education to improve water use while ensuring the economic viability of agriculture in the Texas High Plains.

This Demonstration Project is overseen by a Board of Directors comprised of area producers from Hale and Floyd Counties in cooperation with scientists from Texas Tech University College of Agriculture and Natural Resources, Texas A&M Agrilife Research and Extension, USDA-ARS and NRCS, and the High Plains Underground Water District No. 1.

The **TAWC** program is intended to link research with on-farm demonstration sites that can demonstrate water savings and maintain profitability through use of alternative production systems, water saving technologies, and management tools that allow the producer to save water and remain profitable. As water continues to decline in the Ogallala Aquifer and policies are developed to limit agricultural water use, the ability of our producers to remain both productive and profitable requires closer cooperation between research and production systems and improved interaction and information exchange. This project is intended to bridge the gap between research and "real-world" agricultural production systems through a tighter coalition of researchers and producers and is intended to benefit our agricultural community by providing them with alternative strategies and decision aids that are useful and easily accessible.


**TAWC Solutions** is intended to provide a simple web-based management decision tool and an ET (evapotranspiration) tool that can aid in improved management decisions in the application of irrigation water. The tools on this site are evolving and through their use we hope to continue to improve and expand their capabilities to help secure the future of agriculture in the Texas High Plains.

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You will see a screen that states “There are no rows in this table.” In the right column you have the option of entering a new site location name (ie. Gomez) in the box. Enter the desired name and irrigated field number (ie. pivot 1) and click “**Create Site**”. You will then see a green confirmation box stating “**Your Production Site has been created**” with the new site name and an option to delete the site if desired. You can then create additional site locations and irrigated fields for each location as appropriate. A maximum of 10 fields per site location can be created. You can return to this page and create and delete site locations and fields as needs evolve or a new cropping year begins.

Screen2



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Your Production Site has been created.

New Production Site

**Site Name:**

Enter the name of the Production Site.

**Field Number:**

The number assigned to the irrigated area at the site, i.e. pivot 1, pivot 2 at site Gomez.

### Production Sites

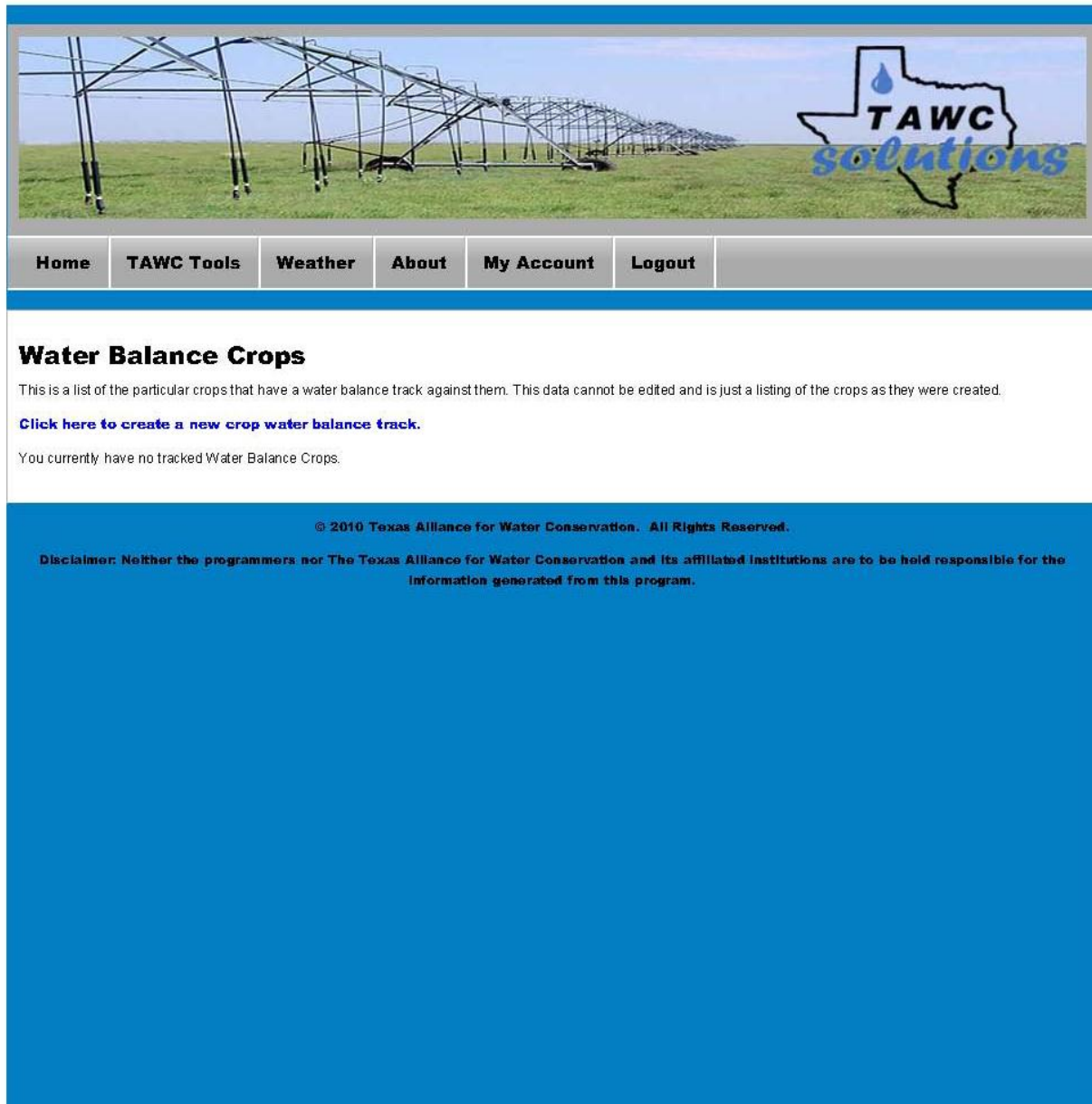
This is a list of your active production sites.

	Site Name	Field	
1	Gomez	1	DELETE THIS SITE
2	Old Mill	1	DELETE THIS SITE
3	Old Mill	2	DELETE THIS SITE

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Return to TAWC ET on the navigation menu and select the next option “Manage Water Balance Crops”, a new screen will appear with an option “[Click here to create a new crop water balance track](#)”.



The screenshot shows a web page for TAWC solutions. At the top is a banner image of an irrigation system in a field with the TAWC solutions logo. Below the banner is a navigation menu with buttons for Home, TAWC Tools, Weather, About, My Account, and Logout. The main content area is titled "Water Balance Crops" and contains the following text:

This is a list of the particular crops that have a water balance track against them. This data cannot be edited and is just a listing of the crops as they were created.


[Click here to create a new crop water balance track.](#)

You currently have no tracked Water Balance Crops.

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Click the text and a new **Crop Water Balance Track** information page will be presented. In the **Site** location box select a previously entered **Production Site** from the drop down menu and provide all requested information then select the “**Create New Crop Water Balance Track**” button at the bottom of the page. You will then see a new page with a green confirmation box stating that “**Your new crop water balance track has been created**”.



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Your new crop water balance track has been created.

### New Crop Water Balance Track

**Site:**  
  
Select the site where this crop is located.

**Crop Type:**  
  
Select the type of crop and crop coefficients. Currently only Northern High Plains(NHP) coefficients are supported.

**Select Planting Date:**

**Weather Station:**  
  
Select the nearest or preferred weather station.

**Crop Acreage:** \*  
  
Total acreage for this crop, not necessarily the irrigated area.

**Starting Moisture[in]:** \*  
  
The initial estimate for moisture in the soil at planting time.

**Initial Effective Rain[%]:** \*  
  
This is the initial effective rain percentage, which can be adjusted at a later date if necessary.

**Initial Effective Irrigation [%]:** \*  
  
This is the initial effective irrigation value, which can be changed at a later date.

**Initial Et[%]:** \*  
  
This is the percentage of predicted evapotranspiration to use. This can be changed at a later date as well.

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Repeat this procedure for each **Production Site** and irrigation field created. Definitions for each input are provided on the next page.

*The confirmation page will revert to default entries after clicking “Create New Crop Water Balance Track” for information requested and is not representative of the track just created.*



**Crop type:** the appropriate crop being tracked for the specific site location and irrigation field.

**Planting Date:** date the irrigated crop is planted by selecting the appropriate month, day and year from the drop down menus.

**Weather Station:** select the closest weather station to the specific site location being tracked from the drop down menu list of stations from the Texas Tech Mesonet.

**Crop Acreage:** enter total field acres for a specific irrigated field.

**Starting Moisture:** an estimated soil profile water content in inches for your specific soil type based on soil probing to a depth of 3 feet within the field and is a number in 0.0 inches (ie. 2.5 inches).

**Initial Effective Rain:** the % (in whole numbers) rain that you expect to normally capture in any given rain event for your specific soil type (this number can be changed for any given event in the Daily Measurements table ( ie. 85%).


**Initial Effective Irrigation:** the % (in whole numbers) of irrigation water that is expected to be absorbed by the soil profile at the site under a given irrigation method ( ie. Sprinkler – 90%, Drip – 95%, etc...).

**Initial ET:** the % of ET or evapotranspiration that you desire to water a given crop and can vary from 0 to 100 % depending of specific producer management desires and goals.

Next select “**Water Balance Tables**” from the **TAWC ET** menu.

You are now presented with the “Check Book” style register for monitoring and adjusting various parameters as the season progresses. The **Daily Measurements** table should be populated with default settings for Effective Irrigation, Effective Rain, and Percent ET based on the information you provided in creating a **Water Track**. You may change the displayed Water Balance Crop being monitored from the left hand column by selecting the desired crop to monitor and the page will update to display that specific location field and crop information. The top of the Table has a **Crop Summary** which maintains current information for the Site location and field selected including **Last ET**, current soil **Moisture Balance**, **Growth Stage**, **Total Irrigation**, and **Total Rain** received since the start date. This allows a producer to get a quick overview of the current status of his operation for that specific location and field.

Below this summary is the **Daily Measurements** table and is a day by day record of measurements for the selected water balance crop. The selected **Water Balance Crop** can be changed by clicking on the list of water balance crops in the right hand column.



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### Crop Summary

Site	Weather Station	Acreege	Type	Last Et	Moisture Balance	Growth Stage	Total Irrigation	Total Rain
Old Mill-1	Abernathy	120	Cotton	0.01	0.33	Strip	0.00	11.34

Select a Different Water Balance Crop

- 1 Gomez-1,Corn
- 2 Old Mill-2,Cotton

### Daily Measurements

Date	Effective Irrigation	Effective Rain	Percent Et	Irrigation	Rain	Daily Et	Moisture Balance	Growth Days	Growth Stage
0 2010-05-11	0.90	0.75	0.60	0.00	0.00	0	3	0	Planting Day
1 2010-05-12	0.90	0.75	0.60	0.00	0.00	0.01	2.99	1	-----
2 2010-05-13	0.90	0.75	0.60	0.00	0.00	0.01	2.98	2	-----
3 2010-05-14	0.90	0.75	0.60	0.00	1.03	0	3.75	3	-----
4 2010-05-15	0.90	0.75	0.60	0.00	0.01	0	3.76	4	-----
5 2010-05-16	0.90	0.75	0.60	0.00	0.00	0.01	3.75	5	-----
6 2010-05-17	0.90	0.75	0.60	0.00	0.54	0.01	4.15	6	-----
7 2010-05-18	0.90	0.75	0.60	0.00	0.00	0.01	4.14	7	-----
8 2010-05-19	0.90	0.75	0.60	0.00	0.00	0.01	4.13	8	-----
9 2010-05-20	0.90	0.75	0.60	0.00	0.00	0.01	4.12	9	-----
10 2010-05-21	0.90	0.75	0.60	0.00	0.00	0.01	4.11	10	Emerge
11 2010-05-22	0.90	0.75	0.60	0.00	0.00	0.02	4.09	11	-----
12 2010-05-23	0.90	0.75	0.60	0.00	0.00	0.01	4.08	12	-----
13 2010-05-24	0.90	0.75	0.60	0.00	0.03	0.02	4.08	13	-----
14 2010-05-25	0.90	0.75	0.60	0.00	0.00	0.01	4.07	14	-----
15 2010-05-26	0.90	0.75	0.60	0.00	0.08	0.02	4.11	15	-----
16 2010-05-27	0.90	0.75	0.60	0.00	0.00	0.01	4.1	16	-----

The only **Required** input for this table is for **Irrigation** events but through added user input and interaction with the program ET can be more accurately calculated for a producer’s specific crop. The **TAWC ET** program is intended to be simple, yet flexible by allowing the producer to tailor irrigation based on specific crop and environmental factors.

Columns displayed in a blue color may be manually adjusted at any time during the season. For example, if you click on a blue number in the column for **Effective Irrigation** a data entry box will pop up allowing you to change the **Effective Irrigation** % for any specific date during the growing season. An option also exists that allows you to select a checkbox that will apply this new value to all subsequent dates in the table or leave the box unchecked and make the change to the current date only. This applies to **Effective Irrigation, Effective Rain** and **Percent ET** columns.

For the **Irrigation** and **Rain** columns the user may click on a blue number for any specific date and enter an irrigation or rainfall event that applies to his specific location. Rainfall will be recorded automatically on a daily basis from the nearest **Weather Station** selected by the user during the creation of a **Water BalanceTrack** unless overridden by that user through manual entry. This allows the producer to better control the conditions of the specific field being monitored by manually updating rainfall measured at the individual site and thus more representative of the sites conditions. **However, the user must manually input each Irrigation event by clicking the blue number and entering each irrigation event amount in inches.**

The **Growth Stage** column is filled with estimated growth stages of the crop based on planting date. These values may be adjusted by the producer to more accurately represent the stage of his crop maturity thereby adjusting the calculated ET value for the crops current and subsequent growth stages. This is accomplished by clicking the blue lines in the column and selecting the appropriate growth stage for the calendar date from the drop down menu in the pop up.

For example if you planted cotton on May 9 the estimated **Emerge** date is May 19, however if emergence occurred a day earlier or a day later the actual **Emerge** date can then be adjusted by clicking the blue lines on the appropriate day and selecting the correct growth stage from the drop down menu. This same logic is followed through the season for **1<sup>st</sup> Square, 1<sup>st</sup> Bloom, Max Bloom, 1<sup>st</sup> Open, 25% Open, 50% Open, 95% Open, and Strip**. Adjusting these values to the actual date of occurrence adjusts the ET calculation to more appropriately reflect the plant requirements and potentially reduce water use. Adjustment of the plants growth stage is not a requirement but will allow the **ET calculation** to be more accurate for the crops individual stage of growth.

We are continually striving to improve the accuracy, usability and performance of this program. Through your feedback and assistance we can be proactive in addressing the needs of the Texas High Plains. This program has been created through the efforts of many involved in this project including Texas Tech University, Texas A&M AgriLife Research and Extension, USDA-ARS/NRCS, High Plains Underground Water District No. 1, Producers of Hale and Floyd Counties and the Texas Water Development Board.

**We must work together to solve the growing issues faced by agriculture today and tomorrow because ‘Water is Our Future’.**

*Your questions and suggestions are both welcome and encouraged. Please see contact information located on the TAWC Solutions Home page under **About**.*