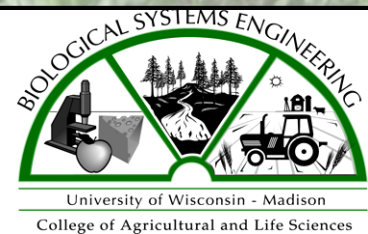


***W**isconsin **I**rrigation **S**scheduling **P**rogram*

WISP 2012

**Wisconsin Section AWRA
Annual Meeting
March 13, 2014**



WISP 2012

- ❑ Spatial variation in rainfall and differences in the soil water holding capacity around Wisconsin have resulted in reduced yields.

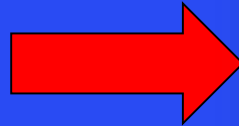
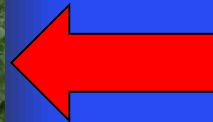


Photo by Eric Cooley



- ❑ Which in-turn has resulted in the increased used of irrigation to maintain agricultural production.

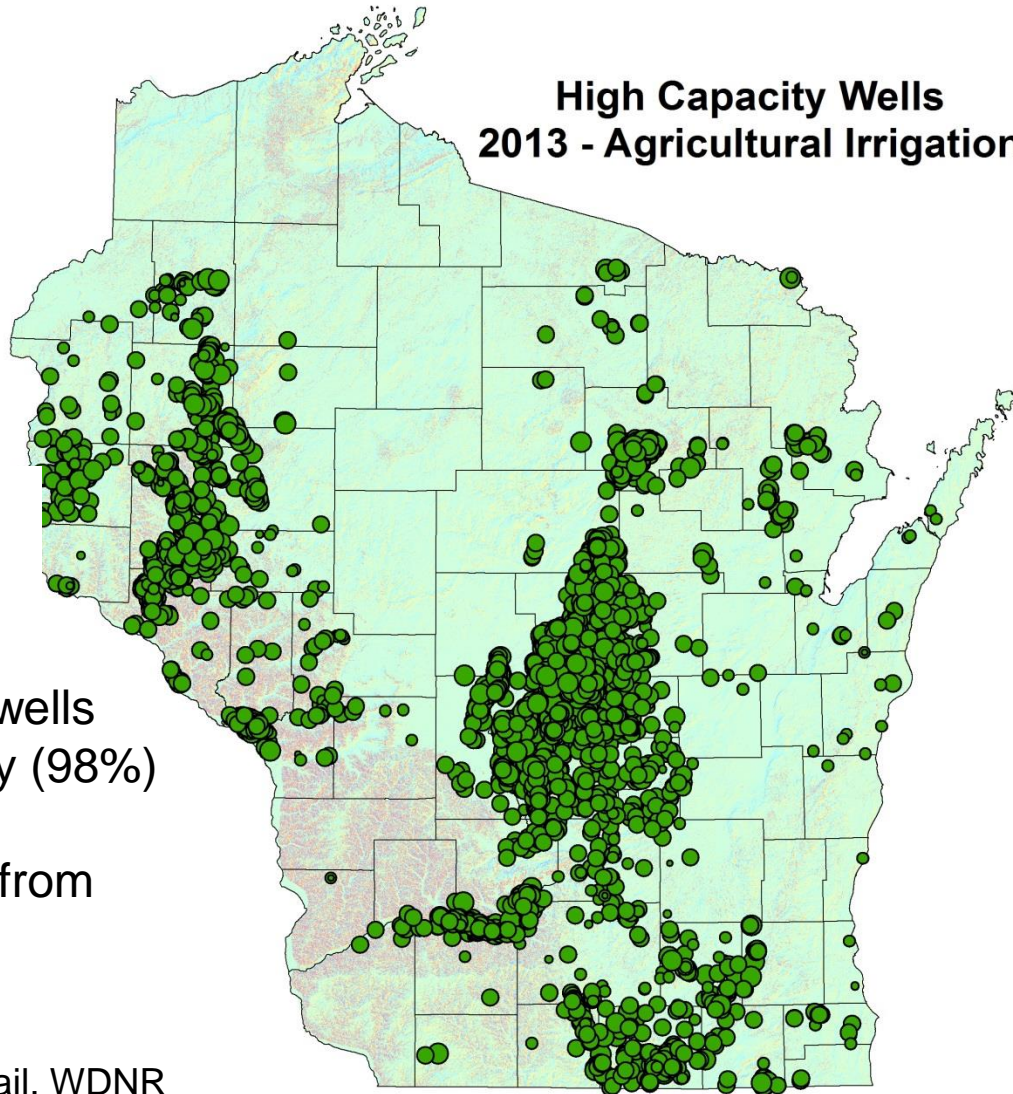
WISP 2012

- ≤ 20 GPM
- 21-69 GPM
- 70 - 500 GPM
- 501 - 1000 GPM
- >1000 GPM

● Aquaculture

● Agricultural Irrigation

High Capacity Wells 2013 - Agricultural Irrigation



Resulting in more wells
as the vast majority (98%)
of irrigation water
withdrawals come from
groundwater.

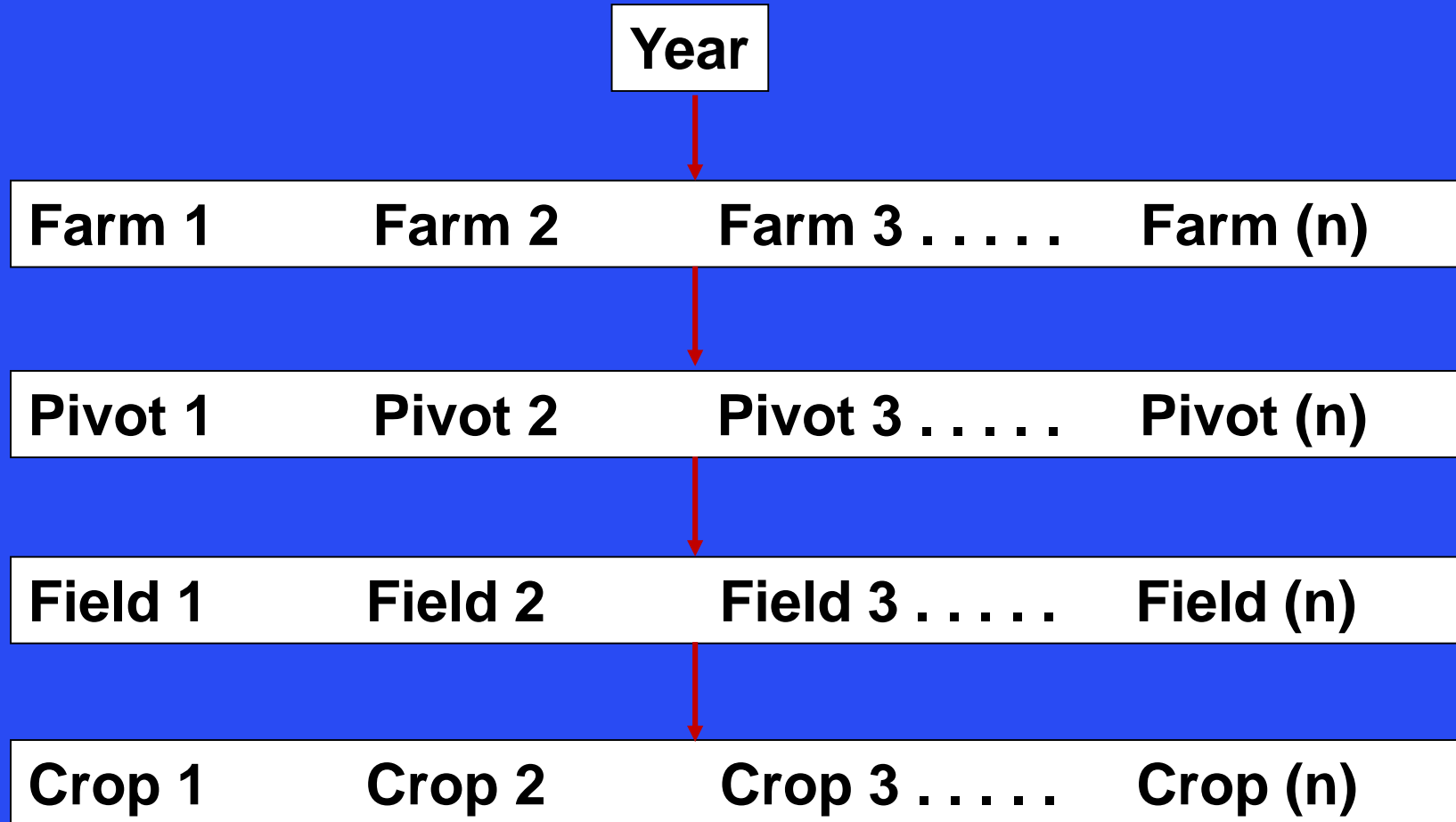
Map courtesy of Bob Smail, WDNR

The Wisconsin Irrigation Scheduling Program (WISP)

- ❑ Excess water application can result in nutrient and chemical leaching into groundwater and wasted pumping energy.
- ❑ The WI Irrigation Scheduling Program WISP 2012 can help growers better manage root zone water content to protect groundwater and also save energy.



WISP 2012 Hierarchy Structure



When starting a new year WISP retains Farms and Fields from the previous year

WISP 2012

- Introductory Screen -

WISP: Wisconsin Irrigation Scheduling Program 2012 Version 1.0.1

[WISP Home](#)
[Farm Status](#)
[Pivots, Fields, and Crops](#)
[Field Status](#)
[Weather Stations](#)
[Multi-Edit Daily Data](#)
[User's Guide](#)
[Latest Info \(updated 22 May 2013\)](#)

USER GUIDE

Wisconsin Irrigation



Scheduling Program

WISP 2012
Version 1.0.1

WISP Home



About WISP

The Wisconsin Irrigation Scheduling Program (WISP), is an irrigation water management tool developed by the Departments of Soil Science and Biological Systems Engineering at the Wisconsin-Madison. WISP is designed to help growers optimize crop water use efficiency by tracking the root zone water inputs and outputs (water balance).

Using WISP's water balance predictions, along with root zone soil moisture monitoring, a grower can plan irrigation timing and amount to take maximum advantage of natural rainfall while minimizing over-application of water resulting in leaching.

Organization

WISP accommodates multiple Farms, Pivots, Fields and Crops with a hierarchy:

- A **farm** can be any set of pivots the user chooses (e.g. common ownership, location or management).
- A **pivot** can have one or more fields growing different crops.
- A **field** is typically defined by a set of common physical or management characteristics (e.g., crop type, soil water holding capacity or irrigation management) assigned to a land area. Field characteristics can change from year to year and have multiple crops per year.
- For each succeeding **crop** on a field, you specify an emergence date, starting soil moisture, depth of the managed root zone, and AD fraction.

To simplify entering daily data which is the same for multiple fields, **weather stations** are provided. A weather station is associated with a pivot; daily data entered for the weather station (e.g., rainfall or irrigation) are automatically propagated to all the fields under that pivot.

Getting Started

Secure access to your WISP data is provided using a service called OpenID (OID). Google is the OID provider currently used by WISP, so you will need a Google account. When you start WISP you are directed to a login page where you enter your email address and password. That's all there is to it!

- [Create a Google account](#) if you don't already have one.
- Back on this WISP site, the [Farm Status](#) link in the navigation bar on the left side of the screen. Your login credentials will be requested, and you will be asked to approve their use for this site.
- Upon successful login, you will see the WISP farm screen
- When you first use WISP, a default farm, pivot, field, and crop are created for you, along with weather/irrigation records for the season. You can add more farms on the "Farm Status" page; pivots, the fields they serve, and crops in the field are managed from the "Pivots, Fields, and Crops" page.
- Click on the "Pivots" link in the navigation bar, and use the "Add Pivots" button to add pivots for the farm.
- All field information is required except "Notes".
- If you have multiple fields under a pivot for which you would like to combine data entry, create a weather station and use "Multi-Edit Daily Data" to enter data for it.

The [User Guide](#) provides additional model input and application guidance.

About WISP

Version: 1.0.0
Build Number: 296

Setting Up Open ID



Sign in to personalize your Google experience.

Google has more to offer when you sign in to your Google Account.

Sign in on the right or [create an account for free](#).



Gmail
Chat with friends and never miss an important email.



Personalized Search
Get more relevant results based on your past searches.



Like Google?
[Make Google your homepage.](#)

See [more benefits](#) of a Google Account.

Sign in with your
Google Account

Email:
ex: pat@example.com

Password:

☒ Stay signed in

[Can't access your account?](#)

Don't have a Google Account?
[Create an account now](#)

©2011 Google - [Google Home](#) - [Terms of Service](#) - [Privacy Policy](#) - [Help](#)

Open ID for Login



Create an Account

If you already have a Google Account, you can [sign in here](#).

Required information for Google account

Your current email address:

e.g. myname@example.com. This will be used to sign-in to your account.

Choose a password:

[Password strength:](#)

Minimum of 8 characters in length.

Re-enter password:

☒ Stay signed in

☒ Enable Web History [Learn More](#)

Location:

Birthday:

MM/DD/YYYY (e.g. "7/8/2011")

Word Verification:

Type the characters you see in the picture below.

Needed Information

Not Needed Information

WISP Farm Status Screen

WISP: Wisconsin
Irrigation
Scheduling
Program 2012
Version 1.0.1

[WISP Home](#)
[Farm Status](#)
[Pivots, Fields, and Crops](#)
[Field Status](#)
[Weather Stations](#)
[Multi-Edit Daily Data](#)
[User's Guide](#)
[Latest Info \(updated 22 May 2013\)](#)

[Logout jcpanuska@wisc.edu](#)

WISP Farm Data

Farms				
Name	ET Method	Notes	AD < 0?	Delete
Test Farm_% Cover	Percent Cover		No	<input type="button" value="Del"/>
Test Farm_LAI	Leaf Area Index		No	<input type="button" value="Del"/>
<div><input type="button" value="Add New Farm (% Cover)"/> <input type="button" value="Add New Farm (Leaf Area Index)"/></div>				

WISP ET Methods

1. User input measured percent canopy cover.
2. Automated estimated predicted Leaf Area Index (LAI).

WISP Farm Status Screen

WISP: Wisconsin Irrigation Scheduling Program 2012 Version 1.0.1

[WISP Home](#)
[Farm Status](#) ←
[Pivots, Fields, and Crops](#)
[Field Status](#)
[Weather Stations](#)
[Multi-Edit Daily Data](#)
[User's Guide](#)
[Latest Info \(updated 22 May 2013\)](#)

[Logout jcpanuska@wisc.edu](#)

WISP Farm Data

Farms				
Name	ET Method	Notes	AD < 0?	Delete
Test Farm_% Cover	Percent Cover		No	<input type="button" value="Del"/>
Test Farm_LAI	Leaf Area Index		No	<input type="button" value="Del"/>
<div><input type="button" value="Add New Farm (% Cover)"/> <input type="button" value="Add New Farm (Leaf Area Index)"/></div>				

No fields below allowable depletion for Test Farm_% Cover

**Warning notification when allowable soil
moisture is depleted.**

The Pivot, Field and Crops Screen

WISP Pivot, Field and Crops Data for TestFarm_% Cover ▾

Pivots for Test Farm_% Cover								
Name ▾	Lat.	Long.	Equipment	Pump Capacity	Energy	Crop Yr	Notes	Delete
% Cover_Pivot 1	44.5	-89.0				2013		Del
% Cover_Pivot 2	44.5	-89.0				2013		Del
New pivot (farm ID: 1192)						2013		Del

Add new pivot data, one for each row in the table

Add New Pivot

Select a pivot and the corresponding fields and crops screens appear below.

Fields for New pivot (farm ID: 1192)							
Name ▾	Area	Soil Type	Field Capacity	Perm. Wilt Pt	Target AD	Notes	Delete
New field (Pivot ID: 2043)		Sandy Loam ▾	15.00	5.00			Del
		Sand					
		Sandy Loam					
		Loam					
		Silt Loam					
		Silt					
		Clay Loam					
		Clay					

Add new field data, one for each row in the table

Add New Field

Crop for New field (Pivot ID: 2043)						
Crop ▾	Variety	Emergence	Harvest/Kill	Root zone depth	AD Frac.	Notes
New crop (field ID: 2801)	A variety	2013-05-01		36.0	0.5	

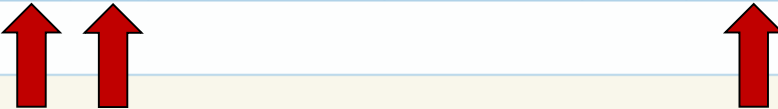
Add crop data for a single crop directly into the table (no double cropping yet)

Adding a Pivot

WISP Pivot, Field and Crops Data for Test Farm_% Cover ▾

Pivots for Test Farm_% Cover

Name ▾	Lat.	Long.	Equipment	Pump Capacity	Energy	Crop Yr	Notes	Delete
% Cover_ Pivot 1	44.5	-89.0				2013		<input type="button" value="Del"/>
% Cover_ Pivot 2	44.5	-89.0				2013		<input type="button" value="Del"/>
New pivot (farm ID: 1192)						2013		<input type="button" value="Del"/>



The longitude is negative for the Western Hemisphere.

WISP is currently set up for a single crop year only.

Adding a Field

Fields for New pivot (farm ID: 1192)

Name	Area	Soil Type	Field Capacity	Perm. Wilt Pt	Target AD	Notes	Delete
New field (Pivot ID: 2043)		Sandy Loam	15.00	5.00			Del

Soil Type dropdown menu:

- Sand
- Sandy Loam
- Loam
- Silt Loam
- Silt
- Clay Loam
- Clay

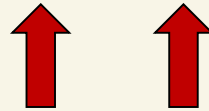
Red arrows point to the 'Field Capacity' and 'Perm. Wilt Pt' columns.

Add New Field

WISP contains texture-based default Fc and PWP values, however these can be easily overwritten by user-input values.

Adding a Crop

Crop for New field (Pivot ID: 2043)						
Crop	Variety	Emergence	Harvest/Kill	Root zone depth	AD Frac.	Notes
New crop (field ID: 2801)	A variety	2013-05-01		36.0	0.5	



The emergence date is the start of the growing season accounting period and is defined as the point when 50% of the crop has emerged.

Seasonal totals begin at this point and proceed to the end of the date range (Oct. 31).

WISP is currently configured for only single cropping.

Adding a Crop

Crop for New field (Pivot ID: 2043)

Crop	Variety	Emergence	Harvest/Kill	Root zone depth	AD Frac.	Notes
New crop (field ID: 2801)	A variety	2013-05-01		36.0	0.5	



The emergence date is the start of the growing season accounting period and is defined as the point when 50% of the crop has emerged. Seasonal totals begin at this point.

The root zone depth must consider existing barriers to root penetration in the soil.

AD Fraction = Managed Allowable Depletion

Field Status Screen

WISP Field Status

Test Farm_% Cover ▾ % Cover_Pivot 2 ▾ % Cover, Pv 1, Field 1 ▾ 2013-07-28

Field Data

Farm: Test Farm_% Cover
Pivot: % Cover_Pivot 2
Field/soil: % Cover, Pv 1, Field 1
Crop: Sweet Corn A variety

Root zone depth: 24.0 in
Emergence Date: 05/01/13
AD at field capacity: 1.32 in.
Initial soil moisture: 15 %

Target 70 % (0.92 in.)

Update Target

Edit Observed Values Below

Date ▾	Poten. ET	Rainfall	Irrigation	% Moisture	% Cover	Adj. ET	AD	Deep Drainage
2013-07-22	0.23	0.00	0.00	3.17898	87	0.23	-1.52	
2013-07-23	0.21	0.00	0.00	2.30815	89	0.21	-1.73	
2013-07-24	0.18	2.00	0.00	9.89148	90	0.18	0.09	
2013-07-25	0.18	0.00	0.30	10.3915	92	0.18	0.21	
2013-07-26	0.14	0.00	0.30	11.0581	94	0.14	0.37	
2013-07-27	0.10	0.00	0.30	11.8915	95	0.10	0.57	
2013-07-28	0.11	1.00	0.60	15.0	97	0.11	1.32	0.74

Seasonal Totals 2013-05-01 to 2013-10-31

[Report in CSV Format](#)

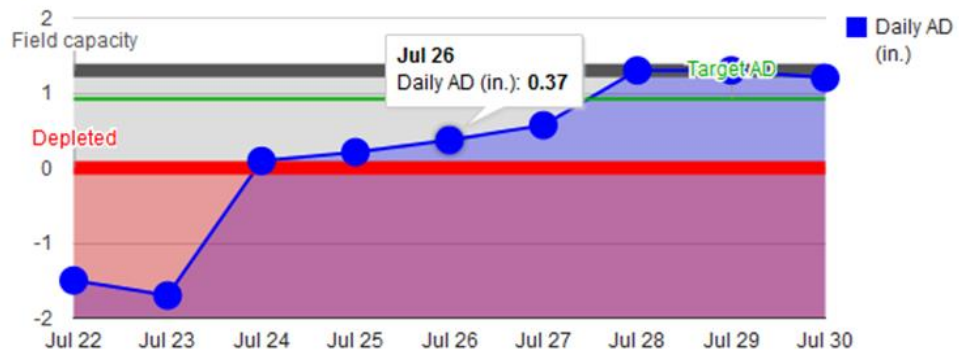
Rainfall: 11.90 in.

Irrigation: 3.00 in.

ET: 24.33 in.

Drainage: 3.64 in.

Calculated Allowable Depletion (inches)



Note the background color changes for $AD < 0$

Field Screen Detail

Field Data

Farm: Test Farm_% Cover
Pivot: % Cover_Pivot 2
Field/soil: % Cover, Pv 1, Field 1
Crop: Sweet Corn A variety

Root zone depth: 36.0 in
Emergence Date: 05/01/13
AD at field capacity: 2.52 in.
Initial soil moisture: 30 %
Target % (1.76 in.)



Seasonal Totals 2013-05-01 to 2013-09-30

[Report in CSV Format](#)



Rainfall: 12.90 in.

Irrigation: 1.90 in.

ET: 25.63 in.

Drainage: 2.79 in.

Current Field Screen Information

Can manually adjust target soil water content.

Running totals from season start to present day.

Archive daily water balance to CSV file

WISP 2012 Archive Output Format

	A	B	C	D	E	F	G	H	I	J
1	Daily Report (2013 Season)									
2	Farm	Pivot	Field							
3	Farm	Pivot	Field							
3	Name	Name	Name							
4	Date	Reference ET	AD	Percent Moisture	Percent Cover	Rainfall	Irrigation	Adjusted ET	Deep Drainage	
65	5/31/2013	0.19	2.19	29.08	12	0	0	0.05	0	
66	6/1/2013	0.16	2.15	28.96	13	0	0	0.04	0	
67	6/2/2013	0.17	2.1	28.83	14	0	0	0.05	0	
68	6/3/2013	0.19	2.04	28.67	15	0	0	0.06	0	
69	6/4/2013	0.02	2.04	28.66	16.25	0	0	0	0	
70	6/5/2013	0.04	2.03	28.63	17.5	0	0	0.01	0	
71	6/6/2013	0.05	2.01	28.58	18.75	0	0	0.02	0	
72	6/7/2013	0.17	1.95	28.41	20	0	0	0.06	0	
73	6/8/2013	0.13	1.89	28.25	23.33	0	0	0.05	0	
74	6/9/2013	0.15	1.82	28.06	26.67	0	0	0.07	0	
75	6/10/2013	0.24	1.69	27.71	30	0	0	0.13	0	
76	6/11/2013	0.18	2.52	30	31	1	0	0.1	0.08	
77	6/12/2013	0.1	2.52	30	32.33	0.1	0	0.06	0.04	
78	6/13/2013	0.24	2.38	29.62	33.67	0	0	0.14	0	
79	6/14/2013	0.23	2.24	29.23	35	0	0	0.14	0	
80	6/15/2013	0.13	2.16	29.01	36.67	0	0	0.08	0	
81	6/16/2013	0.26	2	28.55	38.33	0	0	0.16	0	
82	6/17/2013	0.21	2.36	29.55	40	0.5	0	0.14	0	
83	6/18/2013	0.23	2.2	29.12	41.67	0	0	0.16	0	
84	6/19/2013	0.22	2.05	28.69	43.33	0	0	0.15	0	
85	6/20/2013	0.22	1.89	28.25	45	0	0	0.16	0	
86	6/21/2013	0.12	2.3	29.39	46	0.5	0	0.09	0	
87	6/22/2013	0.14	2.2	29.11	47.33	0	0	0.1	0	
88	6/23/2013	0.25	2.01	28.59	48.67	0	0	0.19	0	
89	6/24/2013	0.2	2.52	30	50	0.8	0	0.16	0.14	
90	6/25/2013	0.2	2.36	29.56	51.67	0	0	0.16	0	
91	6/26/2013	0.18	2.22	29.16	53.33	0	0	0.14	0	
92	6/27/2013	0.22	2.04	28.66	55	0	0	0.18	0	
93	6/28/2013	0.17	1.89	28.26	55.75	0	0	0.14	0	
94	6/29/2013	0.09	1.82	28.04	56.5	0	0	0.08	0	
95	6/30/2013	0.24	2.01	28.58	57.25	0	0.4	0.2	0	

Output from the WISP 2012 data export utility.

Exported CSV file is easily imported into Excel.

The CSV file can be exported even after growing season completion

Field Screen Detail

Edit Observed Values Below

Date	Poten. ET	Rainfall	Irrigation	% Moisture	% Cover	Adj. ET	AD	Deep Drainage
2013-07-22	0.23	0.00	0.00	3.17898	87	0.23	-1.52	
2013-07-23	0.21	0.00	0.00	2.30815	89	0.21	-1.73	
2013-07-24	0.18	2.00	0.00	9.89148	90	0.18	0.09	
2013-07-25	0.18	0.00	0.30	10.3915	92	0.18	0.21	
2013-07-26	0.14	0.00	0.30	11.0581	94	0.14	0.37	
2013-07-27	0.10	0.00	0.30	11.8915	95	0.10	0.57	
2013-07-28	0.11	1.00	0.60	15.0	97	0.11	1.32	0.74

- User inputs overwrite all table values except **Adjusted ET, AD and Deep Drainage**, which are calculated.
- Potential ET is read automatically by default, but can be overwritten by the user.

Field Screen Detail

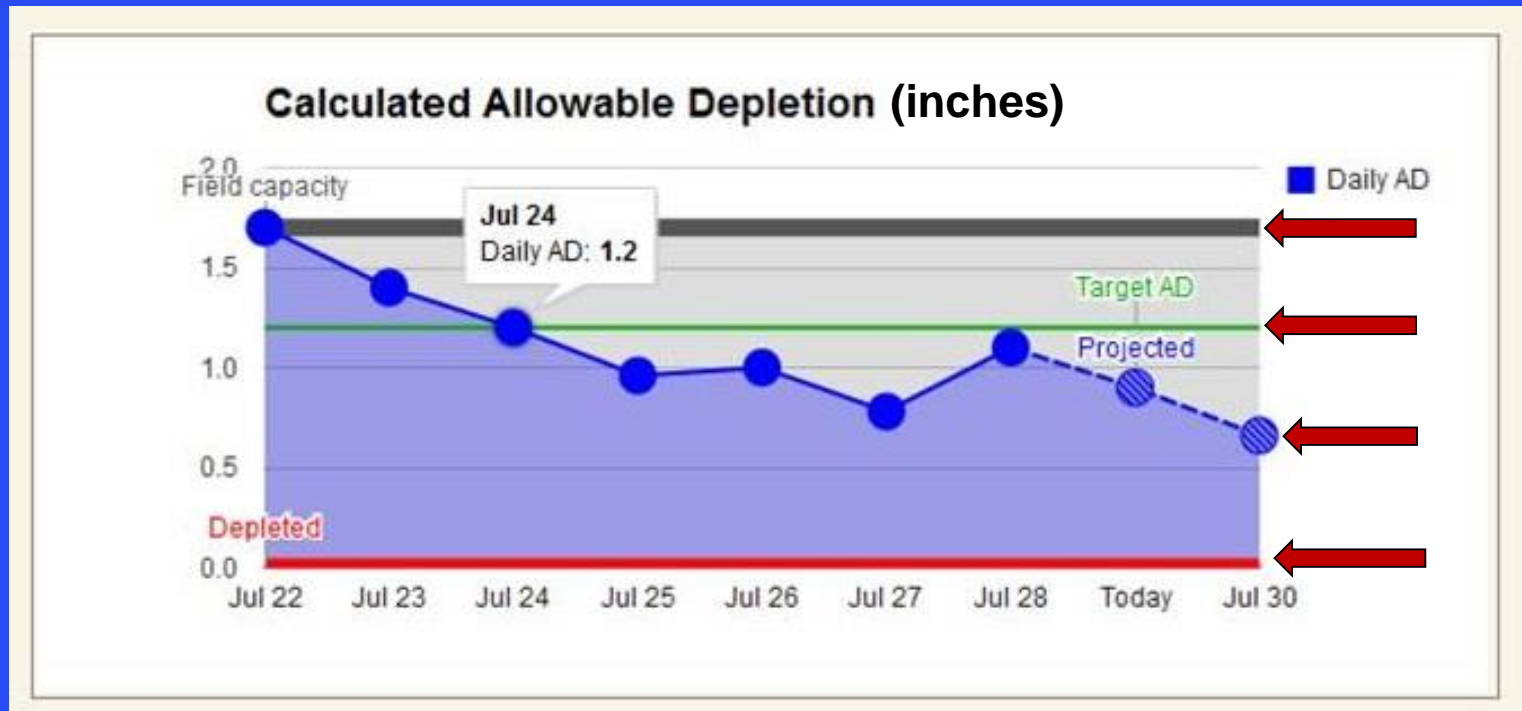
Edit Observed Values Below

Date	Poten. ET	Rainfall	Irrigation	% Moisture	% Cover	Adj. ET	AD	Deep Drainage
2013-07-22	0.23	0.00	0.00	3.17898	87	0.23	-1.52	
2013-07-23	0.21	0.00	0.00	2.30815	89	0.21	-1.73	
2013-07-24	0.18	2.00	0.00	9.89148	90	0.18	0.09	
2013-07-25	0.18	0.00	0.30	10.3915	92	0.18	0.21	



All user-input soil moisture is used from the time of entry forward.

Field Screen Detail



The time series graph displays inches of Allowable Depletion (AD) and projects AD two days into the future.

WISP 2012 Availability

So where do I find WISP 2012 ???

<http://wisp.cals.wisc.edu/>

UW – Madison College of Agriculture and Life Sciences server



QUESTIONS ? ? ?