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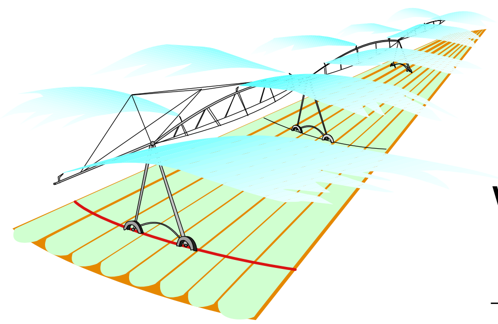


Irrigation Management in Wisconsin—the Wisconsin Irrigation Scheduling Program (WISP)

David Curwen and Leonard R. Massie

Successful irrigation management

Wisconsin growers irrigate about 250,000 acres of potato, vegetable, field, fruit, turf and nursery crops each year to ensure profitable crop production.

Irrigation improves both crop yield and quality. Yield responses are due to increased dry matter production, more plants per acre and increased numbers of vegetative organs (tubers, roots, stems, leaves) or reproductive parts (flowers, pods, fruits).

Irrigation enhances the quality of many crops by reducing moisture stress. Lack of moisture in a crop can produce misshapen fruit and tubers, poorly filled bean pods or ears of corn and low protein content in forages. Moisture stress can deter uniform crop maturity, which is important for efficient harvesting of processing vegetables.

Successful irrigation management eliminates excess irrigation and efficiently uses rain. Wise management conserves energy, reduces costs and protects groundwater quality. Most of Wisconsin's irrigated soils are sandy and the groundwater is close to the surface, so the potential for groundwater contamination by nitrates and pesticides is high. Over irrigation and excessive or untimely rains can add more water than crops can use or soils can store. The excess water moves past the root zone, carrying nitrates and pesticides into groundwater.

Sprinkler irrigation

Sprinkler irrigation is the most common type of irrigation in Wisconsin. Sprinkler irrigation waters crops through a pressurized system of pipes and spray or impact nozzles. The objective is to apply the right amount of water at the right time.

Overhead sprinkler irrigation has multiple uses in crop production. Properly designed and managed sprinkler systems can regulate soil moisture and temperature, apply fertilizers and pesticides, and aid liquid waste and manure disposal.

Sprinkler irrigation of large crop acreages requires large volumes of water. Average daily crop water needs (about 0.2 inch/day in July) require a minimum of 4 gallons per minute (gpm) for each acre irrigated. To apply 0.2 inch of water in 24 hours to 100 crop acres, a sustained pumping capacity of 400 gpm is needed. A very high crop water need of 0.3 inch/day would require 6 gpm/a or a pumping capacity of 600 gpm to irrigate 100 acres in 24 hours. To reduce electric power costs, many irrigators take advantage of "time of day" programs. These programs restrict irrigation to off-peak periods during the day or to about 100 hours per week. Such programs require a pumping capacity of 7.5 gpm/a or 750 gpm/100 acres.

Soil moisture control

The most common use of sprinkler irrigation is to maintain adequate soil moisture throughout the growing season. In this use, irrigation is either a supplemental or primary source of water for the crop. On heavier soils, irrigation normally supplements rainfall that is adequate throughout the season but may not come at the right time or in sufficient amounts. Irrigation is the primary water source for crops grown on sandy soils with low soil water storage.

Maintaining adequate soil water storage during the growing season is necessary to avoid moisture stress. Moisture stress during any part of the season can reduce yields. In addition, many crops have specific growth stages during which moisture stress can significantly reduce yield or quality. These critical periods are seed germination, bud formation, blossom-fruit set and fruit development for pod crops (snap beans, soybeans) and fruit crops (cucumbers, melons, strawberries). The critical stage for corn is from pollination to early ear development. For potatoes, the critical period is from tuber initiation to harvest.

Allowable depletion and evapotranspiration

When planning an irrigation program to control soil moisture, you must consider (1) the readily available water held in a soil's crop root zone that is available for optimum, stress-free growth (allowable depletion or AD), and (2) the amount of water a growing crop uses (evapotranspiration or ET).

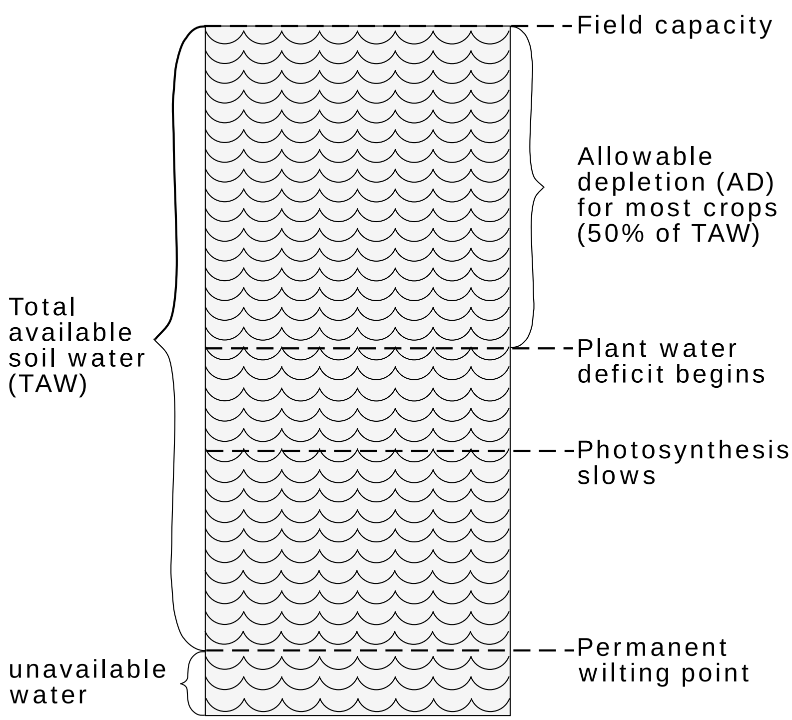
A soil's allowable depletion is less than its total available soil water (TAW). Total available water is the amount of water a soil holds at field capacity minus the amount it holds when plants permanently wilt. (Field capacity is the amount of water a soil will hold after drainage by gravity 24 to 48 hours after a soaking.) Total available water was once considered completely usable and uniformly available to the plant without moisture stress or yield reductions occurring. However, moisture stress can develop before TAW is depleted. Moisture stress, slowdown of photosynthesis and yield reductions can all occur before wilting becomes apparent. As the plant water deficit becomes more severe, wilting occurs, photosynthesis ceases and yields suffer dramatically. Severe and prolonged deficits result in plant death.

Allowable depletion is a percentage of total available water and may change for different crops. For most crops the AD equals 50% of the TAW. For potatoes, the AD is 35%–40% of the TAW. Figure 1 illustrates the relationships among field capacity, total available water, allowable depletion and wilting point.

The AD for a soil is related to soil texture, structure, type and organic matter content. In general, sandy soils have the lowest AD. Silt loam soils have the highest and clays are intermediate. Your county Extension and Soil Conservation Service (SCS) offices can provide AD or TAW information for various soils.

The AD value is also determined by the crop's effective rooting depth. Effective rooting depth is the portion of the soil profile from which most of the water and nutrients are absorbed by the root system. Crops differ in their effective rooting depths (see table 1), and in the uniformity of water uptake within that depth. The effective rooting depth of a given crop may vary with soil texture, the presence of plow pans (or other compaction problems) and the effects of root diseases.

Figure 1. Allowable depletion vs. total available soil water



Some AD values for major crop/soil systems are shown in appendix table A. Sandy soils typically have smaller AD values than do silt loams. A Plainfield loamy sand at field capacity and under normal July climatic conditions could carry a field corn crop for 6 to 8 days before stress occurs. Under the same conditions, a Plano silt loam could carry a corn crop for 13 to 18 days before stress would occur. The AD value for any crop/soil system can be determined from SCS Soil Survey Information. (See example calculation in appendix table A).

A crop's evapotranspiration (ET) is the sum of water loss through direct evaporation from the soil surface and water loss from plant transpiration. In Wisconsin, the ET can vary from 0.12 to 0.30 inch per day depending on crop growth stage, soil and climatic factors. Increasing plant size and crop canopy raises ET rates. A decrease in total available water that exceeds allowable depletion lowers ET rates, but also results in lower yields. Increasing air temperatures, more intense light, longer days, higher wind velocity and decreasing relative humidity can all cause higher ET losses. On a warm, bright, sunny day with low relative humidity and a light breeze, the ET rate may average 0.19 inch/day. Under cool, cloudy, and rainy conditions, the ET rate may be 0.15 inch/day or less. As the growing season advances from April to July, the ET rate generally increases. ET rates may approach 0.25 to 0.30 inch/day during July's hot and dry climate. ET rates usually decrease from August through October.

Irrigation frequency

The frequency of irrigation depends upon the soil's AD value, the stage of crop development and existing climatic conditions, including rainfall.

In general, irrigation will be most frequent on sandy soils, which have low water storage, and under high evapotranspiration conditions as plant size increases. The amount of water applied per irrigation should replace the ET loss, but should not exceed the AD value for the crop/soil system. Applying more water than the soil can hold wastes water and power and may leach nitrogen and pesticides from the root zone. Likewise, the rate of application should not exceed the soil's ability to take up water, or runoff will occur.

The Wisconsin Irrigation Scheduling Program (WISP)

The Wisconsin Irrigation Scheduling Program (WISP) is a research-based program that uses a water budget approach to irrigation scheduling. The program uses evapotranspiration (ET) estimates to monitor soil water storage, termed "AD Balance" (AD BAL). The AD BAL assists growers in determining frequency and amounts of irrigation. This approach provides the scheduling flexibility essential in humid areas like Wisconsin, where rainfall patterns are variable and changeable.

Table 1. Effective rooting depth of crops commonly irrigated in Wisconsin

Depth, inches	Crops
0–12	Strawberries, turf grasses
0-18	Beets (table), lettuce, onions, potatoes
0–24	Beans (snap, lima, dry), peas, peppers, red clover, spring grains, soybeans, sweet corn, tobacco
24–48	Alfalfa, birdsfoot trefoil, field corn, melons, pasture grasses, pumpkins, squash, raspberries

Effective rooting depths for a given crop may vary with soil texture. In general, crops root deeper on coarser textured soils.

A computer program that simplifies the irrigation scheduling process is available through Extension. Data entry is easy and all calculations are done by the computer. (See figure 2 for an example of the main screen.) Information on the computerized version of WISP is available from your county Extension office or by contacting:

WISPLAN
Hiram Smith Hall
1545 Observatory Drive
Madison, WI 53706
(608) 262-4552

Using WISP without a computer

If you don't have a computer, use the WISP accounting form at the back of this publication to record the data you need to derive AD BALs and make irrigation decisions. One form allows for one month of irrigation scheduling, so make several copies of the form. You will calculate and record the following estimates onto the form to help you make irrigation decisions.

Step 1: Fill in the information at the top of the WISP accounting form.

The AD value for the crop/soil system is the amount of readily available soil water storage at field capacity. Select an AD value for the crop/soil system from table 2 or calculate this value from Soil Conservation Service Soil Survey Information as described in appendix table A.

Step 2: Enter the Initial AD BAL.

This is the amount of readily available soil water when irrigation scheduling starts, normally at crop emergence or with the resumption of alfalfa or other forage crop growth. If the soil is at field capacity when irrigation scheduling starts, then the initial AD BAL equals the AD value. If the soil is not at field capacity, then estimate the initial AD BAL using soil tensiometers or the "feel chart" in appendix table B. The initial AD BAL will be a value between 0 and the AD value for the crop/soil system.

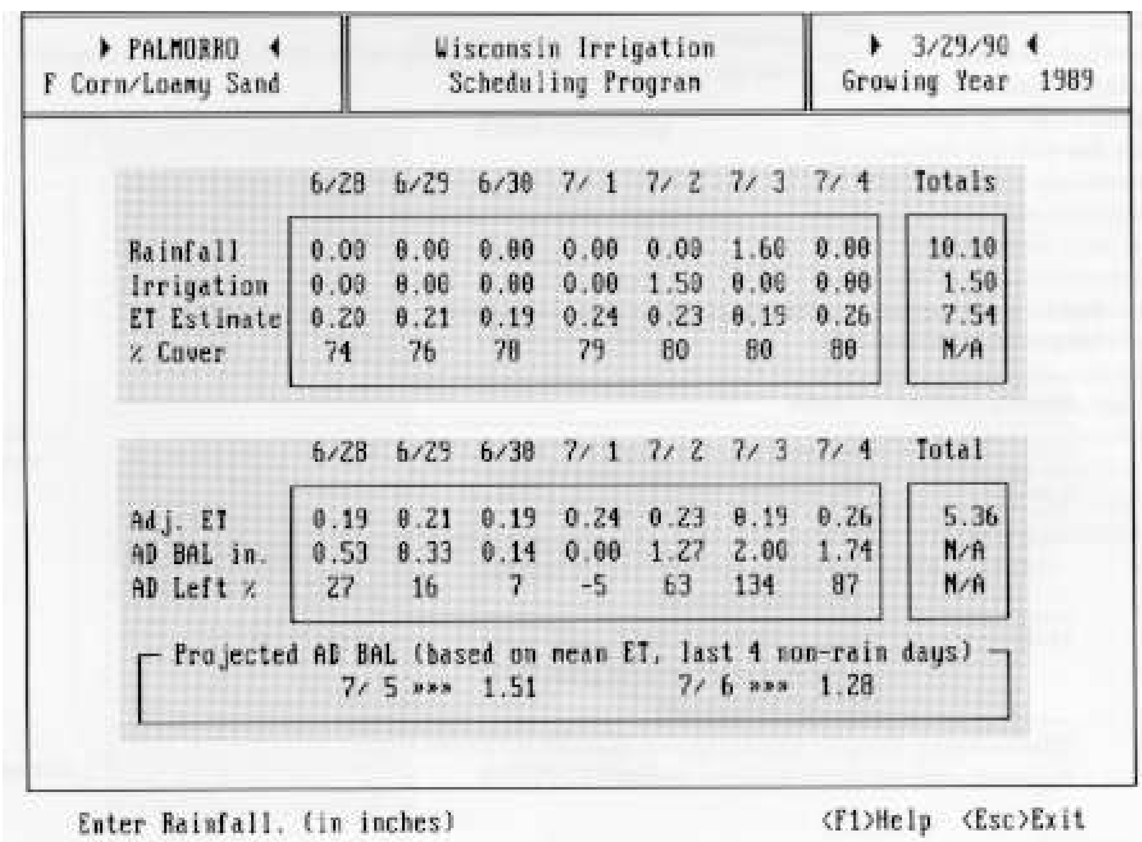
Step 3: Enter rainfall and irrigation in inches.

Any amount of rain greater than 0.1 inch is available for crop growth and should be recorded in WISP. Use in-field rain gauges not affected by irrigation to measure rainfall. To determine applied irrigation, monitor system operating time and pumping rates, or place rain gauges under the system.

Step 4: Enter the evapotranspiration (ET) estimate.

University of Wisconsin-Extension calculates an ET estimate each day from mid-May to mid-September. The ET estimate is for a well-watered crop at

Figure 2. The WISP main screen.



full cover (defined as 80% cover or more in WISP). ET estimates are calculated for each of the state's major irrigated areas using climatic data collected in each area. These estimates are available over the IPM PEST Phone. The toll free number inside Wisconsin is (800) 236-4264. Outside Wisconsin, call (608) 262-4264. Irrigators in areas without ET estimates can derive rough estimates from table 2. Use crop development and prevailing climatic conditions to help determine estimates.

Step 5: Enter % cover.

Enter % cover, or crop canopy development, from crop emergence until 80% of the soil surface is covered by crop canopy. Estimate the % cover for row crops by measuring crop canopy width in one row and divide this figure by the between-row spacing at ground level. (See figure 3.)

Step 6: Determine the adjusted ET estimate.

Use the % cover and ET estimate values to fill in the adjusted ET estimate according to the instructions in appendix table C. You must adjust the daily ET estimate until the % cover reaches 80%. Once 80% cover is reached, no further adjustment is needed for most vegetable crops. For potatoes, however, the percent cover should be reduced by 5% per week when vine senescence (natural dying) begins about mid-August. For field corn, reduce % cover by 5 percent per week when the crop reaches the dent stage. For recently harvested alfalfa, the percent cover increases uniformly from 0 to 80% cover over a 12 to 14 day period. These adjustments in % cover prevent late season over-irrigation.

Step 7: Calculate the daily balance.

Subtract the adjusted ET from the combined amount of rainfall and irrigation for the day. The resulting number will usually be negative because daily irrigation and rain will generally be less than the adjusted ET.

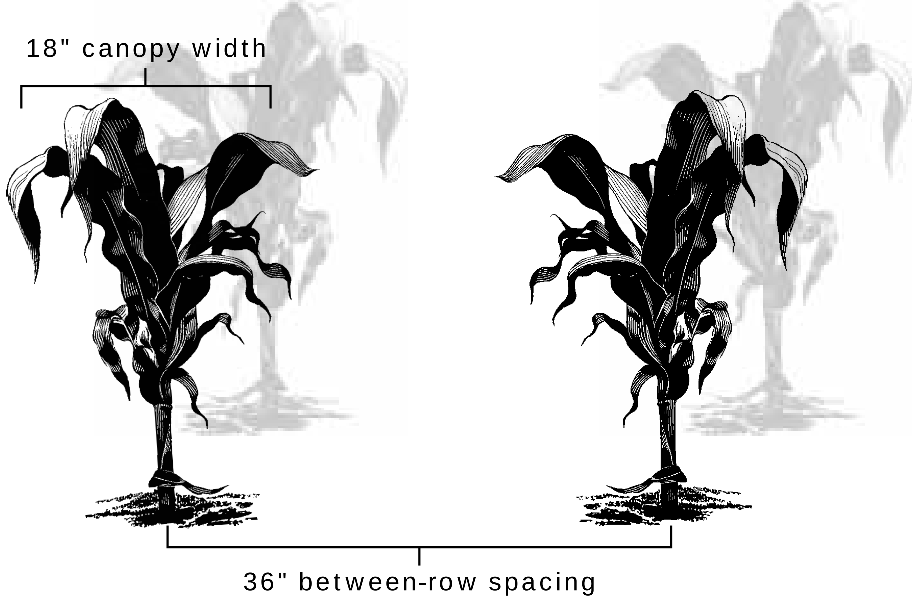
Step 8: Use the daily balance to determine the allowable depletion balance (AD BAL) in inches.

If the daily balance is negative, subtract its value from the AD BAL of the previous day (or the initial AD BAL when beginning data entry). If the daily balance is positive, add its value to the AD BAL from the previous day. If the daily balance is greater than the full AD value for the crop/soil system, then add only that amount of the daily balance needed to bring the previous day's AD BAL to the AD Value for the crop/soil system. The rest of the daily balance represents excess water that will probably move through the root zone and contribute to leaching.

Table 2. Values for estimating evapotranspiration

Climate	Evapotranspiration inch/day May	June	July	Aug.	Sept.
Dull, cloudy	0.12	0.15	0.15	0.12	0.09
Normal	0.15	0.20	0.20	0.15	0.12
Bright, hot	0.20	0.25	0.25	0.20	0.15

Figure 3. To calculate % cover, divide the canopy width by the between-row spacing at ground level. Here, the percent cover is 50% (18÷36=50%).



The frequency of calculating and updating AD BALs depends on the soil type and current climatic conditions. Under normal conditions, wait no longer than three to four days to update inputs for crops grown on sands, and no more than five to six days for crops grown on heavier soils. Under stress-causing conditions, update inputs one day sooner.

Deciding to irrigate

The AD BAL indicates current levels of readily available soil water, in inches, and will help you determine how much, if any, irrigation to apply. Usually, you will decide to irrigate when the AD BAL approaches zero. To provide lead time to irrigate an entire field, do not let the AD BAL actually reach zero.

Under no circumstances should the amount of a single irrigation exceed the AD value for the crop/soil system. This volume of water would exceed the soil's water storage capacity and cause leaching. Normally, apply enough irrigation to keep soil water storage below field capacity, but within the AD range.

When properly used, WISP will help maintain your field's AD BAL between zero and the full AD value for the crop/soil system. This balance ensures adequate, readily available soil water for crop growth, while avoiding soil extremes that can stress the crop (too little soil water), or result in leaching (too much soil water). Careful irrigation management using WISP helps you obtain profitable yields and top quality with minimum impact to water resources.

Examples of completed WISP accounting forms

On the next page are examples of completed WISP accounting forms for two months of irrigation scheduling. The field name—"Palmorro" in this case—and other information is recorded at the top of the form. The allowable depletion (AD) value for the field corn/sand system (as derived from appendix table A) is 2 inches for the 3-foot rooting depth of corn.

The inputs needed to derive AD BALs are entered in the designated columns below the field information. An initial AD BAL of 0.80, derived using the "feel chart" in appendix table B, is entered only for the first month of scheduling. For subsequent months, the grower carries over the AD BAL from the last day of the previous month.

The dates and amounts of rainfall (greater than 0.1 inch) and irrigation are recorded as they occur. On June 1, total rain and irrigation was 0. The grower calculated an adjusted ET estimate of 0.12 and subtracted this figure from 0 to get a daily balance of -0.12. This daily balance, subtracted from the initial AD BAL of 0.80, resulted in a new AD BAL of 0.68. The AD BAL then declined steadily until 0.70 inches of rain fell on June 27, resulting in a positive daily balance of 0.50 and an AD BAL of 0.62. A forecast of rain likely caused the grower to delay irrigation on June 26, even though the AD BAL was approaching 0.

On June 30, the grower applied a 1 -inch irrigation. This exceeded the adjusted ET value of 0.19, so a daily balance of +0.81 resulted. This daily balance, when added to the previous day's AD BAL of 0.17, resulted in a new AD BAL of 0.98 inch, or nearly 50 percent of the AD value for the crop/soil system. Not irrigating to field capacity provides a storage buffer to absorb any rain that may follow irrigation.

On July 4, the 0.06 inch AD BAL was approaching zero, but the grower again decided not to irrigate. No rain fell and, as a result, the AD BAL reached zero on July 5. This indicated that the crop had depleted all readily available water and was coming under stress. A 1.25-inch irrigation on July 6 removed the stress.

Three inches of rain on July 7 followed the 1.25-inch irrigation on July 6. But only 0.99 inch of the resulting +2.88 daily balance was needed to restore the previous day's AD BAL of 1.01 inch to the 2.0-inch AD value for the crop/soil system. The rest of the daily balance (1.89 inches) was excess water and moved below the root zone, where it likely contributed to leaching. Excess irrigation can't always be avoided. However, if rain is forecasted within 24 hours, delay irrigation or reduce the amount to take advantage of any forthcoming rain.

Month 1

Field: *Palmorro*

Crop/Soil System: *Field corn/Loamy sand*

Growing Year: *1993*

Beginning Day of Data: *6-1-93*

AD Value for Crop/Soil System: *2.0 inches*

Month/Day	Rainfall	Irrigation	ET Estimate	% Cover	Adjusted ET	Daily Bal.	AD BAL
June	Initial AD BAL (AD BAL forward)						0.80
1	0	0	0.22	30	0.12	-0.12	0.68
2	0	0	0.21	35	0.14	-0.14	0.54
26	0	0	0.15	76	0.15	-0.15	0.12
27	0.70	0	0.20	78	0.20	+0.50	0.62
28	0	0	0.22	80	0.22	-0.22	0.40
29	0	0	0.23	80	0.23	-0.23	0.17
30	0	1.00	0.19	80	0.19	+0.81	0.98
31	—	—	—	—	—	—	—
Totals							

Month 2

Field: *Palmorro*

Crop/Soil System: *Field corn/Loamy sand*

Growing Year: *1993*

Beginning Day of Data: *6-1-93*

AD Value for Crop/Soil System: *2.0 inches*

Month/Day	Rainfall	Irrigation	ET Estimate	% Cover	Adjusted ET	Daily Bal.	AD BAL
July	Initial AD BAL (AD BAL forward)						0.98
1	0	0	0.24	80	0.24	-0.24	0.74
2	0	0	0.23	80	0.19	-0.23	0.51
3	0	0	0.19	80	0.23	-0.19	0.32
4	0	0	0.26	80	0.26	-0.26	0.06
5	0	0	0.25	80	0.25	-0.25	0.00[a]
6	0	1.25	0.24	80	0.24	+1.01	1.01
7	3.0	0	0.12	80	0.12	+2.88	2.00[b]
8	0	0	0.20	80	0.20	-0.20	1.80
9	0	0	0.22	80	0.22	-0.22	1.58
10							

[a] *An AD BAL of less than 0 is recorded as 0, as the crop has already depleted all readily available soil water.*

[b] *Any amount of an AD BAL greater than the AD value for the crop/soil system is not recorded, as this excess water has probably moved below the root zone.*

Appendix Table A. AD values for major crop/soil systems irrigated in Wisconsin[a]

	Crop effective rooting depth[b]			
	(to 12")	(to 24")	(to 30")	(to 36")
Soil type	Potato, strawberry	Snap bean, pea	Soybean, sweet corn, seed corn	Field corn, alfalfa
	Allowable depletion in inches			
Plainfield loamy sand	0.7	1.1	1.4	1.6
Gotham loamy sand	0.7	1.1	1.3	1.8
Richford loamy sand	0.7	1.4	1.7	2.0
Chetek sandy loam[c]	0.7	1.0	1.0	1.0
Pence sandy loam[c]	0.9	1.3	1.3	1.3
Billet sandy loam	0.9	1.7	2.1	2.4
Onemia sandy loam[c]	1.0	2.0	2.0	2.0
Plano silt loam	1.2	2.4	3.0	3.4
Antigo silt loam[c]	1.3	1.8	2.3	2.4

[a] *Allowable depletion (AD) values are for well-drained soils at field capacity.*
[b] *Effective rooting depth—depth of soil profile from which most of the water is absorbed by the root system. Assumes no barrier to root development.*
[c] *These soils restrict root development to the following depths: Chetek—17," Pence—16," Onemia—28," and Antigo—33"*

Other soil types

You can calculate allowable depletion (AD) values for soils not listed in the above table. The method here uses the 36-inch effective rooting depth for corn and data on available water capacity (AWC, also called TAW) from Soil Conservation Service (SCS) Soil Survey information, available though the SCS office in your area:

The AWC for a soil varies with depth, as the following SCS Soil Survey data for a Salter very fine sandy loam shows:

0–7 inches of profile depth—0.22 inch AWC per one inch depth
7–36 inches of profile depth—0.15 inch AWC per one inch depth

Calculate the AWC for each profile zone, then add the totals together to derive the AWC for the entire rooting depth:

7 x 0.22 = 1.54 AWC for the first 7 inches of rooting depth
29 x 0.15 = 4.35 AWC for the next 29 inches of rooting depth
1.54 + 4.35 = 5.89 AWC for the 36-inch rooting depth of corn

The AD value for most crop/soil systems is 50% of the total AWC. Thus, for a Salter very fine sandy loam:

AD value = 2.9 inches (5.89 inches x 50%)

The AD value is an estimate of the soil's readily available water storage. You may need to modify your AD estimate as you gain experience with the WISP scheduling program.

Appendix Table B. Estimating soil moisture

WISP allows you to start irrigation scheduling when soil moisture is less than field capacity. You can select an initial allowable depletion balance (AD BAL) between 0 and the AD value for the crop/soil system. The following "feel chart" may help you estimate the initial AD BAL.

In the chart, soil moisture is expressed as % available moisture, but can be converted to the initial AD BAL as follows:

50% available moisture	=	0%of the AD value
60–65% available moisture	=	20–30% of the AD value
70–80% available moisture	=	40–60% of the AD value
100% available soil moisture	=	100% of the AD value

For example, the AD value for field corn on sands is 2.0 inches. The ball feel test results in a weak ball with a distinct finger print outline. This represents 70–80% available moisture, or 40–60% of the AD value for the corn/sand system, so the initial AD BAL is 0.80 (2.0 x 40% = 0.80).

"Feel chart" for estimating soil moisture

% available moisture	Loam, silt loam, clay loam soil texture	Sand and loamy sand soil texture
Below 20	Powdery, dry, will not form a ball. If soil is crusted, easy to break into powdery condition.	No ball forms. Single grained soil flows through fingers with ease.
35–40	Dry, almost powdery. A ball can be formed under pressure, but some soil will fall or flake away when hand is opened. The ball is very crumbly and hardly holds its shape.	Forms a weak brittle ball. Finger print outline is not discernible. No soil sticks to hand.
50	Forms a ball readily, holds its shape. No moist feeling is left on hand nor will any soil fragments cling to palm. Ball is very brittle and breaks readily. Soil falls or crumbles into small granules when broken.	Forms a very weak ball. If soil is well broken up, it will form more than one ball upon squeezing. Fingerprint outline is barely discernible. Soil grains will stick to hand.
60-65	Forms firm ball; distinct fingerprint outline on ball. Hand feels damp but not moist. Soil doesn't stick to hand. Ball is pliable. When broken, ball shatters or falls into medium-size fragments.	Forms a weak, brittle ball. Fingerprint outline is not as distinct. Soil particles will stick to hand in a patchy pattern.
70-80	Damp and heavy; slightly sticky when squeezed. Forms tight plastic ball. Shatters with a burst into large particles when broken. Hand is moist.	Forms a weak ball. Distinct fingerprint outline on ball. Soil particles will stick to palm.
100	Wet, sticky, doughy and slick. Soil forms a very plastic ball, handles like stiff bread dough or modeling clay; not muddy. Leaves water on hand. Ball will change shape and cracks will appear before breaking.	Upon squeezing, no free water appears on ball but wet outline of ball is left on hand. Ball has some stickiness and a sharp fingerprint outline is left on it.

Appendix Table C. Evapotranspiration (ET) estimates adjusted for % crop canopy cover (for use with WISP)

ET estimate in inches	% crop cover								
	0	10	20	30	40	50	60	70	80
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02
0.04	0.00	0.00	0.01	0.02	0.03	0.03	0.04	0.04	0.04
0.06	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.06
0.08	0.00	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.08
0.10	0.00	0.02	0.04	0.05	0.07	0.08	0.09	0.10	0.10
0.12	0.00	0.03	0.05	0.06	0.08	0.09	0.11	0.11	0.12
0.14	0.00	0.03	0.05	0.07	0.09	0.11	0.12	0.13	0.14
0.16	0.01	0.04	0.06	0.08	0.11	0.13	0.14	0.15	0.16
0.18	0.01	0.04	0.07	0.09	0.12	0.14	0.16	0.17	0.18
0.20	0.01	0.05	0.08	0.11	0.13	0.16	0.18	0.19	0.20
0.22	0.01	0.05	0.08	0.12	0.15	0.17	0.19	0.21	0.22
0.24	0.01	0.06	0.09	0.13	0.16	0.19	0.21	0.23	0.24
0.26	0.01	0.06	0.10	0.14	0.17	0.20	0.23	0.25	0.26
0.28	0.01	0.06	0.11	0.15	0.19	0.22	0.25	0.27	0.28
0.30	0.01	0.07	0.12	0.16	0.20	0.23	0.26	0.28	0.30
0.32	0.02	0.07	0.12	0.17	0.21	0.25	0.28	0.30	0.32
0.34	0.02	0.08	0.13	0.18	0.23	0.26	0.30	0.32	0.34
0.36	0.02	0.08	0.14	0.19	0.24	0.28	0.32	0.34	0.36

*To use this table, you must have an estimate of the current % crop canopy cover and the ET estimate provided by University of Wisconsin-Extension, Cooperative Extension. You can obtain the ET estimate by calling the toll-free IPM PEST Phone at (800) 236-4264. Outside Wisconsin, call (608) 262-4264.

To adjust the ET estimate for canopy cover, select the appropriate % crop cover value. Move right to the column headed by the ET estimate. The value at the intersection is the adjusted ET estimate.

WISP Accounting Form

Field: ______________________________

Crop/Soil System: ______________________

Growing Year: __________________________

Beginning Day of Data: __________________

AD Value for Crop/Soil System: ____________

Month/Day	Rainfall	Irrigation	ET Estimate	% Cover	Adjusted ET	Daily Bal.	AD BAL
	Initial AD BAL (AD BAL forward)						
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
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30							
31							
Totals							

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