

MEASURING REFERENCE EVAPOTRANSPIRATION (ET_0)

THE COCORaHS GUIDE



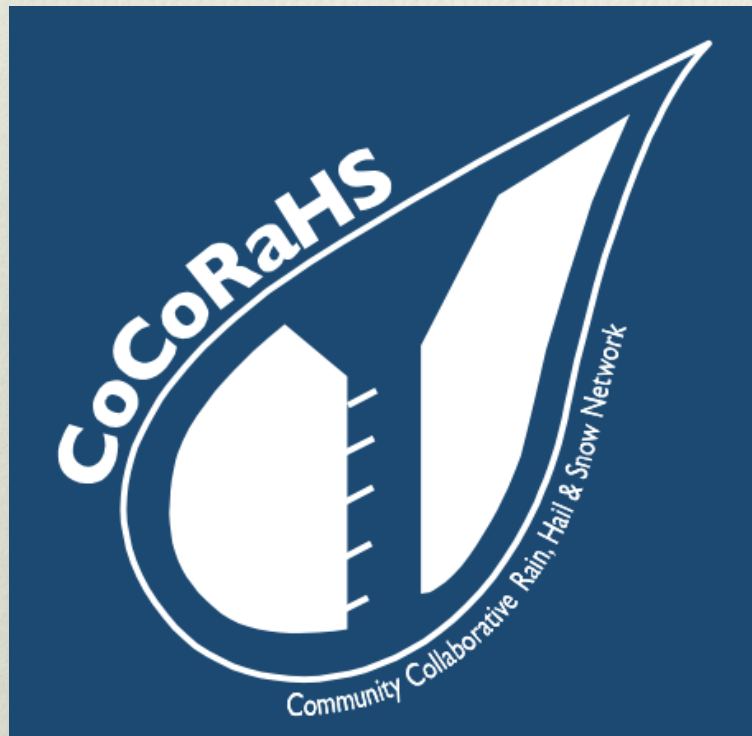
What is Evapotranspiration?

ET (evapotranspiration) is the water evaporated from the ground back to the atmosphere both as transpiration from the leaves of plants and also as direct evaporation from open water and soil.



Photo: H. Reges

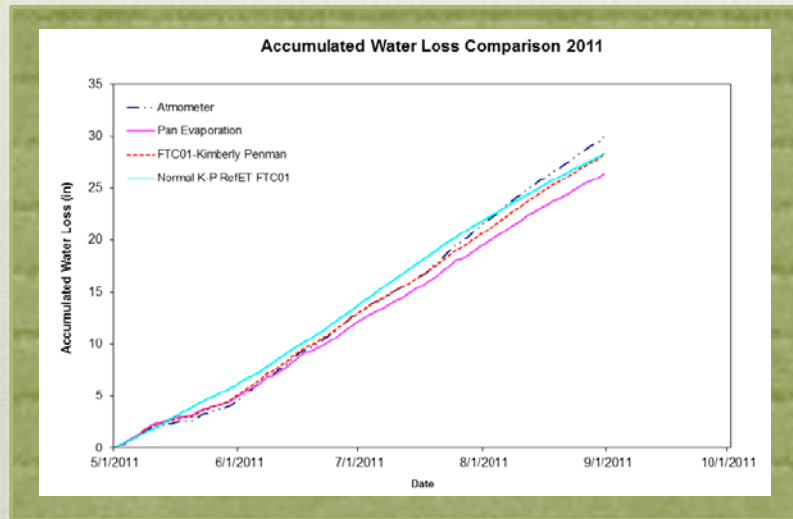
Help CoCoRaHS measure ET!



Help CoCoRaHS measure ET! We know how much water comes from the sky (precipitation) since many of us measure it. Knowing how much water is leaving the soil and returning to the atmosphere is just as important. It matters for agriculture, lawn care, weather prediction, hydrology and much more. We should measure and display this important part of our climate.

Measuring Reference Evapotranspiration **ET_o**
"The 'up' side of the water cycle"

Bringing ET to CoCoRaHS



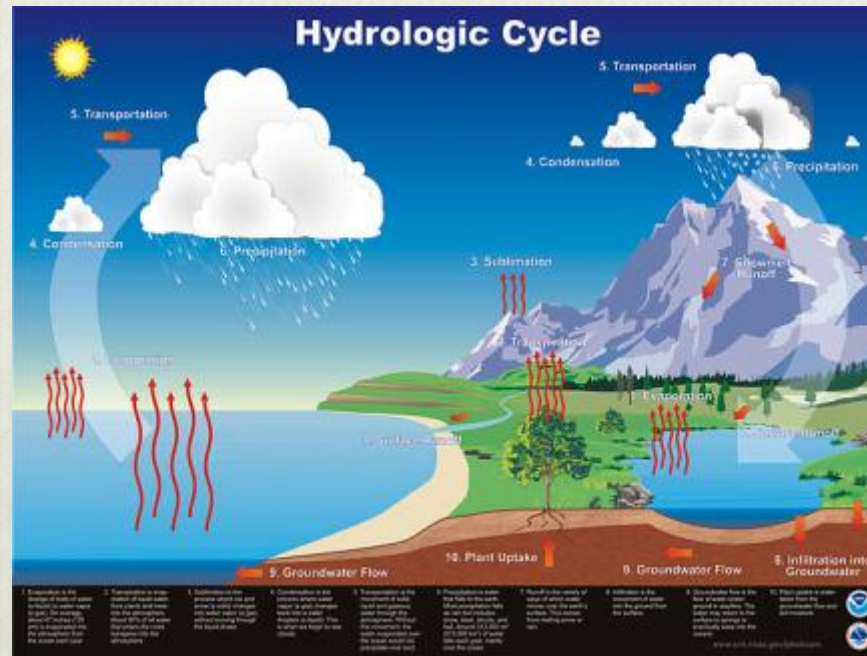
The Colorado Climate Center has been using the ETgauge since 2009. Comparisons with weather-data based reference ET estimations and from Class A pan evaporation data show fairly high correlations on a daily basis and better relationships when accumulated over consecutive days. Based on these findings and the growing popularity of this instrument within the irrigated agricultural community, the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS), began a pilot project in 2011.

The ETgauge is a simple hands-on measurement that demonstrates the water balance in action. *“Simple as a rain gauge, but in reverse”*. It is proving to be an ideal complementary measurement to enhance both the educational capabilities and the data resources provided by CoCoRaHS.

ET_o Training Guide Outline

- ❖ Introduction of the Hydrologic Cycle, ET and the ETgage
- ❖ Installing your ETgage
- ❖ Preparing your Etgage for observations
- ❖ Taking your observation
- ❖ Reporting your observation
- ❖ Viewing ET_o observation and summary reports
- ❖ Caring for your ETgage
- ❖ Frequently Asked Questions

The Hydrologic Cycle



“The cycle in which water evaporates from the oceans and the land surface, is carried over the earth in atmospheric circulation as water vapor, precipitates again as rain or snow, is intercepted by trees and vegetation, provides runoff on the land surface, infiltrates into soils, recharges groundwater, discharges into streams, and ultimately flows out into the oceans, from which it will eventually evaporate again.”

AMS Glossary of Meteorology

Components of the Hydrologic Cycle

- ❖ Evaporation, Transpiration and Sublimation
- ❖ Condensation
- ❖ Precipitation
- ❖ Runoff (stream flow)
- ❖ Infiltration into ground water
- ❖ Groundwater natural flow to streams or pump back to surface

Of these elements, precipitation and stream flow are monitored fairly well but the other important components are only measured in a few places and are often approximated.

What is Reference (Potential) Evapotranspiration (ET)?

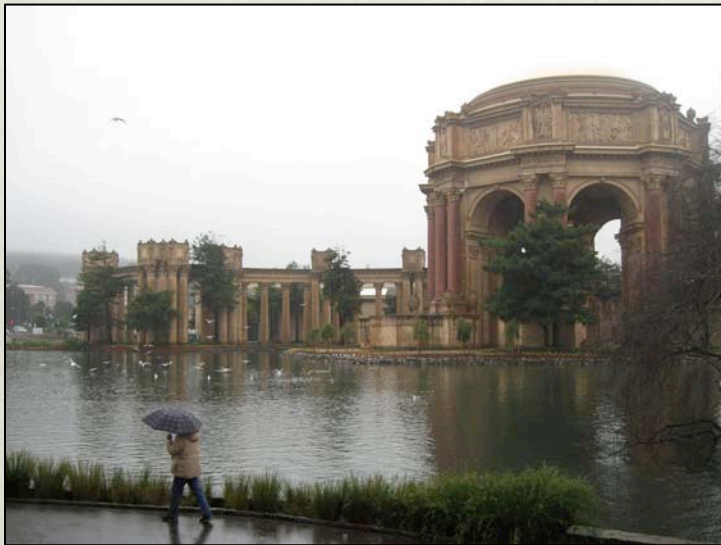
“Reference evapotranspiration is defined as the ET from an extensive surface of clipped grass (ET_g) or alfalfa (ET_a) that is well-watered, and fully shades the ground.”

Kimberly R&E Center, Univ. of Idaho

“. . . generally, the amount of moisture that, if available, would be removed from a given land area by evapotranspiration; expressed in units of water depth. It can be measured in a dry basin by determining the amount of irrigation water used and in wetter regions, by the difference between rainfall and runoff, or by the supply of water required to maintain a constant amount of soil moisture in an isolated block of the soil.”

AMS Glossary of Meteorology

ET varies from place to place and day to day



The amount of water loss due to ET may be very small on cool, cloudy and damp days but may be 0.30" or more on hot, sunny or windy days in summer. In places like Arizona and New Mexico, there may be over 0.50" of ET loss in a single day.

The “ETgauge” and how it works

The ETgauge is a simple evaporation device that simulates crop reference ET. It is a modified evaporimeter (atmometer) where the ceramic evaporating cup is covered with a green canvas/wafer to simulate crop color (albedo) and leaf properties (vapor diffusion resistance).

This instrument has been used since 1984 in a variety of field studies and for operational irrigation scheduling and water management.



Estimating Reference ET



A ceramic evaporator at the top of the instrument responds to sun and weather as plants do. Water is drawn from a reservoir. The water level falls in the sight tube one inch for each inch used by your plants. The ETgage for CoCoRaHS simulates ET_0 (grass reference ET).

Rain cannot get into the instrument thanks to a water resistant membrane.

History of the ETgage

Various atmometers/evaporimeters such as Class A evap pans, wet paper/cloth and porous clay plates/cups have been used for estimating evaporation for more than 150 years.

The first porous ceramic was introduced in 1813 by Scottish scientist John Leslie. It was advanced by Italian priest Angelo Bellani in 1820 and again in 1906 by Burton Edward Livingston, a soil expert for the U. S. Bureau of Soils, Department of Agriculture.

Livingston in Ecology 16(3), 1935 suggested that a white porous clay cup can measure the “evaporating power of the air”.

The ETgage developed in the early 1980's modifies the ceramic evaporation plate by covering with a green canvas to simulate the albedo and diffusion resistance of an alfalfa crop canopy. The ETgage has been used in over 43 states and 27 countries.

For more on data comparisons to reference ET, view the description sheets at www.etgage.com



Who makes the ETgauge?

ETgauges are manufactured by the
ETgauge Company of Loveland, Colorado.

ETgauge Company
www.etgauge.com

1931 S. County Rd 19
Loveland, CO 80537 USA

What time of year can the ETgauge be used?

The ETgauge is designed for measuring during the growing season. In warmer non-freezing climates it can be left outside all year.

You should wait until close to the date of your average last freeze to install the gauge, as it can be damaged by prolonged subfreezing temperatures.



Bring the gauge inside just before the date of your average first freeze in the fall. You can extend the season for ET_r measurements by covering the gauge on cold nights or bringing the gauge indoors during cold snaps.

INSTALLING YOUR ETgage

Where to locate your ET gage

Your location should consist of the prevailing representative vegetation of the area and preferably the vegetation is watered.



An open location with adequate natural ventilation is ideal

Bad locations for your ETgauge



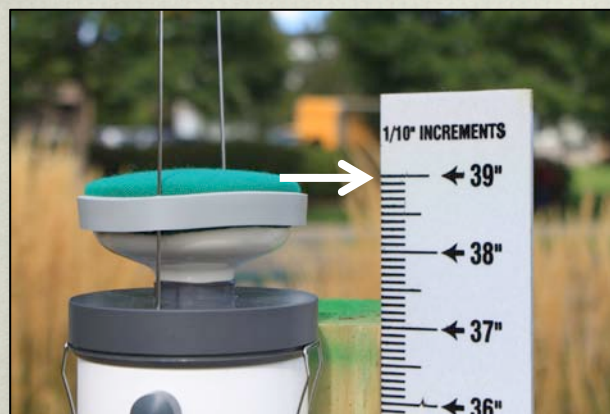
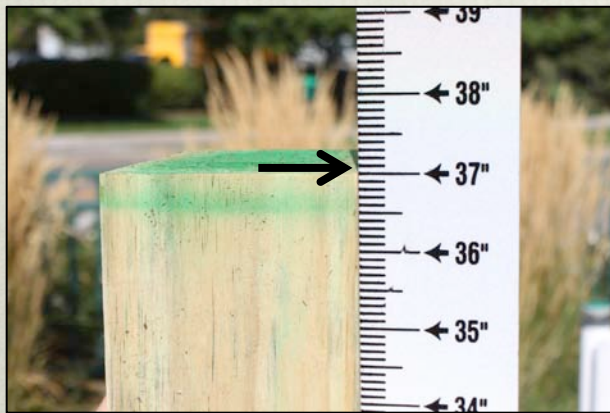
If you do not have an open area that is representative of the vegetation and land use in your immediate area it is probably best not to participate. Perhaps you might be able to find someone else with a better location.

Site documentation



Please provide photographs (send to info@cocorahs.org) for your location that describe the local landscape/irrigation and prevailing vegetation. Gage siting is particularly important for this instrument for the data to be useful.

Installation of your ETgage



After finding an appropriate location, install a post in the ground or find an existing one.

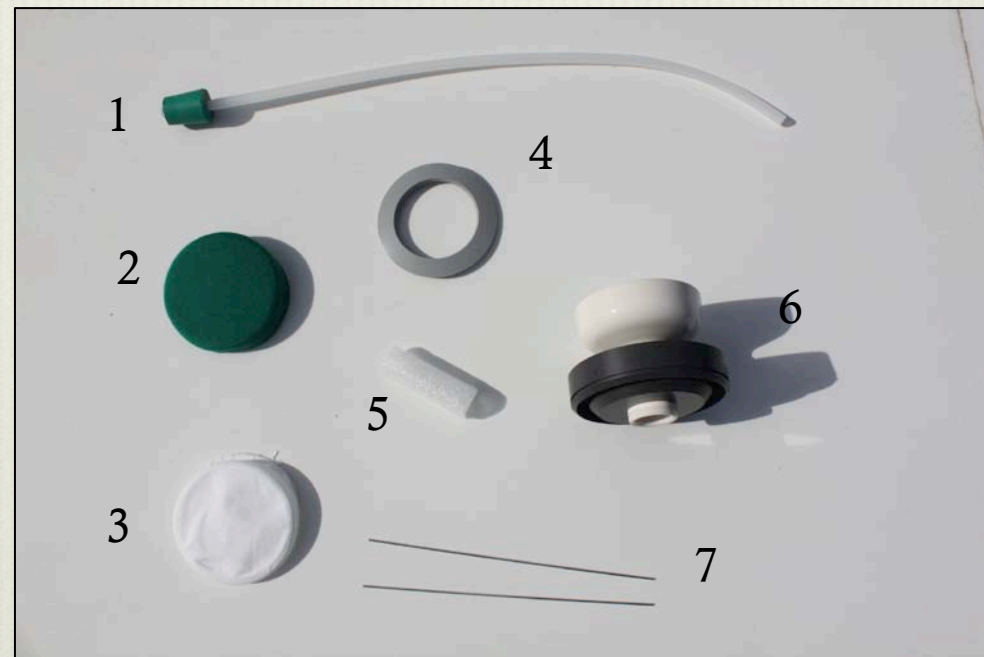
The height of the top of the gage must be 39 inches above the ground. Post top at 37 inches and top of bracket at $\frac{1}{2}$ inch below post top. Level the top of your post.

PREPARING YOUR
ETgage
FOR OBSERVATIONS

Key parts of your ETgage



The ETgage ships pre-assembled.



The key parts of your ETgage are:

1. Rubber stopper and supply tube
2. Green canvas cover
3. PTFE wafer
4. Rubber retaining ring
5. Roll of plastic foam (to prevent freezing)
6. Ceramic cup
7. Bird wires

Don't throw away the roll of plastic foam!



The small curled piece of plastic foam that comes inside the ceramic cup is not packing material. Do not throw it away. It should stay inside the ceramic cup to prevent the cracking of the cup upon the first freeze of the fall season.

Filling the ceramic cup



Be sure to only use *distilled water* to minimize contamination.

(tap water will damage the wafer)

Remove and invert the assembled ceramic cup from the gage (also remove the stopper and tube to reveal the opening)

Slowly, carefully fill the ceramic cup to the top ... and wait a few minutes until the water drops, as it is absorbed into the cup.

Fill it again ... and wait, as the additional water is absorbed into the ceramic cup.

Filling the ceramic cup



Continue this process of filling and waiting until you achieve a reverse meniscus at the top of opening. The ceramic cup must be fully saturated.



Next, insert the stopper and tube while holding the ceramic cup in your hand. Push and turn into place. Water escaping from the cup will fill the supply tube.

Since a good seal between the stopper and the ceramic cup is necessary to keep air out, be sure the stopper fits tightly in the neck.

Since you are creating a vacuum seal and should see water moving up and down the tube as it is being pushed in.

Filling the reservoir



Carefully fill the measuring tube with distilled water.



Fill until you reach near zero on the scale (*does not have to be exactly zero*).



Next insert the saturated ceramic cup. Make sure the clips are engaged to hold the cup tightly in place.

Not enough water? Not quite at zero?

If you fill the ETgauge below the 'zero' mark, you can adjust it by adding more water.



You can always “top-off” the water in the reservoir until you reach near zero on the scale (*does not have to be exactly zero*).

Too much water? Not quite at zero?

If you fill the ETgage above the 'zero' mark, you can adjust it by removing excess water.



Carefully remove the glass tube from the top fitting. Push down on the glass tube and tip out.



Gently lean the tube forward and flow out excess water.



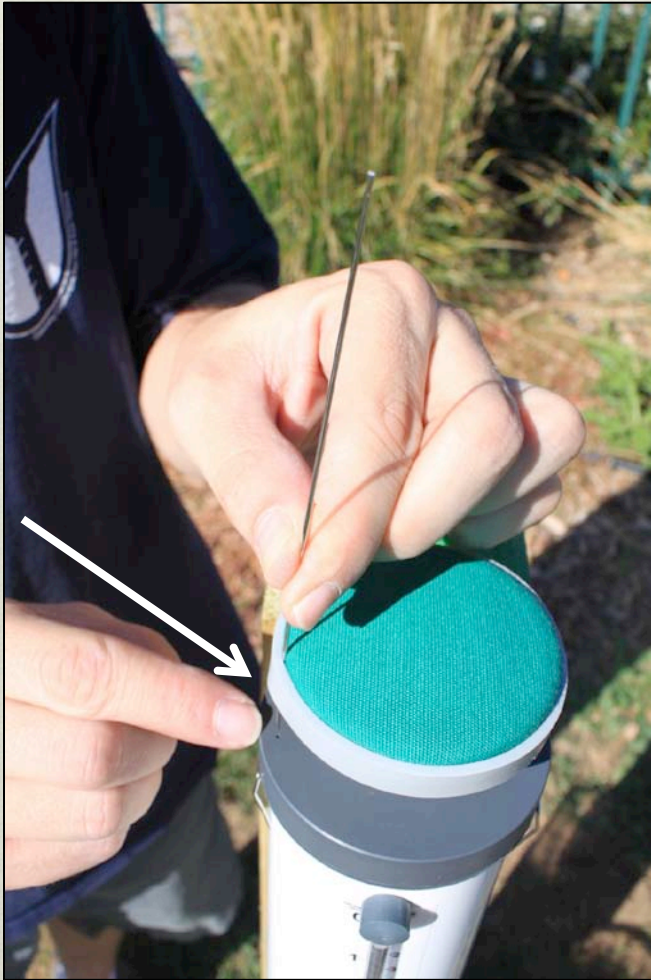
Next reinsert the sight tube back into the top fitting.

Eliminating 'Bubbles in the Tube'



For accurate sight tube measurements, eliminate any bubbles in the glass tube or its bottom fitting. If there are bubbles, eliminate them by first sliding the sight tube down and out of its top fitting, and then blowing into the tube to force water back into the reservoir. The water will come back into the tube without bubbles.

Ready for ET_0 Observations



Finally install the supplied bird wires and you are now ready to take ET_0 observations

TAKING YOUR OBSERVATION

Taking observations



Establish an “observation time”. This should be convenient time for you to check your ETgage – and ideally the same time that you check your CoCoRaHS rain gauge. 7AM is preferable.

Try to take your observations at approximately the same time each day.

Squeeze the 'Flexible Connecting Tube'



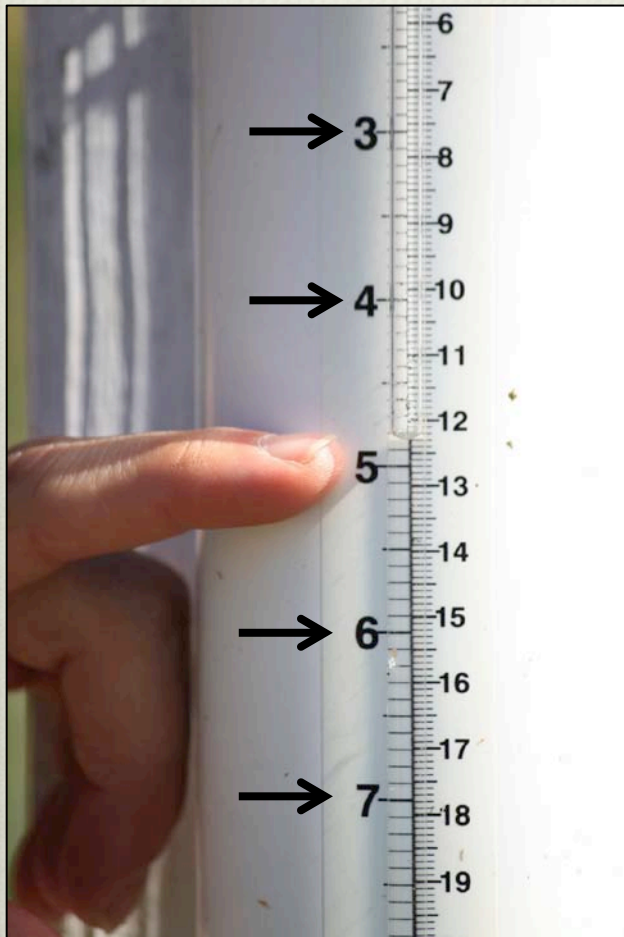
Important

There is a small flexible connecting tube at the bottom of the sight tube. Before you take your daily reading, it is important to make sure your meniscus isn't 'stuck'.

In order to make sure you are seeing the correct reading, *you should squeeze the flexible connecting tube at the bottom of the glass tube several times.* This will force the water to rise and fall, allowing the water in the sight tube to find its natural level.

Once the meniscus settles you may proceed with your reading.

Reading the Sight Tube

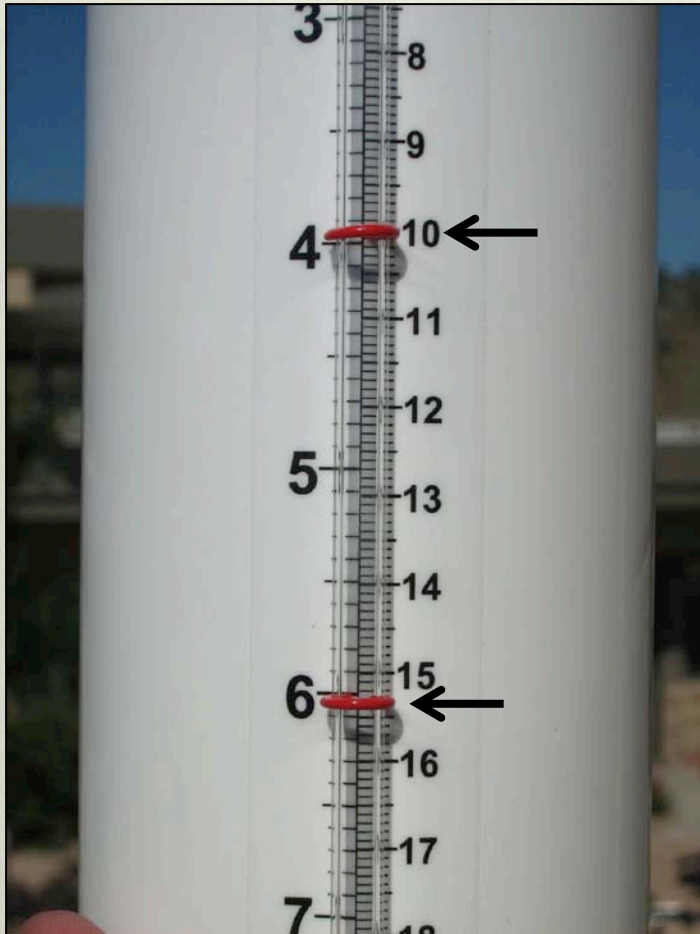


Water evaporated is measured directly by the sight tube on the side of the reservoir. A one inch change in water level corresponds to one inch of reference ET.

You will notice that the water level goes down (and the number on the scale increases) each day as evaporation occurs.

Remember, ETgage numbers **increase** (1 to 12) on the scale as the level of water in the gauge decreases.

The Sliding 'Red Markers'



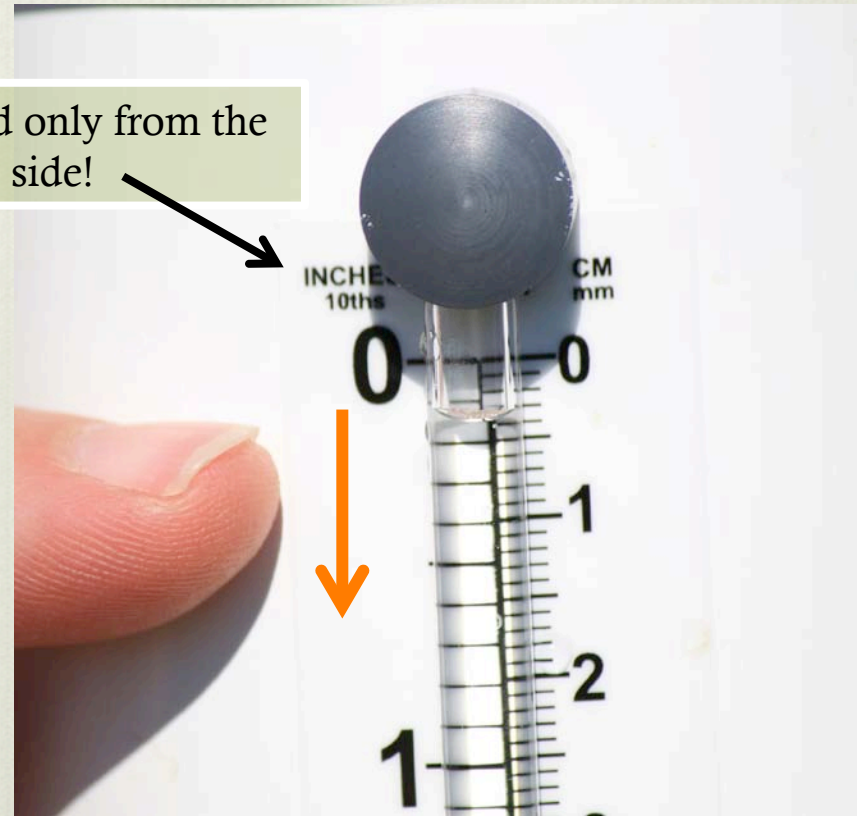
Two sliding red markers are provided on the sight tube to help you keep track of water use. They can also mark limits on allowable soil water depletion.

Reading your ETgauge



Day One: This is how it looks on installation day. The bottom of the meniscus is at the 'zero' mark

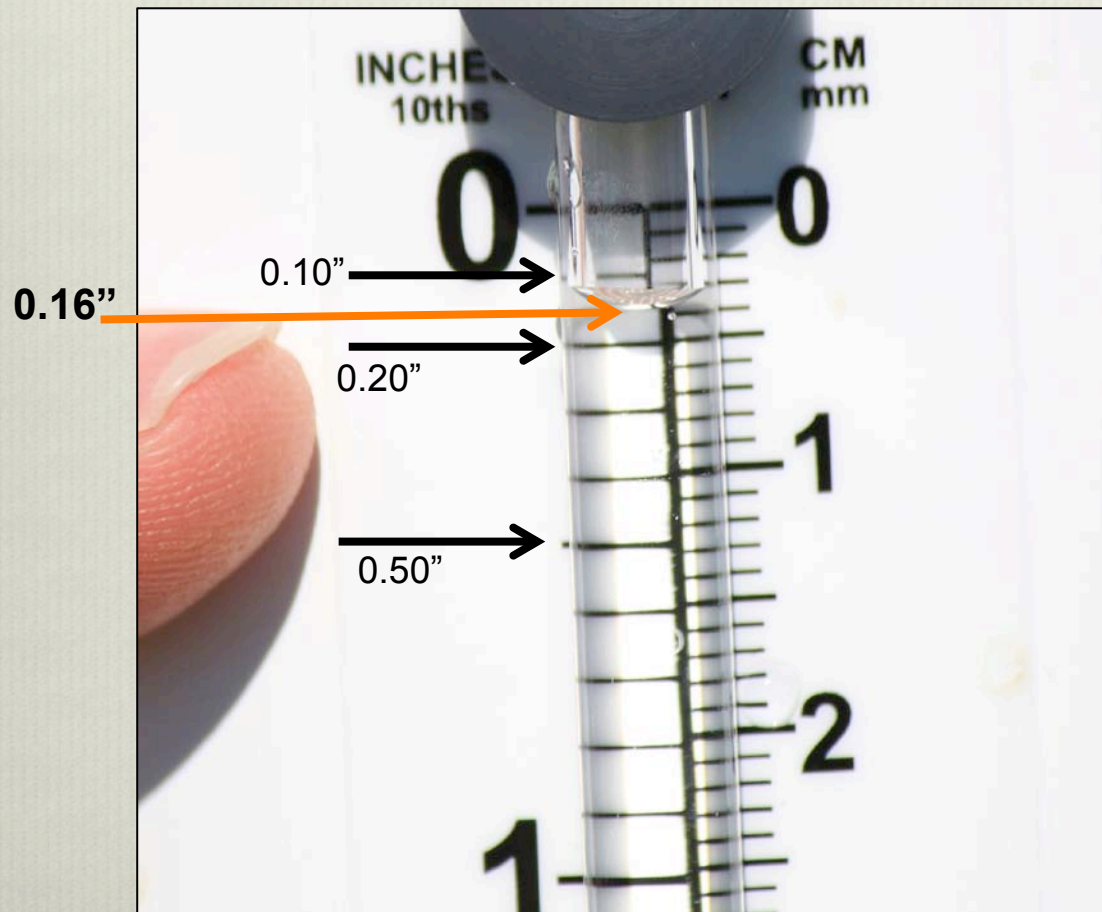
Please read only from the 'INCHES' side!



Day Two: Your first observation!
You should read the gauge from the top down.

Read to the nearest hundredth

Why the nearest hundredth? Your observation should be measured to the nearest hundredth to match your rain gauge observation, which is measured to the nearest hundredth.



Look closely...

Your reading is somewhere between 0.10" and 0.20"

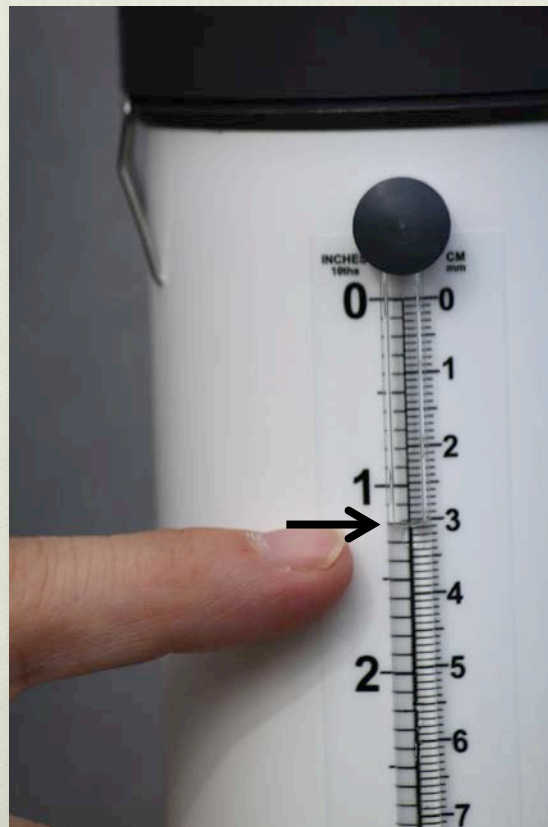
Take your best estimate and report where it is. Let's call this 0.16"

A low ET_0 day



< 0.10" per day

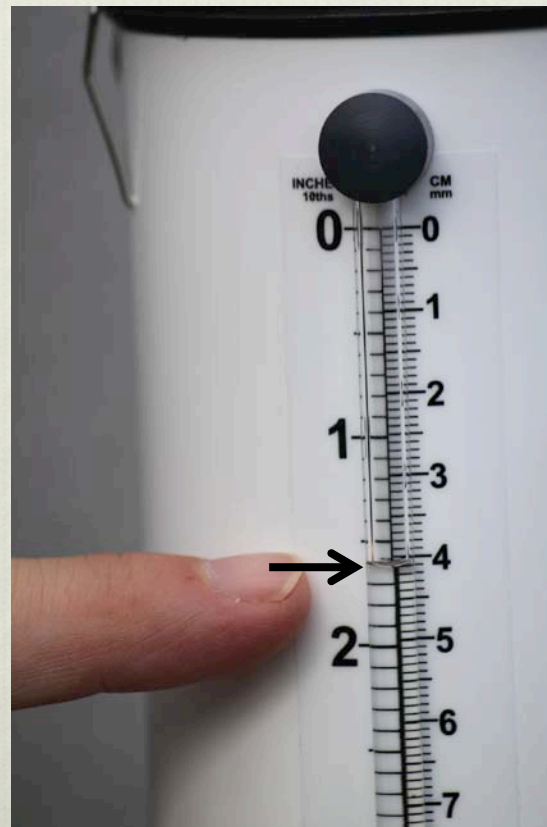
A normal ET_o day



~ 0.20" per day

*This will depend
on your location*

A high ET_0 day



> 0.50" per day

*This will depend
on your location*

When to refill your gage



When you get near the bottom, readings of 9.00" or greater, then it's time to refill the gauge.

After taking and recording your daily observation, remove the head and refill with distilled water. Eliminate bubbles from the tube.

Take another reading and record your refill point on-line.

Long Duration Rainfalls



FYI: During long duration rainfalls, canvas covers may absorb rainwater.

The absorbed water delays resumption of evapotranspiration from the ceramic cup.

This absorption can result in lower readings (an error of -0.02 to -0.05 inch).



REPORTING YOUR OBSERVATION

Reporting ET_o data to CoCoRaHS



After you take your ETgauge observation, visit the CoCoRaHS Web site: www.cocorahs.org and enter your observation under “Enter New Reports” by clicking on “Evapotranspiration”.

Enter My New Reports

- [Daily Precipitation](#)
- [Hail](#)
- [Significant Weather](#)
- [Multi-Day Accumulation](#)
- [Monthly Zeros](#)
- [Drought Impact Report](#)
- [Evapotranspiration](#)

Your Initial ET₀ observation

This is the initial report for your ETgauge.

Record your initial fill Level of your gauge here.

My Data Entry : Evapotranspiration (ET₀) Report Form

Evapotranspiration Report Form

Station Number : CO-LR-610

Station Name : Fort Collins 3.5 SW

Previous ET Report :

No previous ET reports could be found. This is the first ET report for this station. Please set the Refill Level to create the initial ET report for this station.

Create New ET Report

* Denotes Required Field

***Observation Date**

***Observation Time**

***Refill Level**

Notes

Next ET Report :

This is the last ET report for this station.

Your daily ET_o observation

This is how you found the ETgauge

Record your ETgauge level reading to the hundredth of an inch.

If you refilled your ETgauge (only refill after taking your reading) record the new level here.

This is how you left the ETgauge

Data Entry : Evapotranspiration (ET_o) Report Form

Evapotranspiration Report Form

Station Number : CO-LR-284

Station Name : FCL 3.0 W

Previous ET Report : [Edit](#)

Date: Jun 8, 2012 10:00 AM Gauge Reading: 9.12"

Edit Existing ET Report

* Denotes Required Field

***Observation Date** ?

***Observation Time** ?

***Gauge Reading** ?

Refill Level ?

Notes

Next ET Report : [Edit](#)

Date: Jun 12, 2012 7:00 AM Gauge Reading: 0.38"

Don't forget your comments

Be sure to make sure the date (mm/dd/yyyy) and time of your observation are correct.

Comments can be helpful.

Data Entry : Evapotranspiration (ETo ?) Report Form

Evapotranspiration Report Form

Station Number : CO-LR-284

Station Name : FCL 3.0 W

Previous ET Report : [Edit](#)

Date: Jun 13, 2012 7:00 AM Gauge Reading: 0.60"

Edit Existing ET Report

* Denotes Required Field

***Observation Date** ?

***Observation Time** ?

***Gauge Reading** ?

***Refill Level** ?

Notes

Next ET Report : [Edit](#)

Date: Jun 15, 2012 8:30 AM Gauge Reading: 1.19"

Submit a daily precip report

Data Entry : Daily Precipitation Report Form

Precipitation Report Form

Submit Data

Reset

Station Number : CO-LR-284

Station Name : FCL 3.0 W

* Denotes Required Field

10/25/2011

*Observation Date ?

7:00

AM

*Observation Time ?

0.00

*Rain and Melted Snow to the nearest hundredth inch that has fallen in the gauge during the past 24 hours ?

Yes No

Report was taken at registered location?

Observation Notes: (This will be available to the public) ?

No rain today. Dry with afternoon wind.

Enter in your daily precipitation even if it was zero.

By submitting a daily precipitation report we can compute the water balance for this day

The website automatically calculates the ET_0 amount

Data Entry : View Evapotranspiration (ET_0) Report

Notification:

- The ET report Report was saved.

Evapotranspiration Report

[Edit](#)

Station Number: CO-LR-284

Station Name: FCL 3.0 W

Previous ET Report Date: Jun 14, 2012 7:00 AM
Gauge Reading: 0.90"

Observation Date: 6/15/2012 8:30 AM

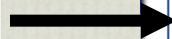
Submitted: 6/18/2012 3:53 PM

Gauge Reading: 1.19"

Evaporation Amount: 0.29"



Notes: Hot dry day. Westerly winds.

Your ET_0 amount



If you make a error or forget something, you can edit your report

Data Entry : Evapotranspiration (ETo ?) Report Form

Evapotranspiration Report Form		Submit Data	Reset
Station Number : CO-LR-284			
Station Name : FCL 3.0 W			
Previous ET Report : Edit 			
Date: Jun 13, 2012 7:00 AM Gauge Reading: 0.60"			
Edit Existing ET Report			
* Denotes Required Field			
<input type="text" value="6/14/2012"/>	*Observation Date ?		
<input type="text" value="7:00"/> <input type="text" value="AM"/>	*Observation Time ?		
<input type="text" value="0.90"/>	*Gauge Reading ?		
<input type="text"/>	*Refill Level ?		
Notes	<input type="text" value="Very hot dry day. A bit windy. Winds from the west."/>		
Next ET Report : Edit 			
Date: Jun 15, 2012 8:30 AM Gauge Reading: 1.19"			
		Submit Data	Reset

VIEWING
ET, OBSERVATION &
SUMMARY REPORTS

Viewing ET_0 observations and summaries

The following ET_0 observations and summaries are viewable on the CoCoRaHS Web site

My Station Summary: Editable list of all daily ET_{gage} readings and computed evaporation amounts from the participant's own station.

Evapotranspiration Reports: A searchable list of all evapotranspiration reports.

Station Water Balance Summary: A listing of precipitation and evaporation by day for up to three selected stations showing cumulative precipitation, evaporation and the resulting water balance.

Water Balance Summary by State: Cumulative precipitation, evaporation and water balance for all ET_0 stations within a state or county.

Searchable list of daily ET_o reports

View Data : List Evapotranspiration (ET_o) Reports

Search Evapotranspiration Reports

Station Fields: Station Number Station Name

Location:

Date Range:

Start Date: End Date:

Searched: Report date between 9/1/2011 and 9/25/2011.

Showing 1 - 50 of 328 Records.

[<Back](#) Page [Next>](#)

Dates	Time	Station Number	Station Name	GaugeReading	Refill Level	Evap Amt	View
9/1/2011	7:00 AM	AZ-MR-326	Phoenix 6.3 SSW	4.44		0.62	
9/1/2011	7:00 AM	CO-BO-202	Ward 4.6 NE		0.83		
9/1/2011	7:00 AM	KS-RL-1	Manhattan 0.5 NE	8.50		0.30	
9/1/2011	7:00 AM	MI-CT-2	Haslett 1.2 N	0.60		0.18	
9/1/2011	7:00 AM	NV-WH-93	Reno 2.5 NNE	0.20	0.20	0.20	
9/1/2011	7:00 AM	ND-CS-1	West Fargo 3.8 SSE	2.85		0.12	
9/1/2011	7:00 AM	VT-CH-4	Underhill 4.4 NNE	0.00	0.00	0.00	
9/1/2011	7:00 AM	WY-AB-8	Laramie 0.8 NNE	5.65		0.27	



View Data : Station Water Balance Summary

View Data

- Daily Precip Reports
- Daily Comments Reports
- Significant Weather Reports
- Multiple Day Reports
- Drought Impact Reports
- ET Reports

- Days with Hail
- Search Hail Reports
- Station Hail Reports

- Station Precip Summary
- Station Snow Summary
- Station Water Balance
- Rainy Days Report
- Total Precip Summary
- Water Balance Summary
- List Stations

PA FROST Data

- Frost
- Onsets
- Snowflake
- Thunder

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- Education
- Training Slide-Shows
- Videos
- Drought Impacts

- Volunteer Coordinators
- Hail Pad
- Distribution/Drop-off
- Help Needed
- Printable Forms

- The Catch
- Message of the Day
- Data Analysis
- CoCoRaHS Blog
- Web Groups
- State Newsletters
- Master Gardener Guide
- State Climate Series

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Station Water Balance Summary

Station 1 : Example: CO-LR-273

Station 2 :

Station 3 :

Start Date: End Date:

Stations:

CO-LR-832
 Fort Collins 0.6 NNW
 Lat: 40.583599
 Lon: -105.073769

* indicates Multi-Day Accumulation Report

Station CO-LR-832

Date	Precip	Evap Amt	Water Balance
06/01/2011	0.00	0.27	
06/02/2011	0.00	0.19	
06/03/2011	0.00	0.34	
06/04/2011	0.00	0.23	
06/05/2011	0.00	0.26	
06/06/2011	0.00	0.24	
06/07/2011	0.04	0.30	
06/08/2011	0.00	0.36	
06/09/2011	1.29	0.21	
06/10/2011	0.02	0.01	
06/11/2011	0.00	0.22	
06/12/2011	0.00	0.20	
06/13/2011	0.00	0.26	
06/14/2011	0.00	0.31	
06/15/2011	0.00	0.33	
06/16/2011	0.00	0.30	
06/17/2011	0.30	0.25	
06/18/2011	T	0.12	
06/19/2011	0.00	0.20	
06/20/2011	0.18	0.08	
06/21/2011	0.01	0.10	
06/22/2011	0.00	0.22	
06/23/2011	0.00	0.28	
06/24/2011	T	0.21	
06/25/2011	0.00	--	
06/26/2011	0.00	--	
06/27/2011	0.00	0.88	
06/28/2011	T	0.16	
06/29/2011	0.00	0.31	
06/30/2011	0.01	0.29	
Totals :	1.85	7.16	-5.31

Station Water Balance Summary

Precip. Evap. Amt Total

06/21/2011	0.01	0.10	
06/22/2011	0.00	0.22	
06/23/2011	0.00	0.28	
06/24/2011	T	0.21	
06/25/2011	0.00	--	
06/26/2011	0.00	--	
06/27/2011	0.00	0.88	
06/28/2011	T	0.16	
06/29/2011	0.00	0.31	
06/30/2011	0.01	0.29	
Totals :	1.85	7.16	-5.31

Water Balance Summary by State

View Data : Water Balance Summary

Search Location and Date Range

Location:

Date Range:

Start Date: **End Date:**

Search

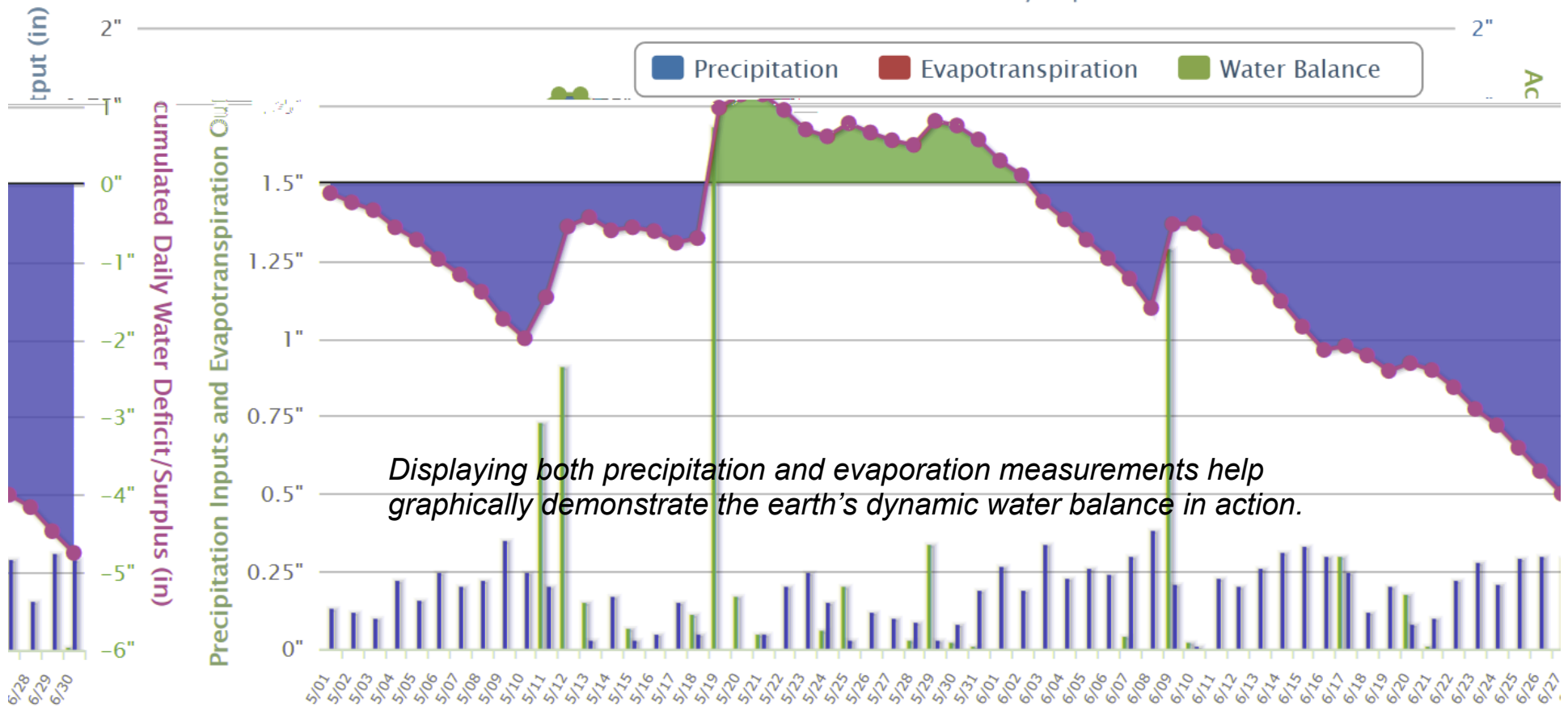
4 Stations with 4 Reports over 31 Days

<u>Station Numbers</u>	<u>Station Name</u>	<u>Daily Precip Sum</u>	<u>Multi-Day Precip</u>	<u>Total Precip</u>	<u>Evap Amt</u>	<u>Water Balance</u>	<u>Daily Snow Sum</u>	<u># of Reports</u>	<u>Latitude</u>	<u>Longitude</u>
CO-LR-255	FCL	2.11		2.11	8.40	-6.29		62	40.5759	105.0858
CO-LR-273	FCL 2.2 NW	2.42		2.42	6.48	-4.06		51	40.5993	105.1152
CO-LR-832	Fort Collins 0.6 NNW	2.23		2.23	6.84	-4.61		60	40.563599	105.073769
CO-LR-901	Loveland 3.9 SW	1.00		1.00	8.61	-7.61		44	40.3725	105.115

CoCoRaHS graphical Water Balance display

May-June 2011 Water Balance for Station CO-LR-832

Source: CoCoRaHS Station Water Balance Summary Report



Precipitation variable, ET_0 fairly consistent

CARING FOR
YOUR ETgage

“Quick rinse of the reservoir”

Pour



Shake



Empty



At the beginning of the year, put some distilled water in the reservoir and swish it around. This will dislodge spiders, etc. that have taken up residence since last season.

“Clean the canvas fabric”

If the green canvas cover becomes dirty, remove and wash it in warm water (not hot water). Rinse thoroughly if soap is used.

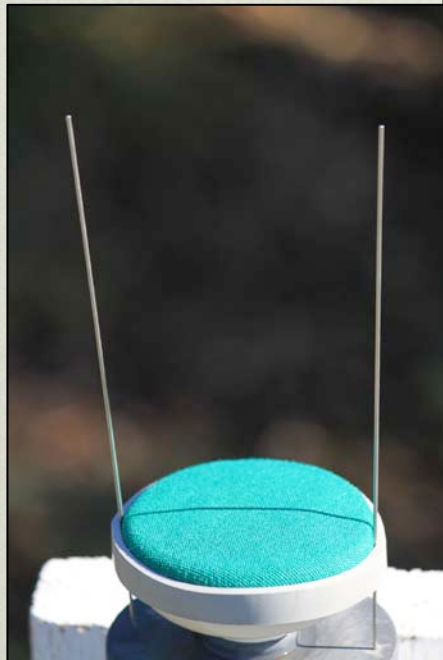


“Change the wafer annually”

It's a good idea to change the disposable wafer at the beginning of each year. Your ETgage comes with extras.



“Keeping birds away”



The provided bird wires will deter birds from perching on and fouling your gauge

FREQUENTLY ASKED QUESTIONS

FAQ

Question: *“Our campus ETgage tends to reabsorb water in a significant way (0.05" to 0.10" per day) during prolonged multi-hour rain periods or after evening rains and damp nights. But the other ones we are using are not reabsorbing anything?”*

Answer: The white ptfе wafer under the green canvas keeps rain water entering thru the plate into the bottle. If there is a wafer, the white ptfе top layer may be damaged (e.g., cuts, by bird droppings) and you need to replace the white wafer.

Question: *“Who uses our ET_0 data?”*

Answer: Your ET_0 data is used by many:

- Farmers/crop consultants for irrigation scheduling
- Municipalities/home owners for turf/lawn water management.
- Hydrologists/engineers for Basin Water Balance models.
- Water quality consultants for soil water balances to prevent nutrient leaching.
- State Climatologists for education and water conservation.

FAQ

Question: *“What if the water level goes back up from where it was before??”*

Answer: The white ptfe wafer under the green canvas is damaged (e.g., cuts, by bird droppings) and needs replacing.

Question: *“What If I am not at home to take the observation for a few days (multiday – and try to also report precipitation for the same time periods)?”*

Answer: That’s OK. The ETgage keeps evaporating and the next reading will represent the cumulative ET for the entire period between readings.

FAQ

Question: *“What if temperatures are forecast to drop below freezing?”*

Answer: Take you ETgage inside for prolonged freezing periods or its time to remove the ETgage for the season. The foam coil inside the ceramic cup will for sure only protect for the first freeze (see instructions).

Question: *“What if I can’t do my observation at the normally scheduled time?”*

Answer: That’s a good question. Do it at the scheduled time the next day. Remember the ETgage provides a cumulative ET_0 reading.

FAQ

Question: *“What if I break the ceramic head?”*

Answer: Contact www.weatheryourway.com for information on purchasing a new ceramic or any replacement parts.

Question: *“Why did the ceramic cup/head go empty of water?”*

Answer: If the reservoir bottle goes dry so will the ceramic cup; just refill both with distilled water. Air can come out of the water over time and the cup will slowly accumulate some air but this does not effect readings. Shake the cup and if it sounds like there is lots of air and almost empty then refill with distilled water.

Question: *“What if the spray from sprinklers gets on the ETgage green canvas cover?”*

Answer: The ETgage should be located so this does not happen, because such water can contaminate, degrade and plug the evaporating surface.

Learn More about *“ET Resources”*

For Reference ET articles/equations/software --

University of Idaho: <http://www.kimberly.uidaho.edu/water>

Google: fao56

To see FAO Irrigation and Drainage Paper 56 – Crop Evapotranspiration

Google: modified atmometer and irrigation

Go to www.etgage.com to see description sheets for Model A and E for data comparisons for reference ET.

FOR MORE INFORMATION

CONTACT COCORAHS HEADQUARTERS AT:
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Colorado State University

The ETgage Company

www.weatheryourway.com



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