The Lawn-and-Garden Moisture Index

The lawn-and-garden moisture index estimate the capacity of current soil moisture to sustain healthy lawns and gardens. The index is computed in two stages.

First, we estimate how much recent precipitation contributes to current soil moisture. We assume that any precipitation over the past 21 days should be included in the computation. We also assume that more recent precipitation is more significant than the less recent. We consider all precipitation during the previous 7-day period to be equally important, but precipitation before that time is discounted according the sliding scale shown in Diagram 1. The result is the total effective precipitation during the period.

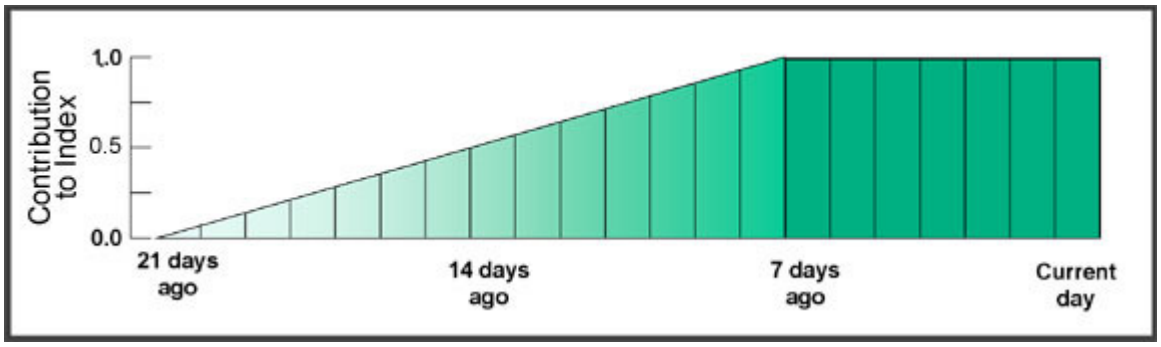

Diagram 1. *The sliding scale used to determine the contribution of recent precipitation to the lawn-and-garden moisture index.*

The formula for converting rainfall over the previous 21 days to LGMI is :

$$\mathrm{LGMI} = \left[\frac{1}{28} \mathrm{P}_{-21} + \frac{3}{28} \mathrm{P}_{-20} + \ldots \frac{27}{28} \mathrm{P}_{-8} + \sum_{i=-7}^{-1} \mathrm{P}_i \right] - \mathrm{EF}$$

Where:
P = daily precipitation,
i = day,
EF = seasonally adjusted potential ET factor

If precipitation fell uniformly through a 21-day period such that the total for the period were 3 inches, then the total effective precipitation

would be 2 inches. The precipitation we use to compute the index is obtained from NOAA's Climate Prediction Center. It is determined from weather radar images in conjunction with precipitation reported at rain gages.

Second, we find out how much the total effective rainfall for the current day differs from a "standard" amount of rainfall considered to be adequate for that time of year to sustain healthy lawns and gardens. The difference is the lawn-and-garden moisture index. Of course, much less precipitation is needed during cold periods than in the warm ones. The curve in Diagram 2 shows the standard amount we assumed throughout the year. In the coldest time of the year, about 1/2 inch per day is considered to be enough to meet plants need; in the hottest, 2 inches. If the total effective precipitation on January 1 were 1 inch, then the index would be +1/2 inch for that day, but the same amount on July 1 would give an index of -1/2 inch. Thus, positive values of the index indicate adequate precipitation or better. Negative values indicate a precipitation deficit.

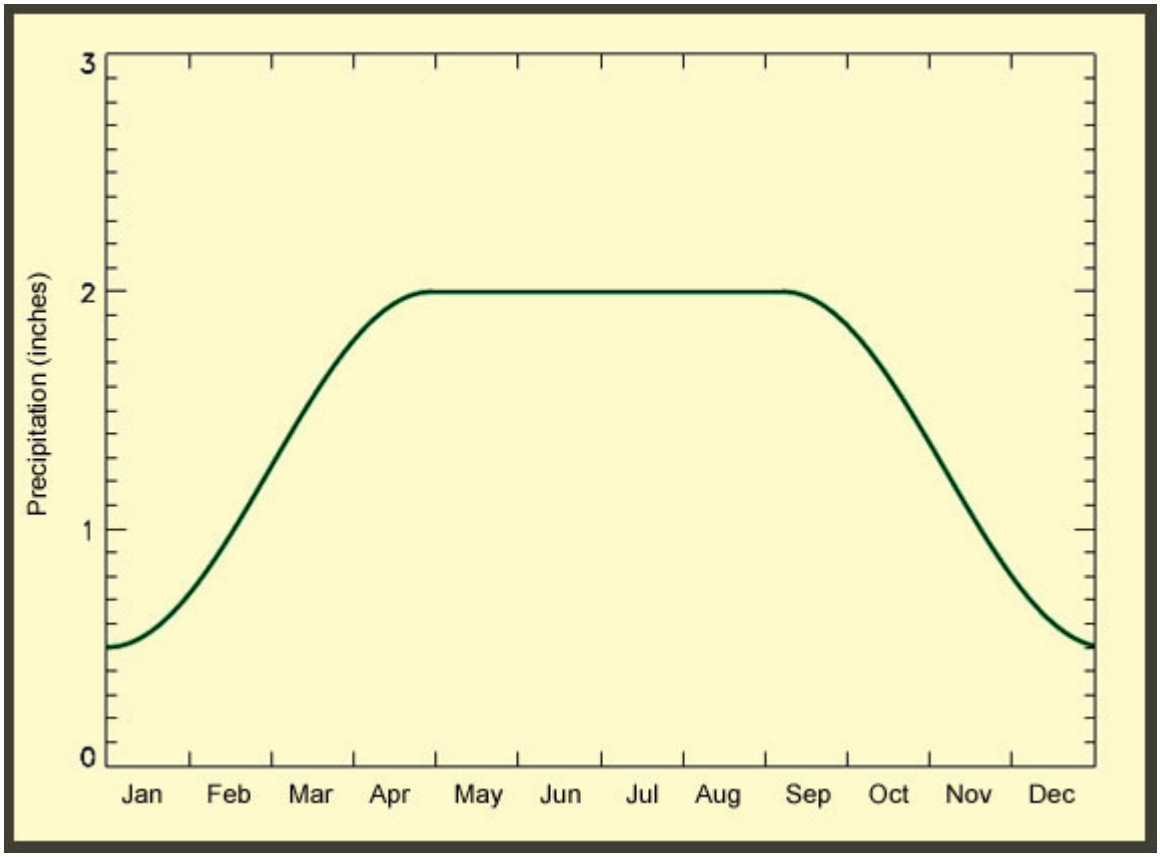

Diagram 2. *The curve used to estimate the standard amount of precipitation is considered to be adequate to sustain healthy lawns and gardens.*

The curve shown in Diagram 2 does not work equally well for every location. Soils are sandy and drain rapidly, LGMI may underestimate plant stress. Soils have the ability to retain moisture for longer periods of time, LGMI may overestimate plant stress. Also, different grasses, shrubs, flowers, and garden crops have differing moisture requirements. However, the curve of precipitation and stress distribution in the region provides a general idea.

The LGMI has a minimum value of -2.0 and a maximum value of 2.0. Values of LGMI less than -1.5 indicate severe drought conditions. It is important to recognize that LGMI can indicate that plants experience a severe drought even when rivers and reservoirs are full. This happens because plants can extract available moisture from the shallow soils of the Southeast USA within 2 to 3 weeks.

The forecast maps below show the probability that LGMI will be less than -1.5, in other words, the likelihood of a severe drought, during 10-day periods over the next 40 to 50 days. These forecasts are based on differences in rainfall probability for the three El Niño Southern Oscillation phases.