

## Local Water Budgets

The previous section mentioned a global average for precipitation, but that average takes in a very broad range of conditions. For example, there are places where

- It hardly ever rains
- It rains, but it is always hot enough that water evapotranspires and doesn't flow away in streamwater
- It rains in a particular season, and streams are full then, but low or dry in other seasons.
- It's always rainy and streams always flow.

If you know what kind of climate you are in, you can make useful predictions, such as when streams will flow, and what kind of plants might be around..

For example, the water surface in many of the large reservoirs in West Virginia is lowered during the winter. That allows the reservoirs to store water in the case of a large storm or rapid snowmelt event, and prevents that water from causing floods downstream. Large storms can also occur in summer, when reservoir levels are higher, but at that time evapotranspiration will have removed water from the soil, allowing the soil to store the water and prevent flooding.

Walter Diagrams are a good way to summarize the general climate in a particular place.

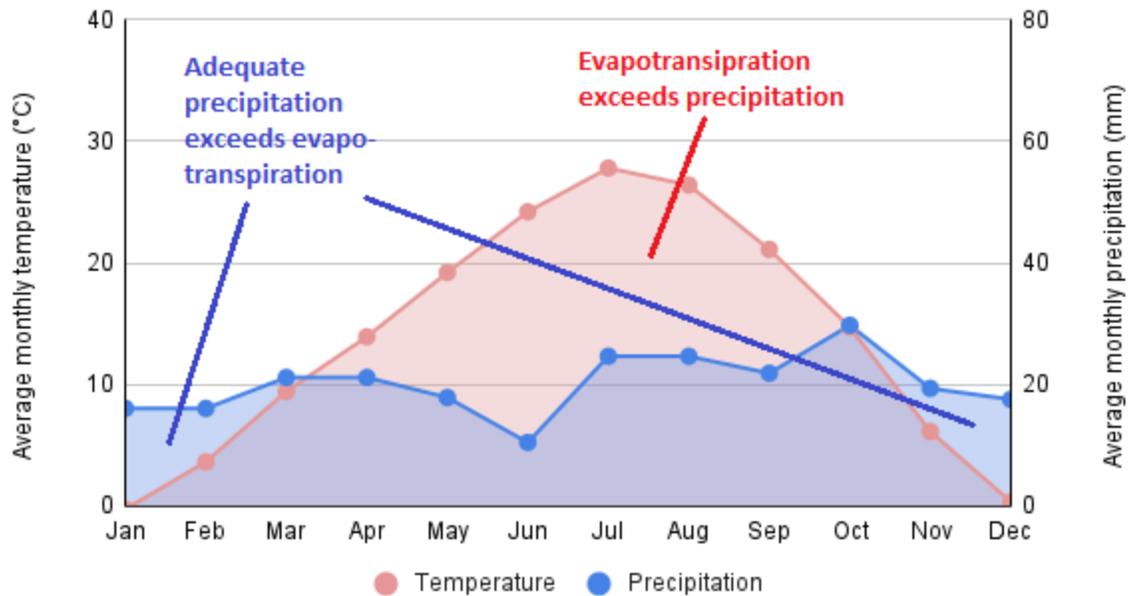
The key insight in these diagrams is that a climate that is 10 degrees hotter in a month will evapotranspire an additional 20 mm of precipitation in a month. **This is not exact!** It is just a rule of thumb that gives you a rough idea of whether there is enough water around to maintain flow in streams and moisture to support vegetation

Here is a simplified<sup>1</sup> Walter diagram for Moab, Utah. There is some precipitation in an average month year-round. Precipitation averages 0.8"/month. In the cooler months, November through March, temperatures are cool enough that the water does not entirely evaporate or transpire. In the warmer months, April through October, it is hot enough that all the water evapotranspires. At those times you would expect streamflows to be decreasing or streams to be downright dry, unless they are fed by some kind of underground reservoir.

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<sup>1</sup> A complete Walter diagram would include record temperatures, frost periods, elevation, months with frost possible and other information.

## Moab, Utah



Here are simplified Walter diagrams for Charleson, WV, Moab, UT, Los Angeles, CA, and Upper Tract, WV. Upper Tract, WV, is called the driest place in the state, but it looks pretty wet against Moab and L.A. Like Moab, L.A. has a large part of the year when evapotranspiration exceeds precipitation by far! But in the case of L.A., it is the seasonal lack of precipitation, rather than really hot weather, that dries the place out.<sup>2</sup>

<sup>2</sup> BE CAREFUL OF AVERAGES! THEY DON'T ALWAYS HOLD! Los Angeles has had huge, disastrous wildfires in January, 2025. The city was way behind in its average rainfall.

