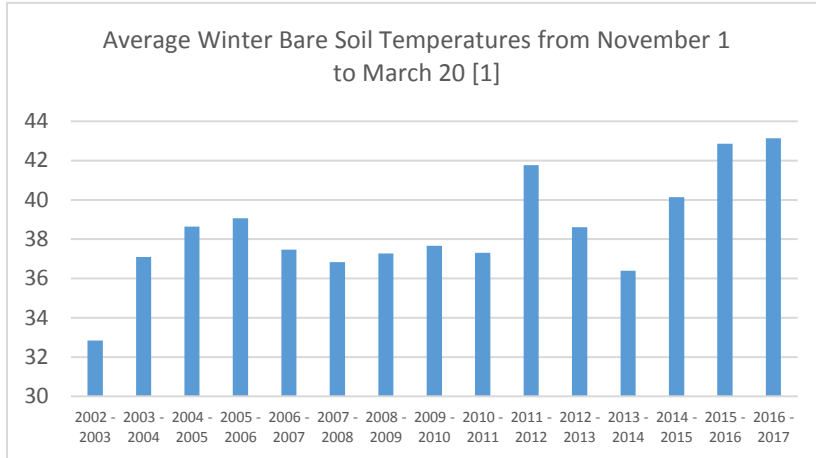


# Increasing Winter Soil Temperatures: How Gardeners Can Respond



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Your garden soils are likely the warmest they have been in at least fifteen years based on soil temperature records at three sites surrounding Central Indiana. <sup>[1]</sup> In fact, those three sites registered a whopping average of 43.2 degrees Fahrenheit in bare soil from November 1, 2016 through March 20, 2017, which is nearly five degrees



warmer than the average over the same period. While air temperatures are expected to rise in subsequent winters and because air temperature is directly related to soil temperature (Karmakar, et al. 2016), your garden soil will be affected in several ways. One way is through the increased decomposition of soil organic matter (SOM), an aspect of soil health of particular concern for gardeners as it holds many of the nutrients your plants need.

The necessary process by which organic material is broken down by bacteria and other microorganisms is sped up in warmer temperatures. A warmer winter means that organic matter, mostly made up of carbon, is being lost to carbon dioxide, leaving less organic matter, and therefore carbon, in the soil for your garden during the growing months. Consider the following strategies to mitigate the loss of SOM and improve soil health:

1. **Minimize Tilling:** Tilling increases the oxidization of carbon, which makes up the bulk of SOM. “Unfortunately, [tilling] is [...] one of the most abused methods resulting in soil loss, damage to the soil structure and carbon loss through oxidation when used incorrectly.” (Karmakar, et al. 2016) If you must till, limit the depth to just one inch.
2. **Employ microorganisms:** The microorganisms found in your compost bin and in compost create stable forms of carbon from your food scraps and other garden/lawn debris and builds humus. “Regular applications of compost and/or compost teas will inoculate the soil with beneficial organisms that build humus and other long lasting carbon polymers.” (Karmakar, et al. 2016)
3. **Bare Soils Should be Avoided, Plant Vegetation Cover:** Covering your soil, for example, with cover crops, during the winter AND summer is, “the best way to prevent soil and carbon loss.” In addition, “it is not always necessary to eradicate weeds.” Soils that are covered by vegetation remain cooler during the winter.
4. **Add Organic Matter:** Adding leaves, coffee grounds, and other mulching material (i.e. from cover crops), is a great way to build SOM especially as temperatures rise.

<sup>1</sup> Data summarized from Iclimate.org using three stations in and around Central Indiana (ACRE – West Lafayette, Davis PAC – Farmland, and Southeast PAC – Butlerville) from 2001 through 2017. Temperatures used were daily average temperatures for each station during the annual timeframe of 11/1 through 3/20.

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## References

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