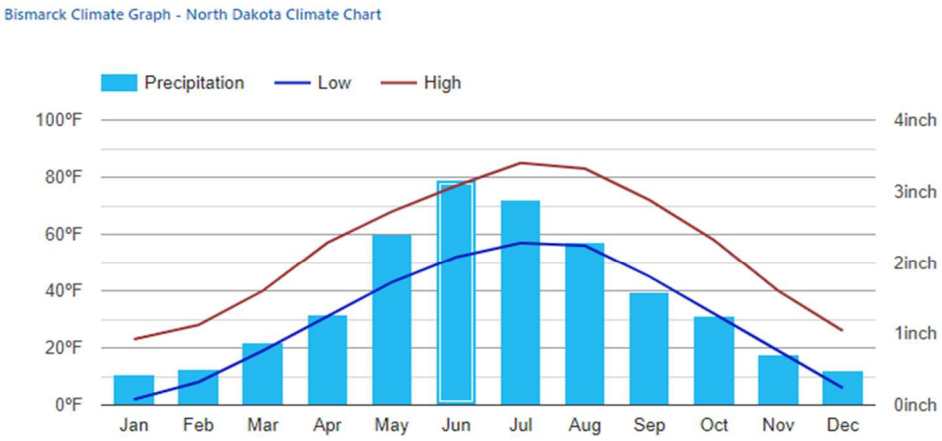
Gabe Brown - Cover Cropping Advocate in North America

Gabe Brown has the following regenerative agriculture views. He states that soil water and sunlight are the resources that all life develops from. Use of cover crops, zero tillage and high-density grazing are the keys to improving these resources. Soil life needs a balanced diet using a wide variety of warm and cool season broadleaves and grasses. The living roots provide exudates for soil aggregation and soil health. Therefore, he keeps the ground covered at all times with living crops/pastures and residues. To place things in context it is important to understand the climate Gabe has in Bismarck North Dakota.

Climate
North Dakota is a mid-western state in the centre of North America. It has a humid continental climate in its eastern half and a semi-arid type in the western half. Summers are warm to hot while winters are cold

Summers in North Dakota summers are warm to hot, with the average high temperatures between 77°F (25°C) to 87°F (30.6°C) at the peak of July. Temperatures touch 90°F (32.2°C) for an average of 10 days in the northeast to 24 in the south. The southwest and south-central regions even witness a few days over 100°F (37.8°C). Winters are cold, with widespread snow cover and extremely variable temperatures. Temperatures fall below 0°F (-17.8°C) for an average of 40 to 70 days state-wide. During years of little snowfall, the temperatures remain in the 40°F (4.4°C) to 60°F (15.6°C) range. Dry and cold air masses during the winter and hot and warm air in the summer result in large daily fluctuations in temperatures. Spring and autumn are relatively mild, with a caveat of extreme conditions due to frontal air passages and high winds.



The annual precipitation in North Dakota ranges from 14" (355.6mm) in the west to 22" (558.8mm) in the east. Late spring and summer are the wettest parts of the year, while winter is the driest season.

Snowfall is the prominent form of precipitation in the winter and averages 51" (1295.4mm) in the year. The state has a history of snowfall in all months except July and August. The annual sunshine averages 2737 hours, with a peak of 354 hours in July. The humidity is highest during the cold season and is in a monthly range of 0% to 75% over the year.

Noting the high rainfall in summer some of the principles advocated are:

- The foundational key to the cover cropping system is no till after a history of wheat/ summer fallow based on tillage and high inputs.

- Adoption of techniques with no till have been:
  - Green manure incorporation
  - Diverse multispecies cover crop cocktails to provide N and increase nutrient cycling
  - Intensive rotational grazing.

- Aims to keep a live root in the soil at all times to stimulate soil biology for improved nutrient cycling. He uses 25 different species for improving soil health.

- This has reduced commercial fertiliser use by 90% and herbicides by 75%.

- Uses tissue analysis to gauge his crop health

- Now aiming to have companion cropping with summer crops – an oats-hairy vetch cover crop sprayed with low rates of glyphosate to leave vetch under corn. Follow up with a cool season forage mixture to grow through corn residues in cold temperatures.

- He plants forage crops (oats, peas, radish, turnip, red clover and hairy vetch) which are green chopped along with weeds and then hopefully rely on vetch, red clover and turnips to regenerate to provide grazing in autumn.

- Radish roots are used for bio drilling channels in compacted layers. Turnips are not as aggressive.

- Planting a forage mix has plant species roots at different depths and when they die, they increase soil organic matter throughout the entire profile.

- Claims SOM has increased from 1.3 to 1.9 % to 4.4 % in 16 years. However, there was no mention of measurement depth or bulk density measurement/ change.