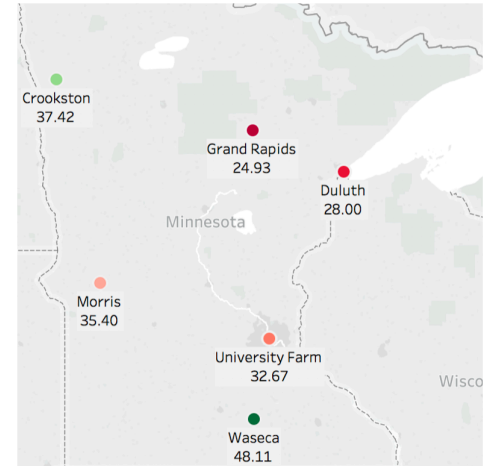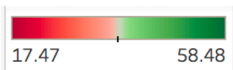## Average Barley Yield (bushels/acre), 1931-1932
from different sites in Minnesota

Site	Glabron	Manchur..	No. 457	No. 462	No. 475	Peatland	Svansota	Trebi	Velvet	Wisconsin No. 38
Crookston	32.15	36.45	40.00	39.55	38.12	33.42	30.55	44.38	36.70	42.88
Grand Rapids	21.78	27.55	25.82	22.42	17.47	30.73	23.15	25.20	27.63	27.57
Duluth	27.77	25.77	28.15	25.30	30.22	31.68	23.97	32.27	24.38	30.47
Morris	31.95	30.90	36.12	38.68	33.42	36.53	30.40	45.20	32.48	38.32
University Farm	39.93	26.95	34.85	31.08	27.33	30.42	31.28	32.82	33.35	38.65
Waseca	46.47	41.17	50.15	55.23	44.02	42.30	42.92	56.53	43.82	58.48

Variety (column group header, above table)

Average yield, per variety and site

17.47	58.48

Average yield, per site

24.93	48.11

(Map of Minnesota showing sites:)
Crookston 37.42
Grand Rapids 24.93
Duluth 28.00
Minnesota
Morris 35.40
University Farm 32.67
Waseca 48.11
Wisco

This visualization tells the story of which sites in Minnesota tend to yield more or less barley, and how this seems to roughly correlate with latitude. As you can see, Waseca seems to be a better barley growing site than the other five. Moreover, it seems that, with the exception of Crookston, the further south a site is, the more barley it produces on average, although more data would be needed to definitively draw this conclusion.

Pros:

The **table** format on the left was chosen so that the viewer can examine any patterns, or lack of, in barley yield **per variety** as well as in barley yield **per site**. For instance, it could have been the case that different varieties of barley perform better at different sites.

I chose the **red-green color spectrum** as an encoding for yield because:

1) A color spectrum highlights the best and worst datapoints and still allows the viewer to examine the numbers. There are many varieties of barley in the data, and many numbers for how well each grew at each site – I wanted the viewer to be able to examine these while still getting an overall impression of how well the different barley varieties grew at each site and relative to each other. Note that yield is quantitative and so value isn't the best encoding for it because it makes it difficult to perceive small differences in the data, according to Bertin's levels of organization. However, the impression the visualization is trying to convey is about the big picture of barley yields, and is not concerned with small relative discrepancies.

2) Green is commonly associated with growth/fertility/Go while red is associated with famine/negativity/Stop. Even without the legend below the charts, the viewer should intuitively associate the sites with more green datapoints as better places to grow barley.

The **ordering** of sites in the table is intentional. They are ordered by latitude, so the first site is the most northern and subsequent sites are further south in Minnesota. This ordering visually **aligns with the map** on the right, so the viewer can easily compare the map and the table by moving their eyes mostly horizontally, instead of both vertically and horizontally. From this alignment, the viewer can also decide if there is a rough correlation between latitude and barley yield.

The **map** on the right of average barley yield per site gives the viewer geographic context to the data and a more macro view. The viewer can see the sites' locations relative to each other, the Great Lakes, major rivers, and borders with other states.

The data across years were **averaged** because of the problem's context. Because the study was focused on growing barley and was conducted near the beginning of the Great Depression, I inferred that the study was trying to determine which sites and varieties were better for growing barley to feed more people. Thus, the story the visualization should tell is about the places and varieties of barley that grow **consistently** well, not places with great variation in the yield.

Cons:
The delineation between red and green is arbitrary. A red data point does not necessarily mean barley has a tough time growing at that particular site. It's just relative to how barley is growing at the other sites.

This visualization does not reflect differences between the years. Morris actually performed better in some varieties than Waseca in 1932, but that isn't represented in this visualization. Since different land was used each year of the study, it could be that Morris is just as good of a site for producing barley depending on the land being used.

Tools:
Tableau (map and chart)
Microsoft Word and Pages (arrangement of visualization)