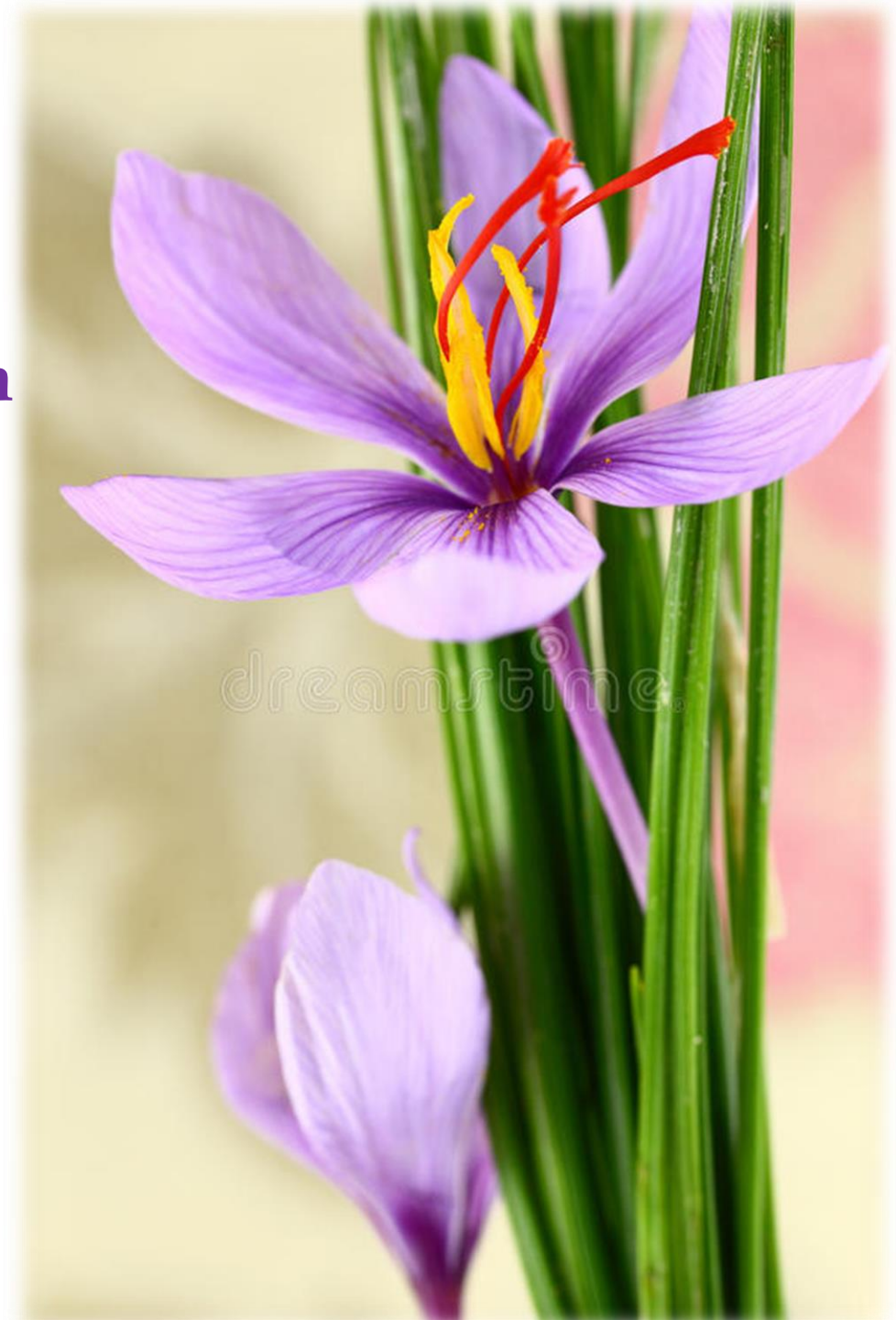


Effect of Corm Density and Winter Protection on Saffron Yield in Rhode Island

R. Gheshm, and R.N. Brown

The University of Rhode Island

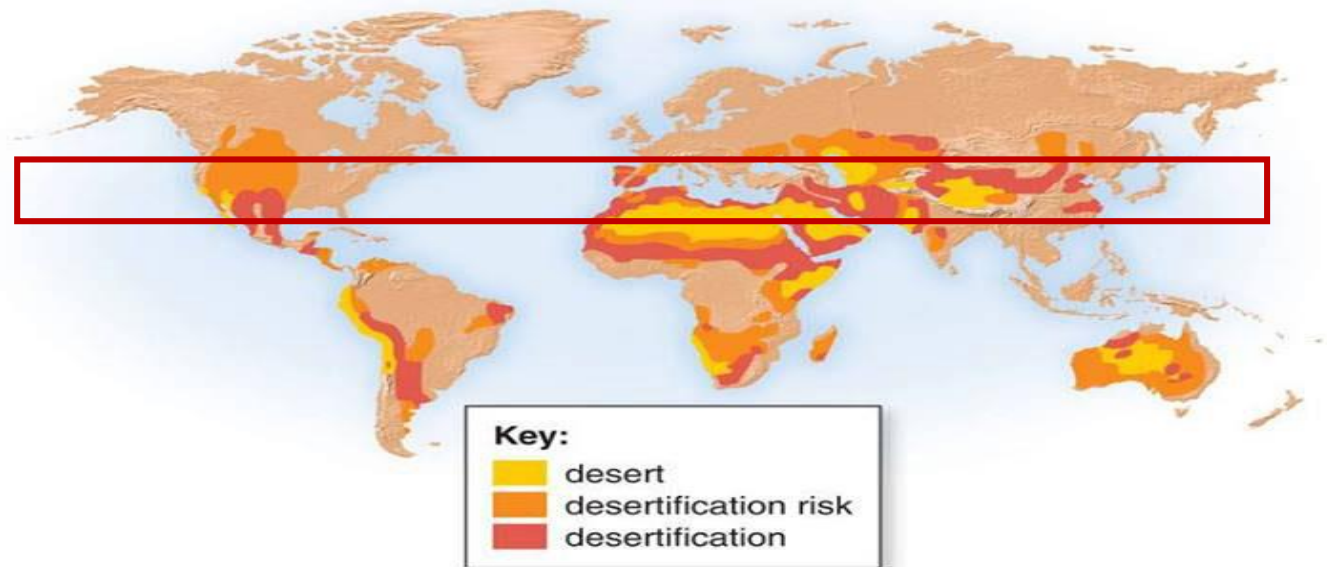


**RESISTANCE IS
THE FIRST STEP
TO CHANGE**

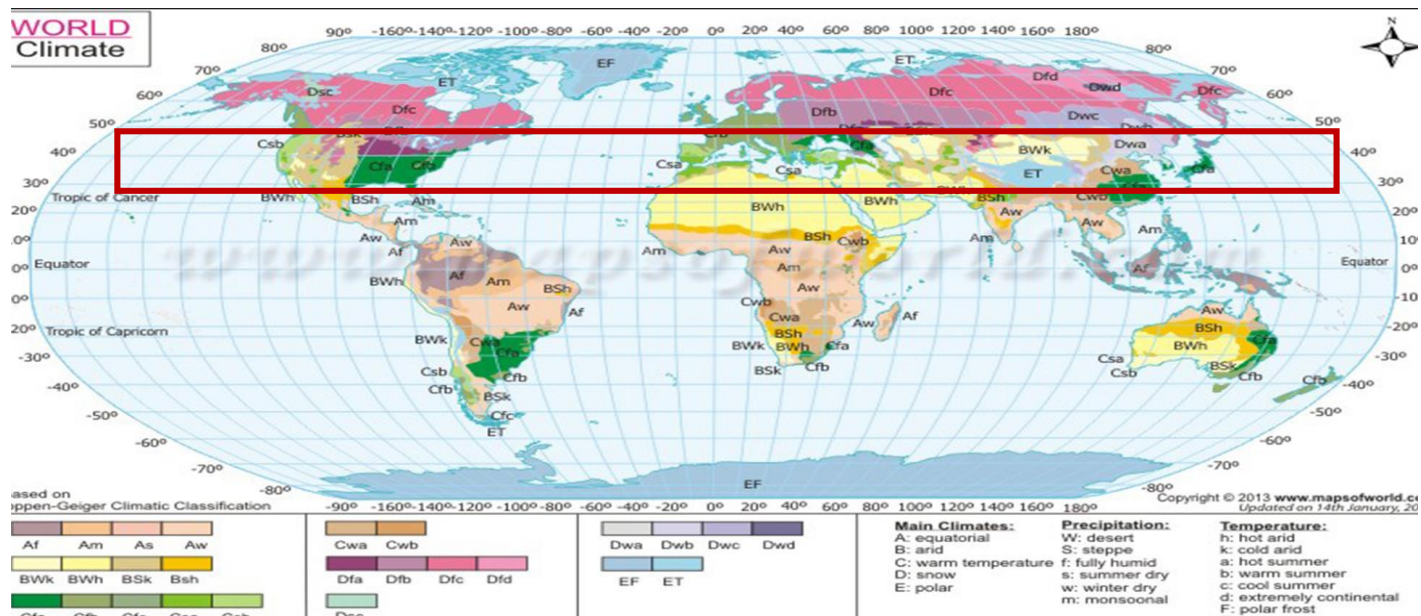
Louise Hay

Why Saffron?

Desertification is happening all around the world.



The United states can be a good habitat for Saffron.

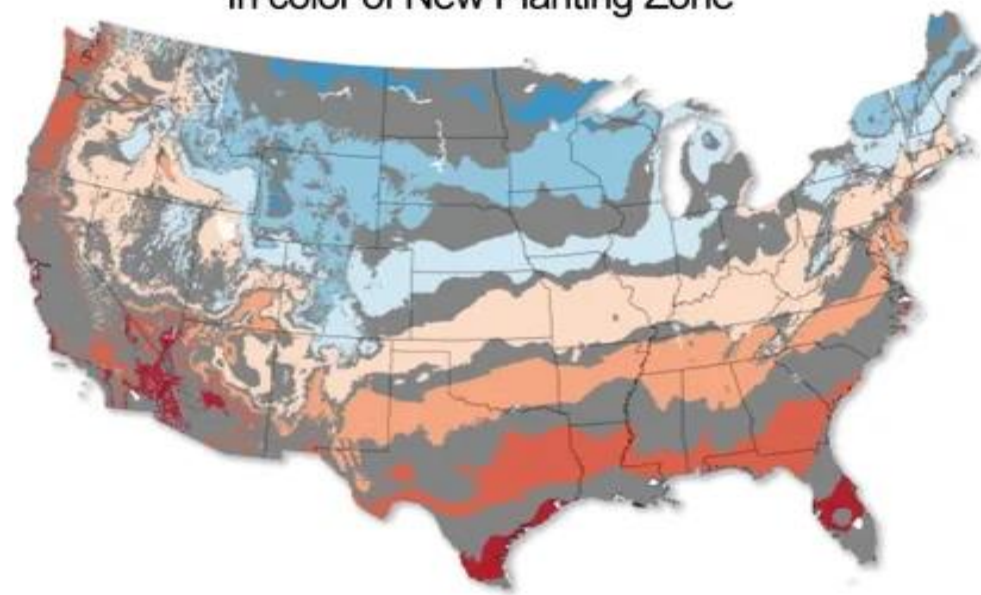


Shift in Plant Hardiness Zones

Zone Changes in Past 10 Years
In color of New Planting Zone



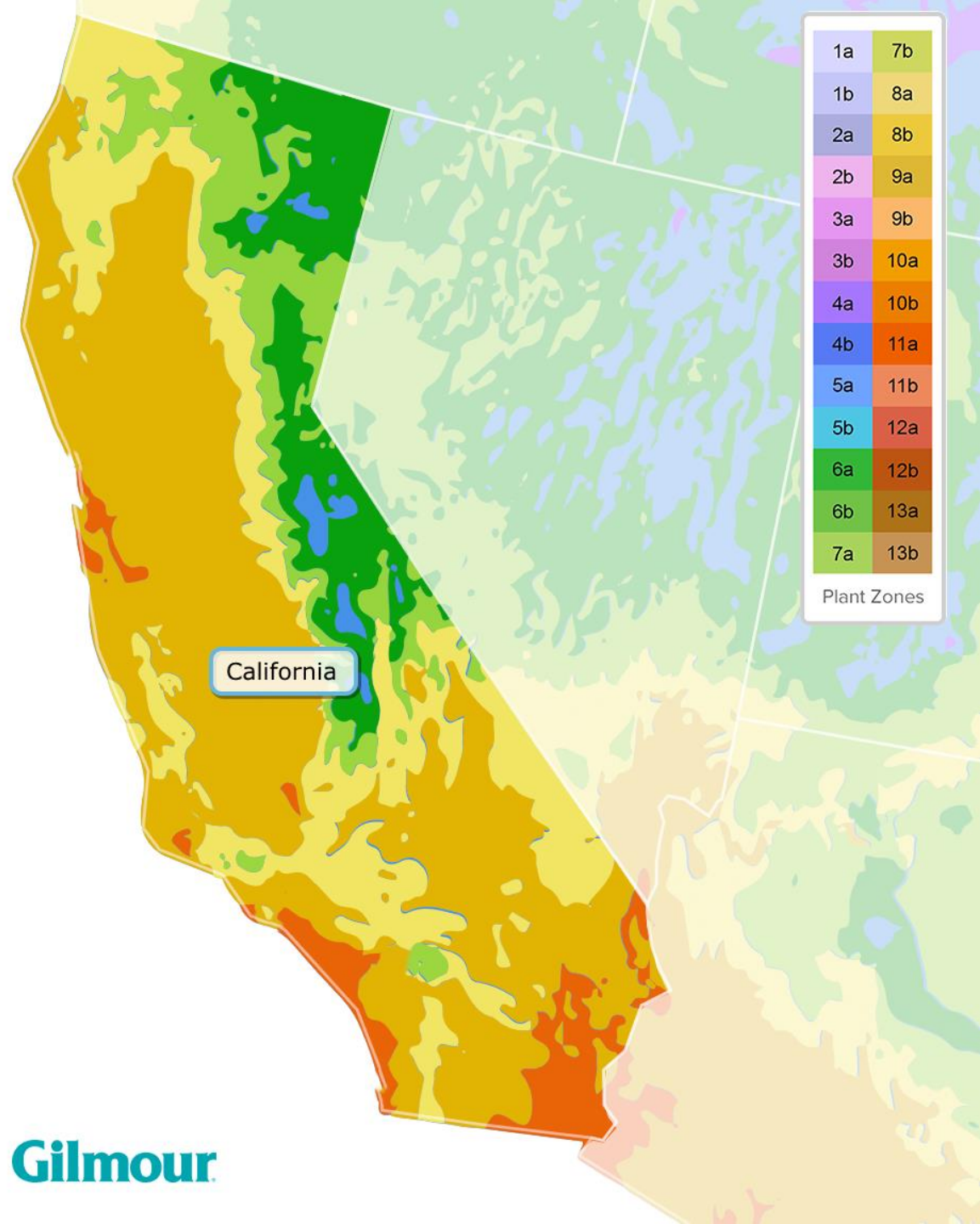
Zone Changes in Next 30 Years
In color of New Planting Zone



Average Annual Extreme Minimum Temperature by Climate-Related Planting Zone



Photo by [Anthony Dunn Photography](#) on [flickr](#)

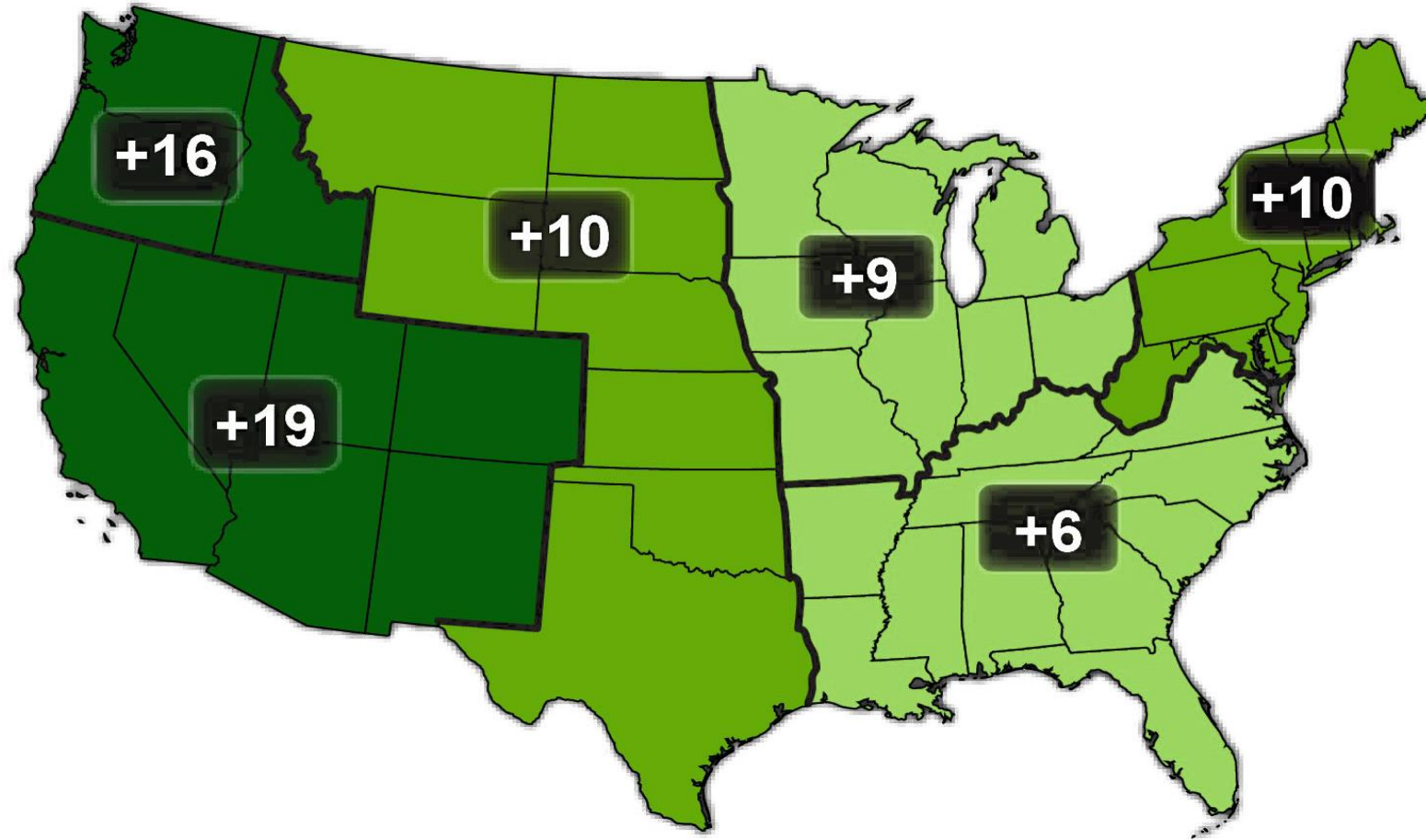


1a	7b
1b	8a
2a	8b
2b	9a
3a	9b
3b	10a
4a	10b
4b	11a
5a	11b
5b	12a
6a	12b
6b	13a
7a	13b

Plant Zones

Gilmour

Observed Increase in Frost-Free Season Length



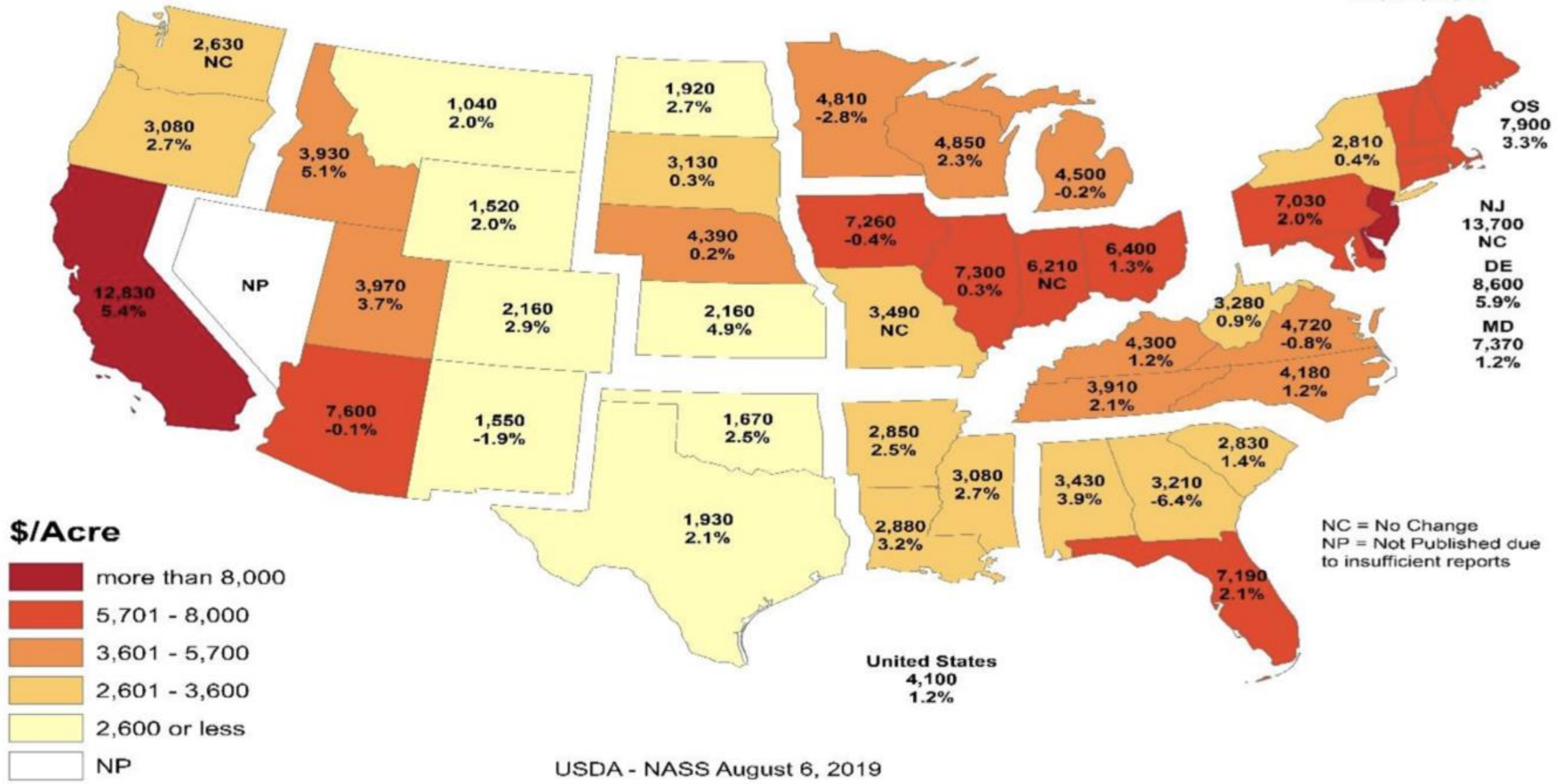
Observed change in the frost-free season length in the United States. The Midwestern and Northeastern U.S. experienced an increase in the frost-free season of 9 and 10 days, respectively, from 1958-2012.

Why Saffron in New England?

2019 Cropland Value by State

Dollars per Acre and Percent Change from 2018

OS includes CT, MA, ME, NH, RI, VT



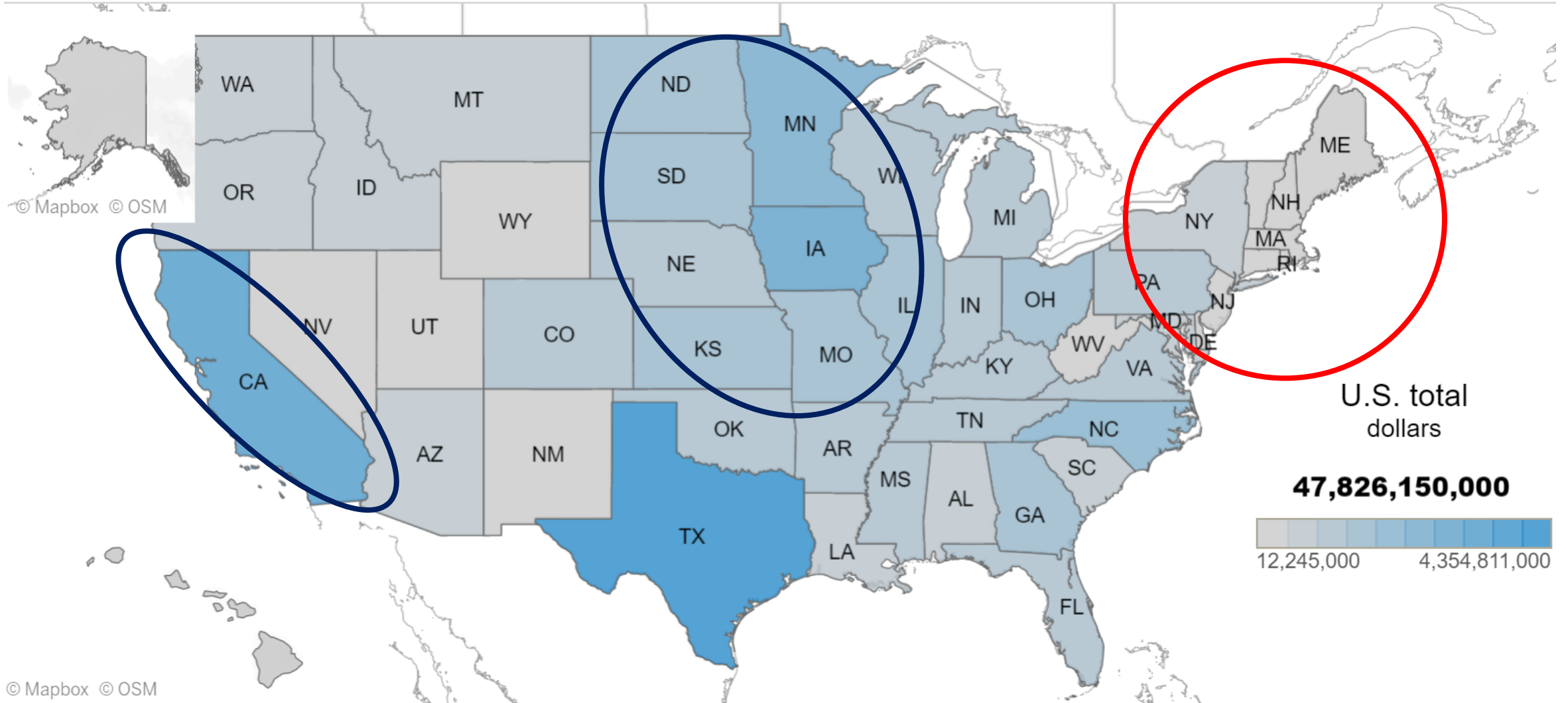
Average farmland value and cash rent by farm production region, 2018 (dollars per acre)

Region	Farm real estate value	Cropland value	Cropland rent	Pasture value	Pasture rent
Corn Belt	6,430	6,710	204	2,470	39
Pacific	5,550	6,780	272	1,650	12
Northeast	5,100	5,480	80.5	3,480	36.5
Lake States	4,890	4,800	153	2,110	34
Southeast	3,870	3,990	84.5	3,990	20
Appalachian	3,820	3,920	99.5	3,350	21.5
Delta States	2,980	2,820	111	2,550	18
Northern Plains	2,170	2,830	102	1,070	21
Southern Plains	2,220	2,020	40	1,710	7.9
Mountain	1,140	1,810	90.5	634	5.3
U.S. total (48 States)	3,140	4,130	138	1,390	12.5

Source: [*Land Values, 2018 Summary*](#), USDA, National Agricultural Statistics Service, August 2018.

Farm-related income by State in 2018

dollars



<https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/charts-and-maps-of-us-farm-income-statement-data/>

Effect of Corm Density and Winter Protection

Objective:

Evaluating the possibility of producing
saffron in Southern New England.

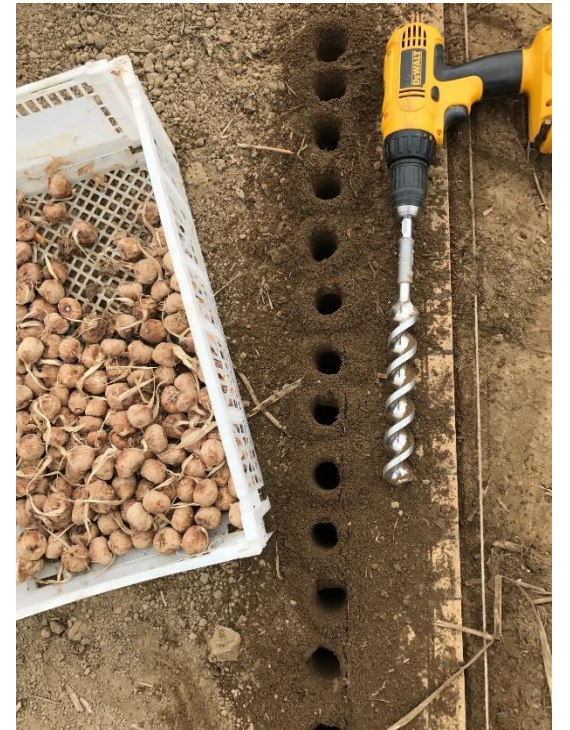


Winter protected plots vs Exposed Plots

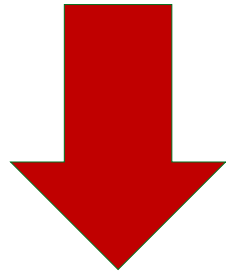
Low tunnels with two layer of
Spun-bonded fabrics + plastic

Density

120 and 162 corms/m²



Low density

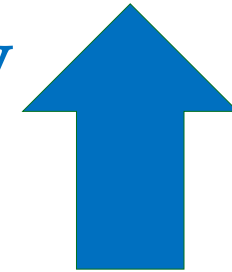


120 Corms/m²

Between rows = 12 cm (4.7 ")

Within rows = 6.5 cm (2.4")

High density

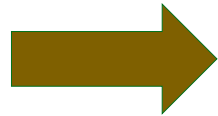


162 corms/m²

Between rows = 8 cm (3.15")

Within rows = 7.5 cm (2.75")

October late, to
early Nov
Flowering



Nov. to March
vegetative
growth



April early
June daughter
corms
completion



August and
Sep.
dormancy.





Rabbit and Deer are the most serious pest in November and December in open field and exposed plots of Saffron



Voles and Moles are the most serious pest in the winter under low-tunnels



SORRY
WE ARE
CLOSED

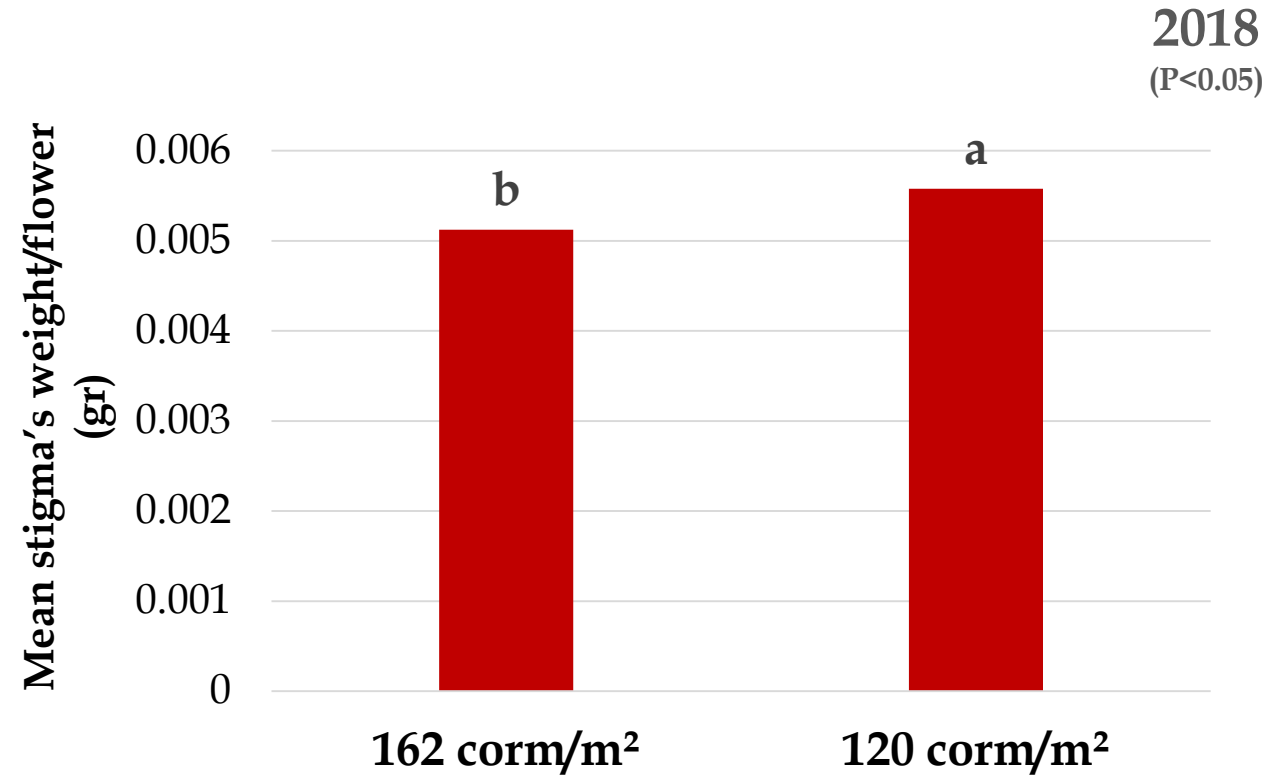


The effect of saffron corm density on, flower number, and dry stigma weight in the field in 2018, and 2019

	Flower number N	Dry Stigma weight (g · m ⁻²)
2018		
High density	261 a ^Y	1.35 a
Low density	145 a	1.24 a
2019		
High density	179 a	0.93 a
Low density	208 a	1.15 a

^Y Differences among different data labeled by the same letters are statistically not significant at $\alpha = 0.05$.

Traits mean weight per flower



The effect of winter protection on, flower number, and dry stigma weight of Saffron planted in the field in 2019

Winter protection	Flower number N	Dry Stigma weight (g · m ⁻²)
Protected	150 b ^Y	0.80 b
Unprotected	238 a	1.27 a

^Y Differences among different data labeled by the same letters are statistically not significant at $\alpha = 0.05$

Monitoring the plants after removing the winter covers in both years showed that the plants under low tunnels had bigger and taller leaves





Overall

- **Saffron** could **survive** and produce an **acceptable yield** in southern Rhode Island.
- Increasing plant density **does not increase yields**
- Low tunnels and **winter protection** are unnecessary.

Further decreases in **density** should be evaluated.

Thank you.



