






# Environmental Systems

Project 1-2

Fall 2017  
ARCH 633

# LEGEND

RECORDED HIGH - ○  
DESIGN HIGH -   
AVERAGE HIGH -   
MEAN -   
AVERAGE LOW -   
DESIGN LOW -   
RECORDED LOW - ○

## COMFORT ZONE

SUMMER

WINTER

(At 50% Relative Humidity)

## DESIGN HIGH: Residential

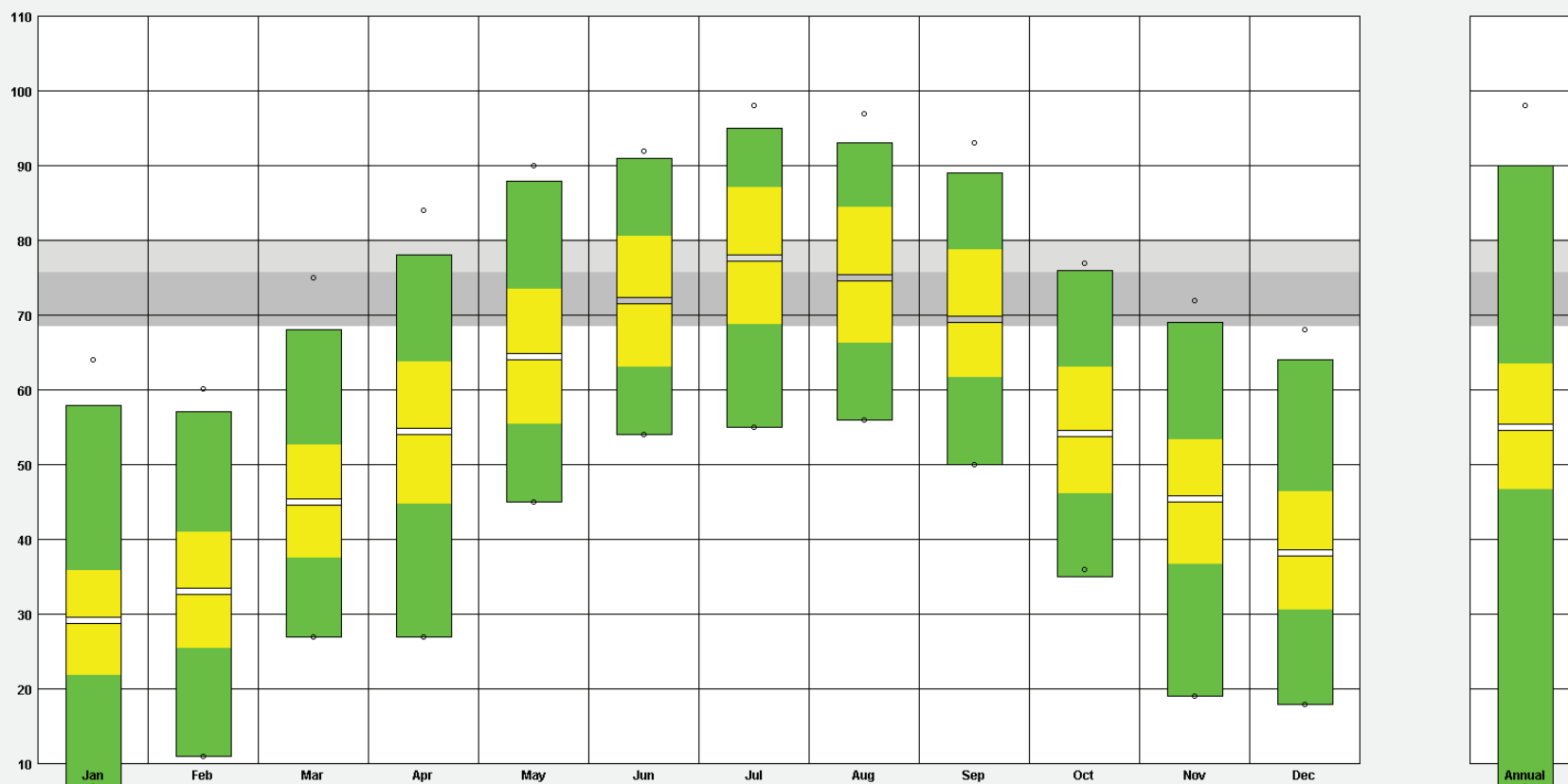
- ☒ 1% of Hours Above
- ☐ .5% of Hours Above
- ☐ 0% of Hours Above

## DESIGN LOW: Residential

- ☐ 1% of Hours Below
- ☐ .5% of Hours Below
- ☒ 0% of Hours Below

## TEMPERATURE RANGE:

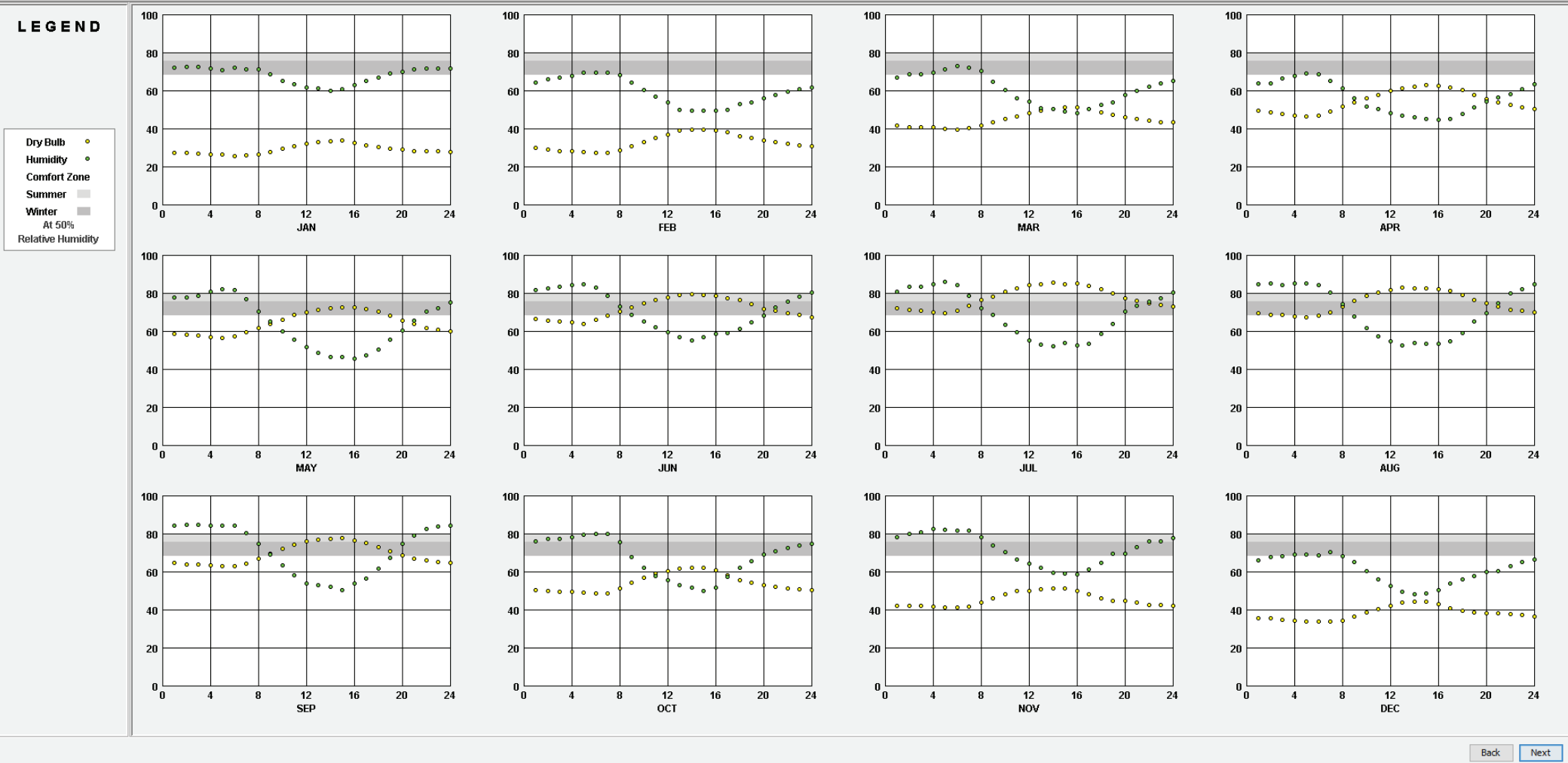
- ☒ 10 to 110 °F
- ☐ Fit to Data



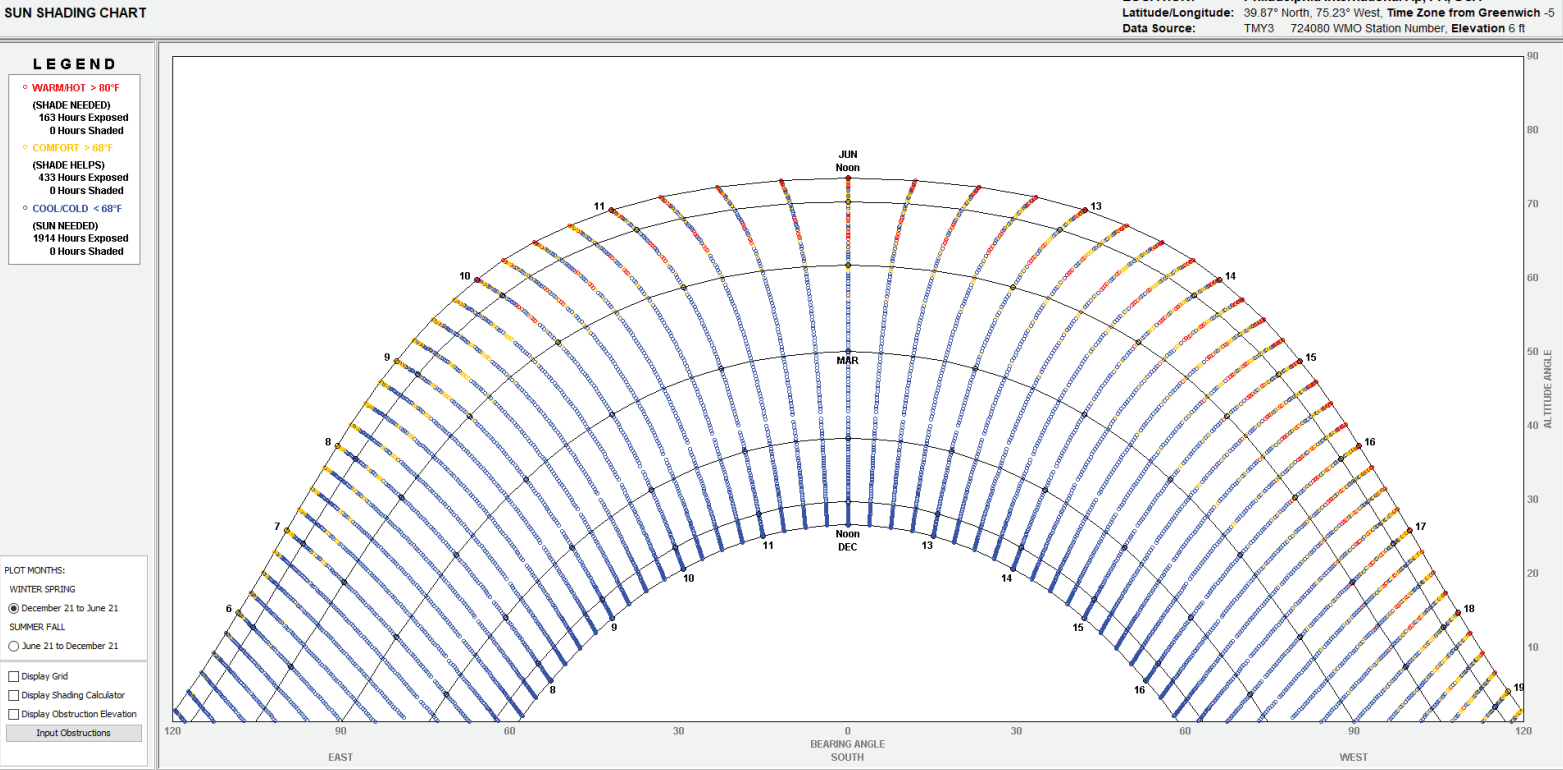
Back

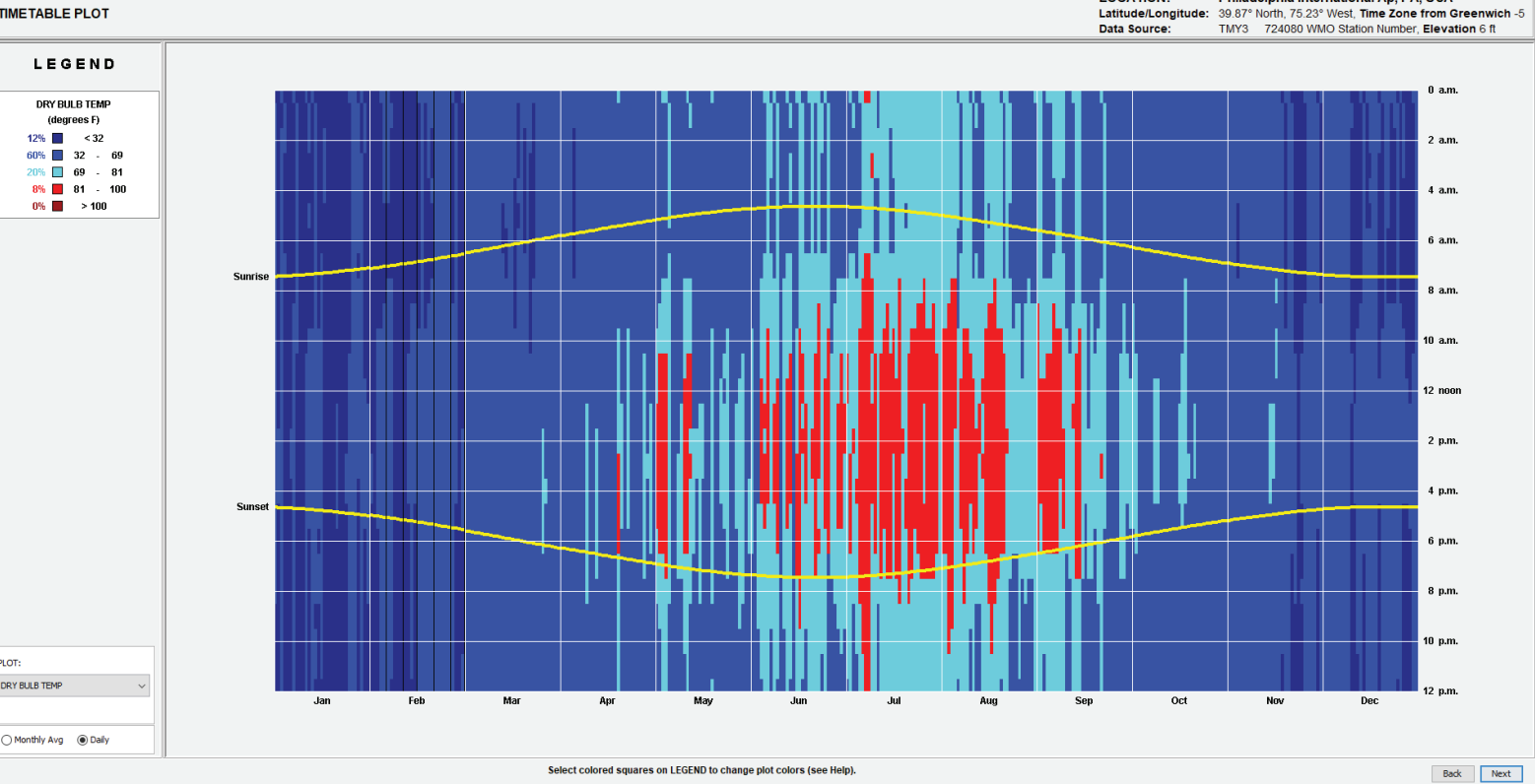
Next

Throughout the year the weather ranges from -13 degrees all the way up to 90 degrees Fahrenheit. The graph indicates the mean average of the months from May up until September range between the comfort zones. However there are hours during the summer in which there is too much heat stress to stay outdoors.



The graph shows the levels between the dry bulb temperature of the month in comparison to the mean level of relative humidity within the same month. This shows how that the relative humidity is usually higher during the winter; however during the summer the dry bulb temperature increases to make them close to one another, with a few instances in which the dry bulb temperature over exceeds the humidity.





## LEGEND

COMFORT INDOORS  
100% COMFORTABLE  
0% NOT COMFORTABLE

### DESIGN STRATEGIES: JANUARY through DECEMBER

9.6%	1	Comfort(842 hrs)
9.4%	2	Sun Shading of Windows(825 hrs)
	3	High Thermal Mass(0 hrs)
	4	High Thermal Mass Night Flushed(0 hrs)
	5	Direct Evaporative Cooling(0 hrs)
2.1%	6	Two-Stage Evaporative Cooling(181 hrs)
	7	Natural Ventilation Cooling(0 hrs)
	8	Fan-Forced Ventilation Cooling(0 hrs)
23.7%	9	Internal Heat Gain(2076 hrs)
10.5%	10	Passive Solar Direct Gain Low Mass(918 hrs)
	11	Passive Solar Direct Gain High Mass(0 hrs)
2.6%	12	Wind Protection of Outdoor Spaces(231 hrs)
	13	Humidification Only(0 hrs)
11.0%	14	Dehumidification Only(961 hrs)
6.8%	15	Cooling, add Dehumidification if needed(598 hrs)
41.7%	16	Heating, add Humidification if needed(3655 hrs)

100.0% Comfortable Hours using Selected Strategies  
(8760 out of 8760 hrs)

Comfort Zones show:  
Summer clothing on right,  
Winter clothing on left.

PLOT: COMFORT INDOORS

☒ Hourly ☐ Daily Min/Max

☒ All Hours ☐ Select Hours

1 a.m. through 12 a.m.

☒ All Months ☐ Select Months

JAN through DEC

☐ 1 Month JAN Next

☐ 1 Day 1 Next

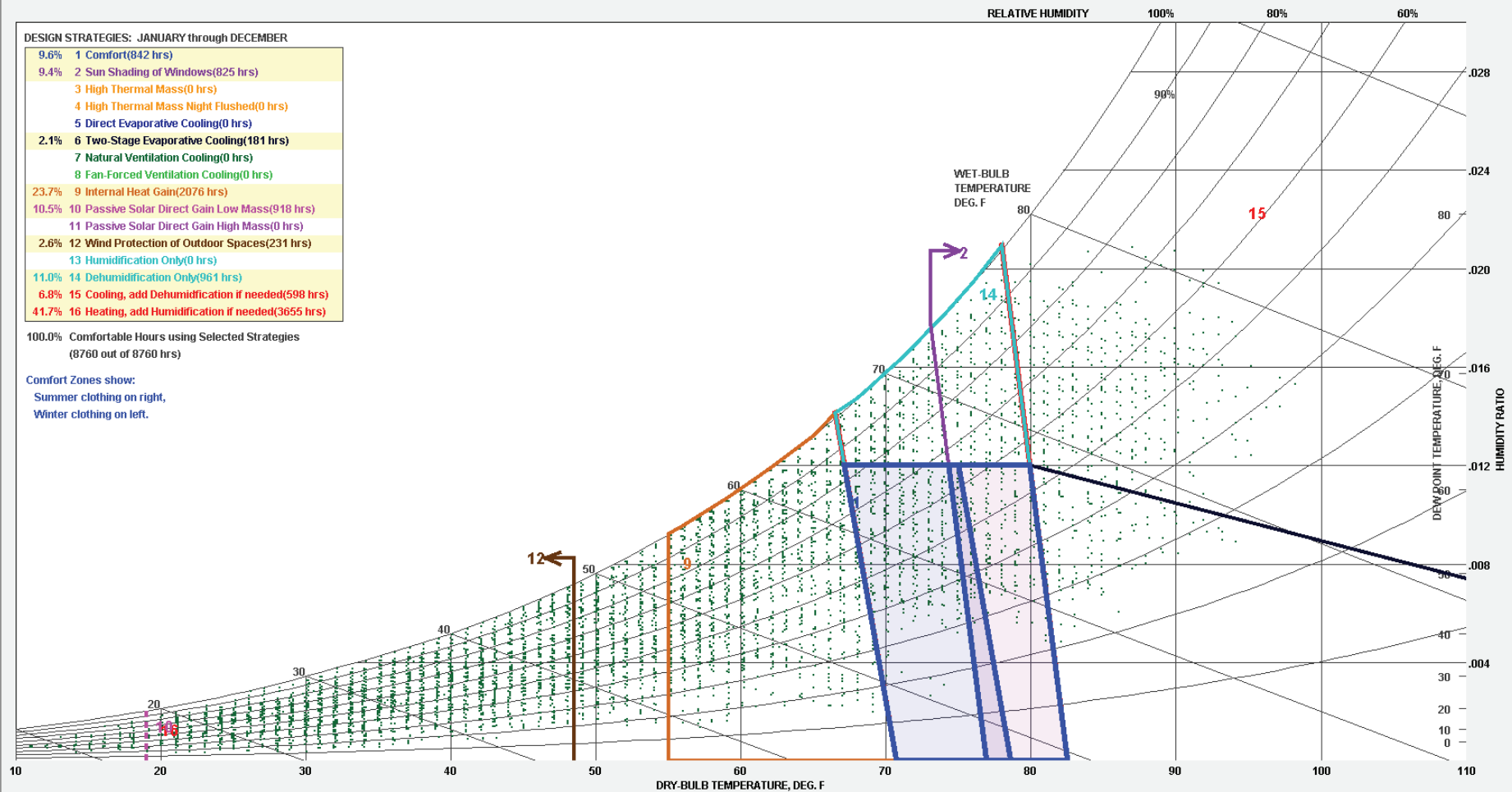
☐ 1 Hour 1 a.m. Next

TEMPERATURE RANGE:

☒ 10 to 110 °F ☐ Fit to Data

☒ Display Design Strategies

☒ Show Best set of Design Strategies



The levels of the hours in which comfort level could be achieved are through the times in which the temperature ranges from 70 to 83 degrees and a relative humidity from 0 until 85% humidity, considering a lower humidity as you go up with the temperature.