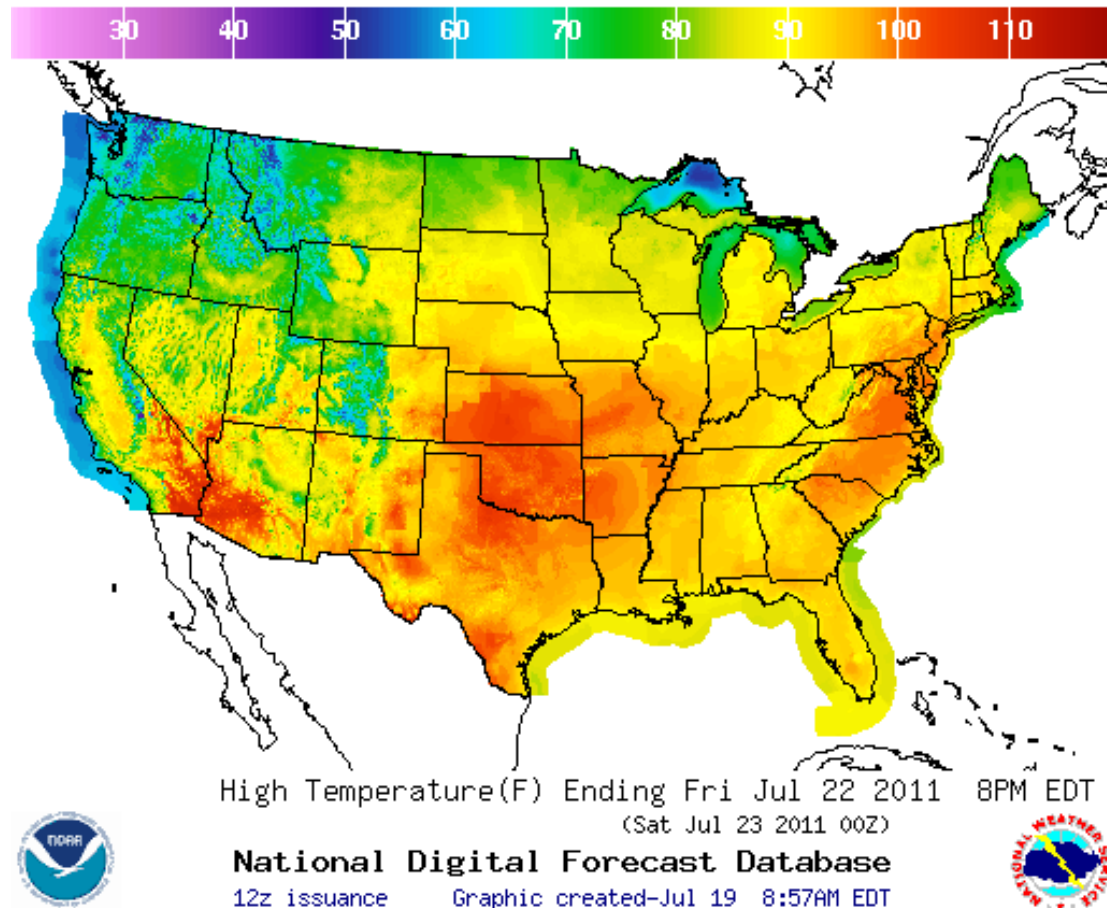


# Energy Efficient Dehumidification by Solar Driven Liquid Desiccant Systems

By Ryan Everly and Esdras Murillo

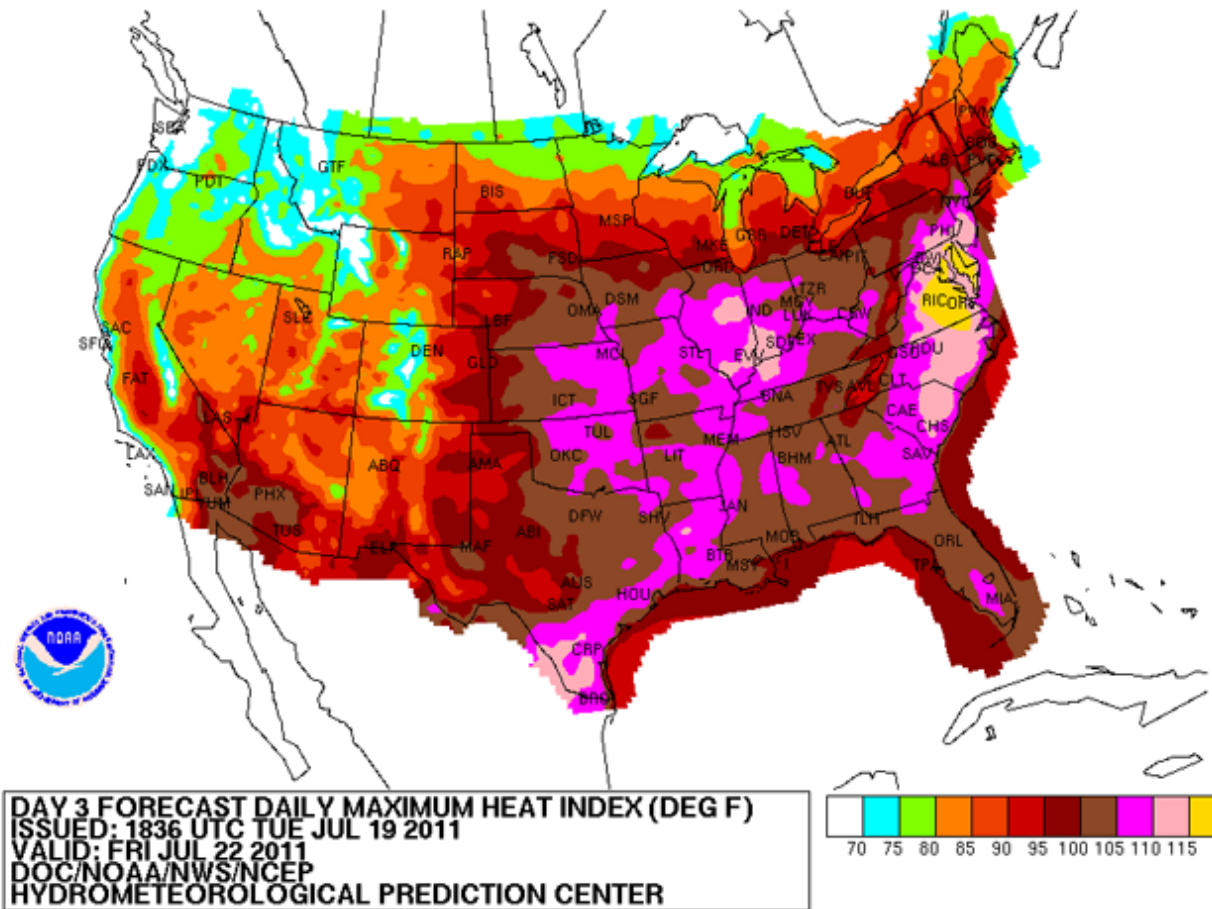
Advisor: Ulrike Passe

# Why Dehumidification?



# Why Dehumidification?

Heat Index Forecast for Friday, July 22, 2011



# Why Dehumidification?

- How it feels vs. actual temperature
- Higher humidity at high temperatures = extreme discomfort
- Turn up the air conditioning
- \$\$\$, Electricity, Environment
- But...

# Why Dehumidification?

- What if you could decrease the humidity?

## NOAA's National Weather Service

### Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

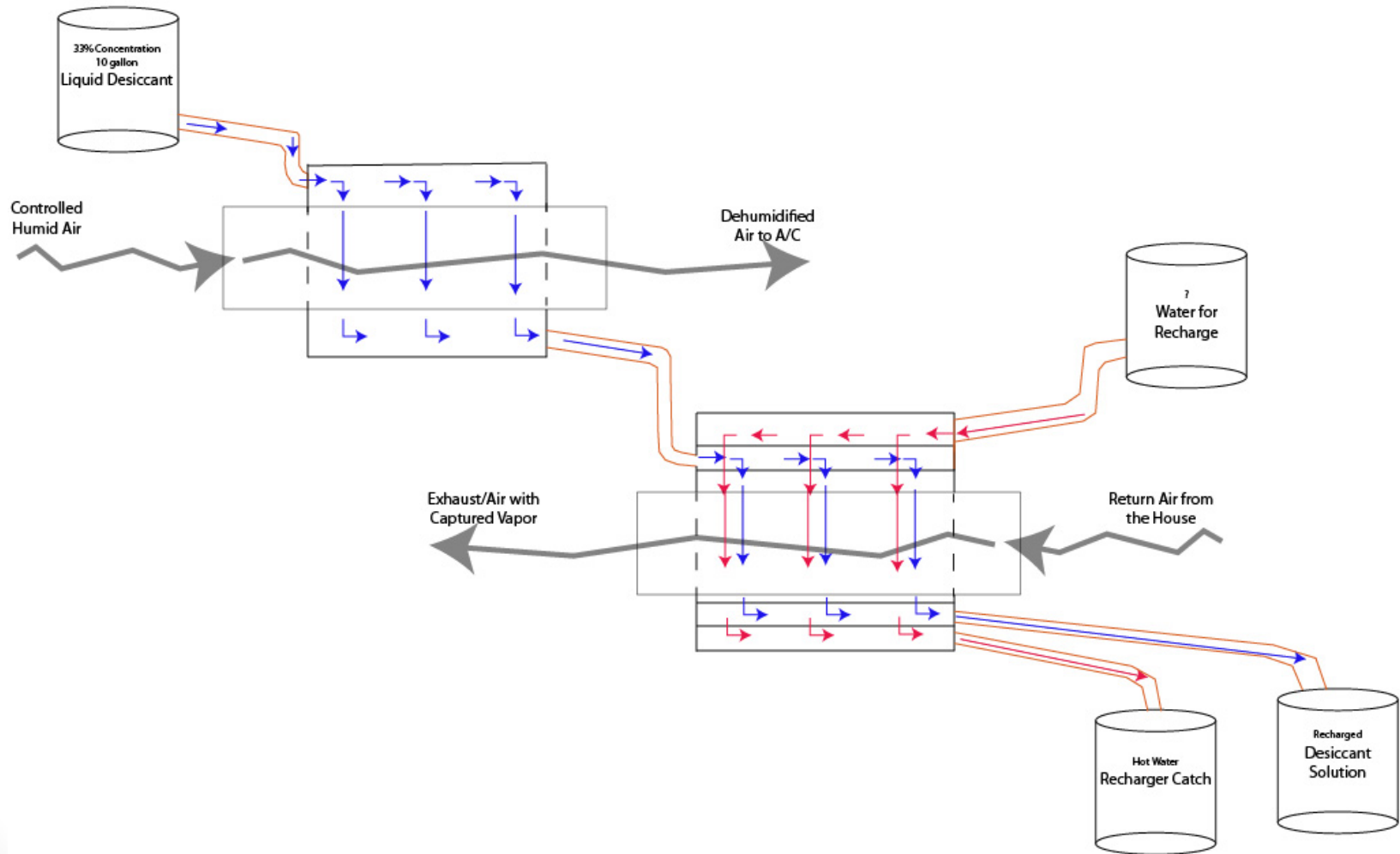
### Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

- Caution
- Extreme Caution
- Danger
- Extreme Danger

# Why a Desiccant System?

- Renewable and easy to make
- Cheap
- Safe
- Can be driven by solar hot water tank

# Liquid Desiccant System Design



# Current Setup

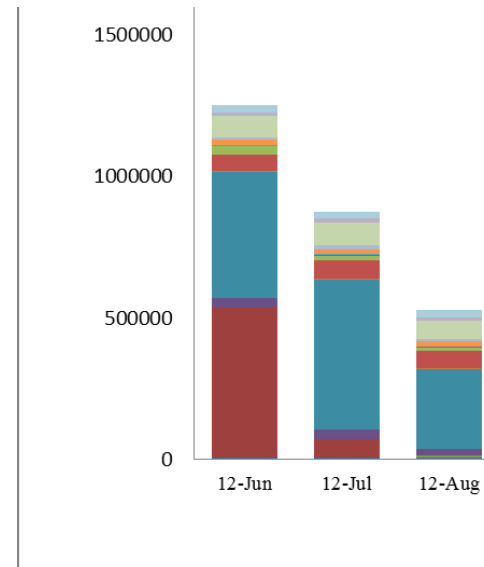


- ◎ Data Acquisition System
- ◎ Absorber and Recharger Box
- ◎ Runs itself



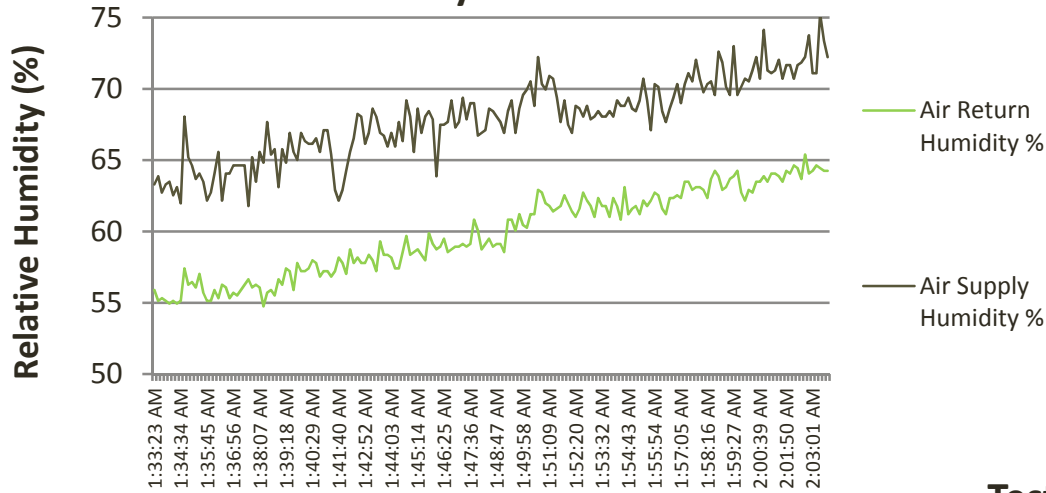
# Goals

- Increase the efficiency of the current system
- Fit into mechanical room
- Visible decrease power consumption
- Display results and system to inform and educate public

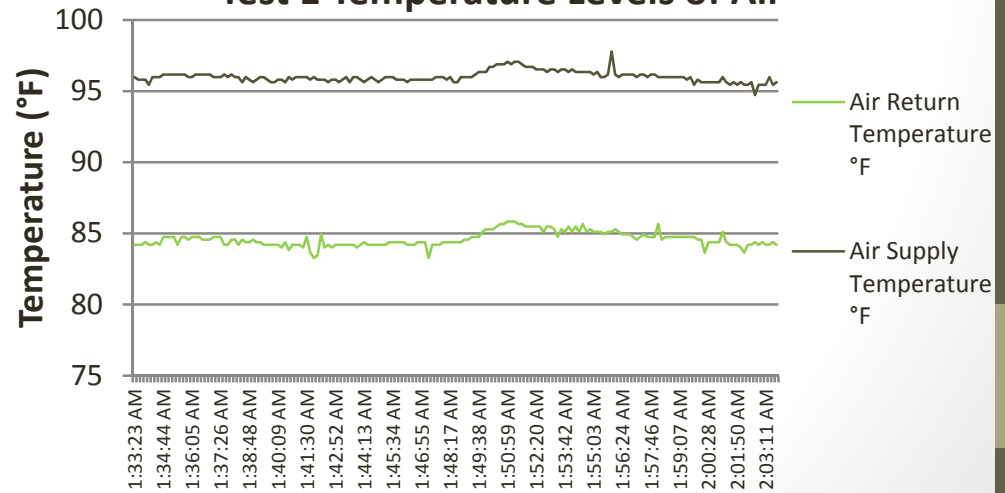


# Preliminary Testing

## Test 1 Humidity Levels of Air



## Test 1 Temperature Levels of Air



# Next Steps

- New data acquisition system
- Installation of recharge loop
- Testing
- Installation of system into the Interlock House

# Credits and Grant Acknowledgements

- This material is based upon work supported by the National Science Foundation under Grant Number EPS-1101284. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
- Nicholas Hulstrom and Steve Hoff and Clayton Hoermann and CBER