# **Cooler Phoenix Initiative**: City-research collaboration for science – based urban heat solutions

### Melissa Guardaro

#### Graduate Fellow, UREx SRN PhD Student, School of Sustainability, Arizona State University

ICLEI Webinar Series - 21 March 2018



### **Urban Heat Island Formations**





### IPCCC Climate Projections for American Southwest Region









### OSHA Work/Rest Schedule for Exposure to Heat and Hot Environments

			Light Work		Moderate Work	
Heat Risk Category		Wet Bulb	Work/Rest	Water Intake	Work/Rest	Water Intake
		Globe Temp		(quart/hr)		(quart/hr)
No Risk	Unacclimated	78 – 79.9	50/10 min	1/2	40/20 min	3⁄4
	Acclimated	78 – 79.9	continuous	1/2	continuous	3⁄4
Low	Unacclimated	80 - 84.9	40/20 min	1/2	30/30 min	3⁄4
	Acclimated	80 - 84.9	continuous	1/2	50/10 min	3⁄4
Moderate	Unacclimated	85 – 87.9	30/30 min	3⁄4	20/40 min	3⁄4
	Acclimated	85 – 87.9	continuous	3⁄4	40/20 min	3⁄4
High	Unacclimated	88 – 90	20/40 min	3⁄4	10/50 min	3⁄4
	Acclimated	88 – 90	continuous	3⁄4	30/30 min	3⁄4
Extreme	Unacclimated	> 90	10/50 min	1	avoid	1
	Acclimated	> 90	50/10 min	1	20/40 min	1



# Frequency of Heat Associated Deaths by Year, Maricopa County (2006-2016)





### Heat Associated Illnesses by Day (N=755), Maricopa County 2016



\*Yellow bars indicate days with Excessive Heat Warning Illness Occurrence in these days. Source: National Syndromic Surveillance Program – BIoSense Platform (12 Maricopa County Hospitals)

URELSRY

### **Impacts of Urban Heat**

Water Use

Economy

Public Health



Zone 10



Ashley McKnight/GPCC)

Air Quality



Phoenix Children's Hospital

#### Energy Demand



AZ Capital Times



Chad Bricks/12 News

#### Thermal Comfort





### **Cooler Phoenix Work Plan**





### **Cooler Phoenix Initiative**





## **Principles for Creating a Cooler Phoenix**

- The effects of extreme heat and the Urban Heat Island can be addressed to maximize thermal comfort and cooling, and minimize energy and water use, especially within the urban core.
- 2) The Urban Heat Island and extreme heat **do not have a uniform impact** across Phoenix and strategies to respond to its effects will vary from one location to another.
- **3) Prioritize** cooling initiatives for:
  - a. The hottest areas of Phoenix
  - **b. Vulnerable populations** and areas with little shading and public cooling opportunities.
  - c. Enhanced shade throughout the city especially where thermal comfort is important such as high use public walking routes and transportation nodes.
  - d. Developing cool islands where people are concentrated.
  - e. City infrastructure projects in the **design stage** that could support cooling elements, such as buildings, streets, and landscaping.
  - f. Incorporate cooling guidelines into any zoning and design guidelines currently being revised.
- 4) Implementing strategies to address the Urban Heat Island and extreme heat cannot be done solely by the city and the city alone. **Broad public support is critical to success.**



# **Cooler Phoenix Initiative Brainstorming** & Inventory **COP ASU Heat Team** Heat Research **Symposium**



### **Cooler Phoenix Initiative**





### **Cooler Phoenix Initiative**









# Questions?

# Melissa.Guardaro@asu.edu

