## This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



Getting Smart
 About the
 Colorado River
 Basin: Research
 Trends

Kelly Kopp, WEAN-CRB, AWE, USU Paul Lander, WEAN-CRB, U of CO Peter Mayer, WEAN-CRB, AWE, Water Demand Management







# WATER EFFICIENCY ACTION NETWORK

- All uses and users of the waters of the Colorado River Basin are interdependent; we all benefit by ensuring that sufficient water remains available to sustain and enhance our economies, communities, and environment.
- To collaboratively advance the understanding, application, and effectiveness of water use efficiency in the states of the Colorado River Basin.



- Identify needs and opportunities for improving water efficiency in the Basin.
- Demonstrate and promote the value of Basin-wide efficiency, and measure the results.
- Accelerate innovation and adoption of efficiency products and practices.
- Create a centralized Basin states' forum for water efficiency.
- Improve the health of Colorado River Basin ecosystems.
- Effectively advance water efficiency solutions and practices in members' communities.
- Be a clear voice for water efficiency efforts in the Basin states.

## Research Working Group

Network for collaboration organized by:

- Topic categories-initial list based on Alliance for Water Efficiency research topic list
- Organization-affiliation of the researcher(s)
- Location-of the people and organizations doing the work
- People-those producing the research, including key words to describe the topic and their expertise
- A broad reach is intended



## Research Topic Categories\*

- Alternate water supplies
- CII water use and efficiency
- Drought and drought response
- Green building
- Outdoor water use
- Fixtures and appliances
- State level policy
- Water efficiency planning
- Water energy nexus
- Ecosystem services, in-stream flows
- Water rates and rate structures
- Water resources planning and management





### Dormant Kentucky Bluegrass



### **Recovering Perennial Ryegrass**



# + Collecting Seed in Russia



# <sup>+</sup>Ornamental Horticulture Research



Bigtooth Maple Landscape Evaluations-Grafted Utah maples have been evaluated in Logan, Kaysville, and Lehi, Utah and Aberdeen, Idaho landscapes.



-Melody Richards

#### Multispectral Imagery



**Classified Imagery** 

**Overlay of Parcel Boundaries** 

Includes Landscape in Parking Strips

**IDENTIFYING CAPACITY TO CONSERVE** with Landscape Irrigation Ratios (LIR)



+

LIR < 1 = Efficient LIR 1 - 2 = Acceptable LIR 2 - 3 = Inefficient LIR > 3 = Excessive •Provides a software graphical user interface to run within the ArcGIS environment

•Estimates water use and water need (with flexible assumptions)



## Ornamentals and Dendrochronology

#### Water management

- Quantifying water use of woody plants
- Tree rings for climate reconstruction

#### Native plants

- Roundleaf buffalo berry (Shepherdia rotundifolia) hybrid
- Lacy buckwheat (Eriogonum corymbosum) cultivar development

## Quantifying Woody Plant Water Use



Comparing three maples, Bigtooth (Native, hot dry), Sugar (East, hot humid) and Bigleaf (West, cool dry).

## Tree Rings for Climate Reconstruction



- Relate tree ring width to past precipitation, river flow, temperature.
- Juniper and Douglas Fir



### Landscape Lysimeters (Bird's-Eye View)



#### Mixed Landscape at Maturity





## Turf and Ornamental Research

- Do different climate-based irrigation controller technologies achieve landscape water conservation without negatively impacting landscape quality?
  - Quantify the amount of water saved in turfgrass and ornamental area using different controllers.
  - Determine the level of drought stress in turfgrass and ornamental plant for the different treatments.
  - Evaluate plant quality and growth on the plants under different treatments.



## + Irrigation Efficiency and Adequacy



#### + Conclusions



In 2011, WeatherMatic<sup>®</sup> controller had the best performance.

In 2012, all climate-based controllers had similar performance.

Field Studies on Landscape Plants' Water Needs in California

# 79 plant species to date 33 trees, 12 groundcovers, 34 shrubs

- Locations no summer rainfall
  - Inland valley 28 trees
  - South Coastal 28 shrubs, 9 groundcovers, 5 trees
  - Low Desert 6 shrubs, 3 groundcovers

### Non-Turf Ornamentals



- Performance & water requirements uncoupled with ET<sub>o</sub>
- ET<sub>o</sub> × PF model not robust enough to precisely estimate water requirements
   Plant-climate interactions too complex
- Use more water than they need
- Traditional landscape plants perform acceptably with low to moderate water
  - Typically acceptable 30-70% of  $ET_o$
  - Less water may limit growth, not quality
- Discrepancies with WUCOLS





#### **Decision Center for a Desert City**

Conducting climate, water, and decision research and developing innovative tools to bridge the boundary between scientists and decision makers and put our work into the hands of those whose concern is for the sustainable future of Greater Phoenix.

#### Spotlight



#### News



#### Research





#### Water Sustainability and Climate



Home News People Publications Internal





#### 2010 Annual Water Use Comparison (kgal)



Avg. Annual Indoor and Outdoor Use



#### 1999 REUWS vs. 2014 REUWS



## <sup>+</sup> H<sub>2</sub>O Tech Connect

- Connect-people and ideas with resources and capital
- Find-solutions to world water challenges and global problems
- Share-knowledge and expertise
- Partner-to form groups to share research
- Discover-a community of people with similar interests







#### ACCELERATING CONNECTIONS IN TECHNOLOGY

<u>Tips on how to use the smart connect network</u> - H2O Tech Connect is a smart connection and matchmaking network that connects the water industry, entrepreneurs, university innovators, investors, service providers, mentors, technology corporations, public agencies, economic development professionals and other key players in global innovation to facilitate highly efficient and relevant networking and collaboration and drive economic impact for technology commercialization, tech transfer, start-up growth, and ich execution



Contact Us Help About Privacy Policy Terms & Conditions





© 2003-2014 another introNetworks<sup>™</sup> solution

## <sup>+</sup> Thanks very much....



<u>kelly.kopp@usu.edu</u> <u>paul.w.lander@colorado.edu</u> peter.mayer@waterdm.com