The Hidden Value of Landscapes

Zachary S. Johnson, PLA, CLT, CLP
Anthony Koski, Ph.D.
Alison O’Connor, Ph.D.
Colorado State University
Introducing the California White Paper

- Published by University of California Cooperative Extension in 2015
- Used to clarify and quantify the water used for landscape use in California
- Addresses misconceptions and misguided attacks
- Offers BMPs for landscapes
Introducing the Colorado White Paper

• Written to clarify and quantify the water used for landscape use in Colorado in response to the Colorado Water Plan and the many benefits of landscapes.
3% of Colorado’s Water is Used for Landscapes and Recreational Areas

- “Other” includes:
  - Down stream users*
  - Agricultural use
  - Drinking water
  - Bathing and cooking
  - Mining and hydroelectric generation
  - Lost to evaporation
  - And many more uses!

*60% of Colorado’s water leaves the state and is used by others downstream
Conserving Water is Paramount

• Colorado’s population is expected to double to 9 million people by 2050
• That means demand for water will increase
• Citizens and industry need to work together to spread awareness and practice water conservation
• These steps will help us face natural disasters in a more prepared way—fire, flood, drought and temperature extremes
We’ve Made Huge Strides to Conserve

• In the past decade, Coloradans have already reduced per capita water consumption by nearly 20%

• Tiered water pricing, new technologies, planting appropriate plant material, education and better awareness have all made this happen

• We need to continue on this path
The ROI on 3%

• Though important, aesthetics is only one of the many benefits that landscapes provide.
Air Quality: Carbon Sequestration

• Carbon inputs from industry, automobiles and burning fossil fuels can be offset by vegetation
• Trees have been found to store 5% of all human-caused carbon emissions
• Lawns can sequester carbon up to 30 years and have greater carbon storage when they are well-maintained
• Well-placed trees can reduce heating and cooling costs and reduce the need for fossil fuels
Air Quality: Reducing Airborne Pollution

- Pollutants are primarily trapped by the leaves of trees.
- The tree canopy for the Denver Metro provides air quality benefits in excess of $1.7M.
Cooling Effects of Vegetation

• Where there is limited vegetation, buildings and hard surfaces absorb solar radiation and can increase the surface temperature of urban structures 18-38°F higher than the ambient air temperature.

• Three trees around the home can save $100-250/year in energy costs.

Cars parked under trees are 45° cooler.
Stormwater Management

• Pervious surfaces, such as lawns and planting beds, help treat stormwater runoff close to the source

• When stormwater is slowed by landscaped areas, the amount of runoff into storm drains is reduced along with sedimentation of streams, rivers and lakes
Creating Areas for Wildlife

- Golf courses, HOAs and commercial businesses can become Audubon Sanctuary properties, where they take measures to protect and encourage habitat for wildlife
- Landscapes can provide wildlife refuge, migration corridors, food, shelter and areas to reproduce
Real Estate and Property Values

• For every $1 invested in landscaping a property, there is an ROI of $1.35
• Large street trees can increase a home’s value by up to 15%
• Street trees and well-maintained landscapes also increase rent prices (for offices and homes)
Landscapes Improve Our Lives

• Landscapes help people connect to nature
• Green spaces and vegetation facilitate personal relaxation, rejuvenation and socialization by pulling people outdoors to engage within their community
Landscapes Improve Our Lives

• A single tree can serve as informal meeting places for group and individual activity
• These noted psychological and physical benefits span across gender, generations and culture

Village meeting in Kenya
Landscapes Reduce Crime

- Landscape vegetation around buildings can mitigate irritability, inattentiveness and decrease impulsive behavior—all of which are well-established psychological precursors to violence.
Landscapes Reduce Crime

- Residents in public housing reported 25% fewer domestic crimes when landscapes and trees were planted near their homes.
- Landscapes invite people to spend time outdoors, which results in getting to know your neighbors.
Landscapes Increase Child Development

• Provide areas to play and be a kid!
• Landscapes also increase imagination, creativity, intellect and cognitive function
• Children diagnosed with ADD had reduced symptoms when exposed to green space, even if through a window
Landscapes Reduce Stress

• The majority of people retreat to a natural setting when stressed (66%)
• 95% of people experiencing stress and anxiety felt calmer and more relaxed after spending a short time in a landscape
Landscapes Improve Health and Fitness

• Yard work provides sufficient exercise to meet the Center for Disease Control’s guidelines for physical activity
  – Mowing your lawn (walking) can burn up to 370 calories per hour

• People who joined a community garden had lower body mass indexes (BMI) than their neighbors who were not in the community garden program and were less likely to be overweight
Unintended Consequences: “Cash for Grass”

• When water becomes scarce, it’s easy to target landscapes and simply encourage people to turn off the water.

• The “Cash for Grass” programs in California and Nevada gave homeowners money for removing turf.
Existing trees
If no irrigation is provided, how long will they last?
Unintended Consequences: “Cash for Grass”

- Rockscapes can increase ambient temperature
- Nutrient and sediment run-off is increased
- No place for kids or dogs to play
- Weed control remains
- Disjointed look to neighborhoods
- Loss of carbon storage benefits
Unintended Consequences: Increase in Ambient Air Temperature

- With the loss of vegetation and their ability to shade, ambient air temperature often increases.
- Shaded streets are often 30-40 degrees cooler.
- Converting to rock or synthetic turf does not help with cooling effects.
Air Temperature was 82 degrees F
Unintended Consequences: Loss of Recreational Space

• People in communities with abundant greenspace generally enjoy better health
• Tree lawns contribute to perceptions of more walkable streets, which can promote more physical activity in children and youth
• Elderly people that had nearby parks, tree-lined streets, and space for taking walks showed higher longevity over a 5-year study period
Planning for Drought: Policies

• Develop clear policies and work together with all interested policies
• Start the process before crisis occurs
• Keep the public informed

City of Greeley launches water budget program, setting personalized budgets for every Greeley household

Greeley Tribune
January 29, 2017
Planning for Drought: BMPs

• The GreenCo Best Management Practices (BMPs) were introduced in the 2002 drought and have been updated several times.

• These are the guidelines on how to reduce water consumption and protect water quality while producing, designing, installing and maintaining healthy, beautiful landscapes.
Planning for Drought: Prioritize

• Prioritize watering of healthy large trees and shrubs

• Focus irrigation efforts on recreational areas for physical and psychological benefit of people

• Avoid over-irrigation and runoff!
Planning for Drought: Financial Incentives

• Many water districts and cities offer rebates or financial incentives for water efficient technology

Residential Sprinkler Equipment Rebates

New technology is available to help make sprinkler systems more water-efficient. Fort Collins Utilities offers rebates on qualifying equipment, including:

1. Rain sensor: wired, $15, wireless, $30
2. Soil moisture sensor: $45
3. High efficiency nozzles: $25 (purchases of $50-$99), $50 (purchases of $100-$199), or $100 (purchases of $200+)
4. Pressure-reducing heads: $20 (purchases of $40-$79) or $40 (purchases of $80-$159), or $80 (purchases of $160 or more)
5. WaterSense stand alone controller: $100
6. WaterSense add-on weather station: $50
7. PRV at Point of Connection: Varies
8. Drip Conversion Kit: 50% rebate, not to exceed $50

City of Fort Collins
Planning for Drought: Budgets

• Budget accordingly to repair broken heads, leaks, inoperable valves and rain sensors, malfunctioning drip system components, and sprinkler overthrow.

• Making repairs will ensure that irrigation systems are operating at optimal efficiency when used.
Planning for Drought: Education

• Provide formal and informal educational opportunities for constituents

• Educate consumers about water-saving technologies, appropriate plant material and services offered by local water utilities and the green industry

• Help consumers realize they might already possess water saving technologies, such as controllers with seasonal adjustment options and water restriction settings
Planning for Drought: Homeowners

• Plant selection
• Develop a plan for the landscape
• Prioritize watering
• Delay planting
• Utilize new technology
• Use mulch
• Apply pesticides cautiously and practically
We Can Learn from the Past to Plan for the Future

There’s a big ROI on that 3%. That’s why we need to preserve landscapes while we conserve water.

97% other

3% = outdoor irrigation