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Water Quality & Quantity Issues For Turfgrasses In Urban Landscapes

Urban Perennial Grasses In Times of a Water Crisis: Benefits and Concerns

Dr. Mike Kenna

US Golf Association

Water Quality and Quantity Issues for Turfgrasses in Urban Landscapes

- 3-Day Workshop held January 23-25, 2006 in Las Vegas, Nevada
- Hosted by The Council for Agricultural Science and Technology (CAST)
- Opportunity to discuss issues facing the turfgrass and water industries

CAST

The Science Source for Food, Agricultural, and Environmental Issues

Water Quality and Quantity Issues for Turfgrasses in Urban Landscapes

- 25 Scientists
- Co-chaired by Dr. James Beard, Texas A&M University and Dr. Mike Kenna, USGA
- Linda Chimenti, Managing Scientific Editor, CAST
- One free copy to all current CAST members

What's the Problem?

Proponents:

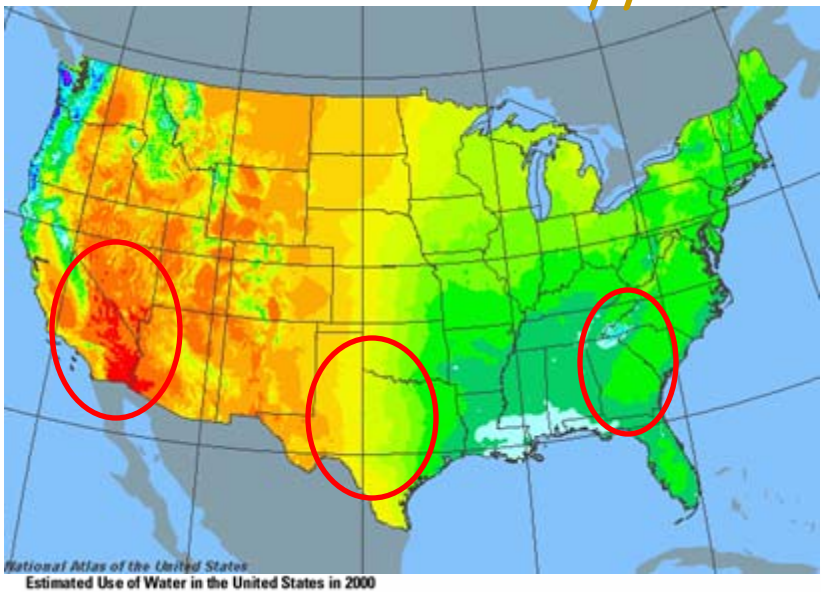
- Environmental and human benefits
- Decreased runoff from storm events
- Erosion and pollution control
- Heat dissipation
- Recreational and business opportunities
- Enhanced property values

Critics:

- Use excessive water
- Require unnecessary pesticides and fertilizers
- Disturb existing land-use patterns
- Waste time, money and Resources

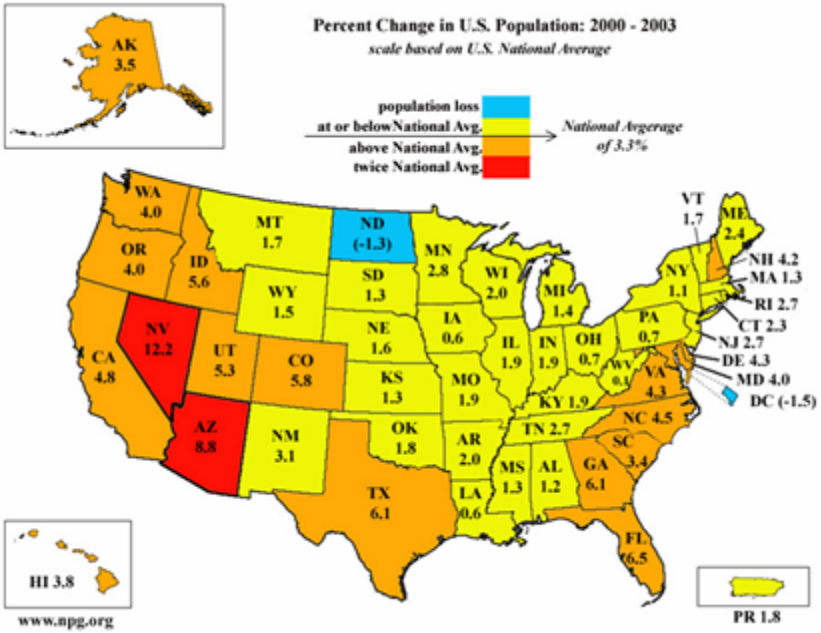
Pending Water Crisis

Limited Water Supplies



Estimated Use of Water in the United States in 2000

Population Growth



High Water Withdrawal

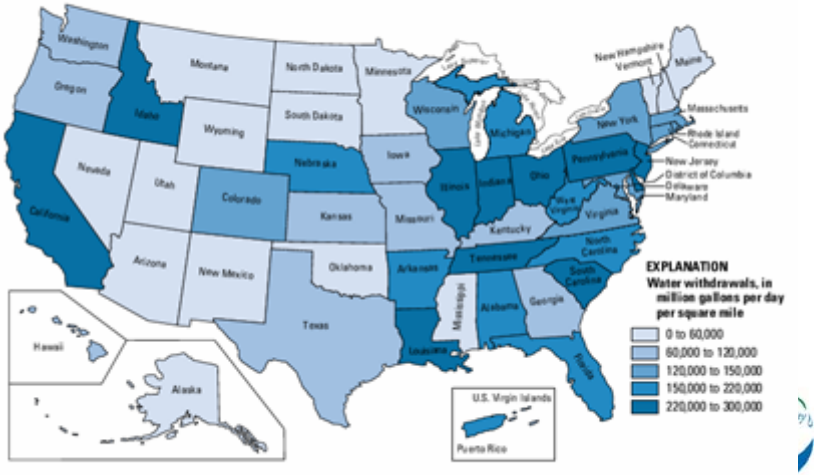
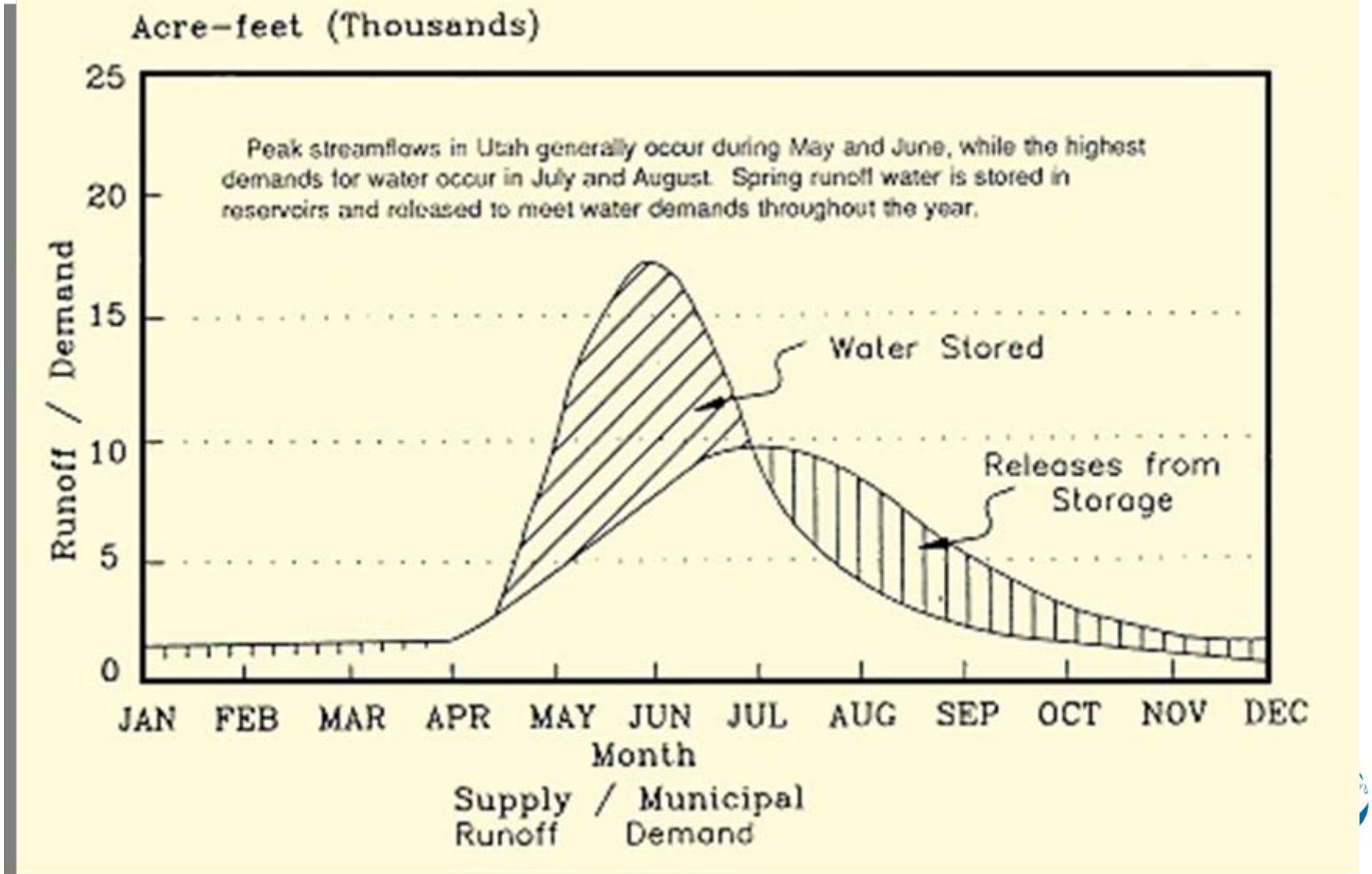


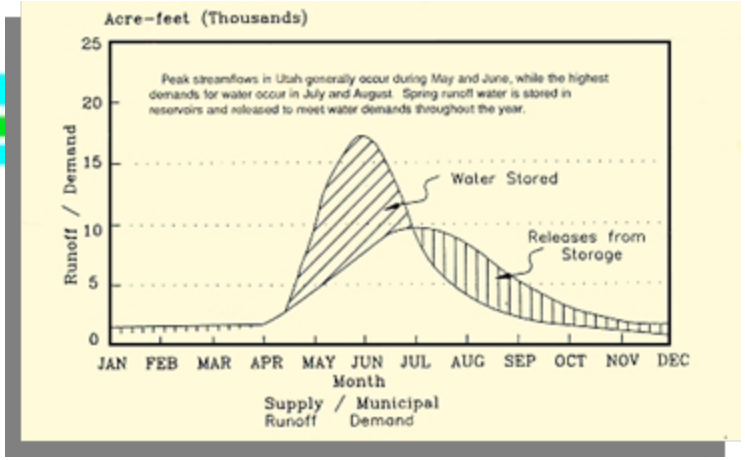
Figure 4. Intensity of freshwater withdrawals, 2000.

Understanding “Peak Demand”



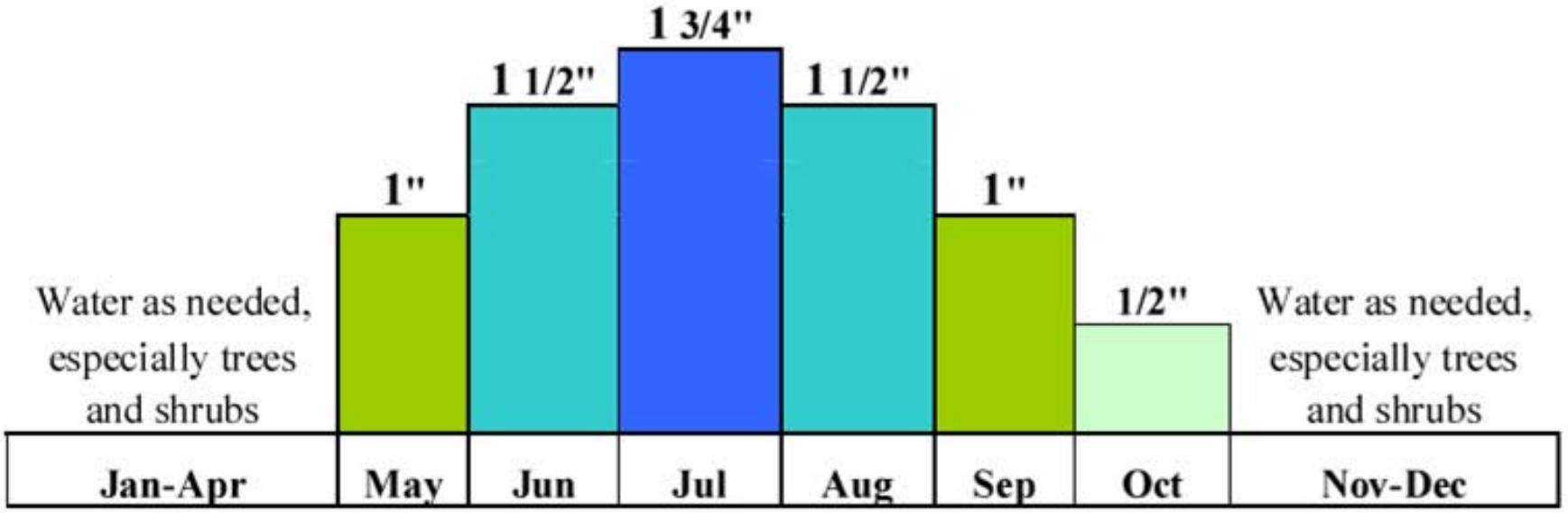
Addressing ‘Peak Demand’

DENVER WATER



Three Options for Efficient Watering

1. Weekly Watering Amounts for Bluegrass Turf



Water Policy

- Our drinking water system is extremely decentralized
  - Local government ownership
  - Independent government authority ownership
  - Privately owned companies
  - Public-private partnerships

Environmental Protection Agency

- Clean Water Act
- Safe Drinking Water Act
- Prevent pollution and decrease risk to humans and ecosystems
- Integrated federal, state, and local implementation
- Positive impact on water protection and conservation

Water Use and Conservation

- Select correct turfgrass for the climate
- Proper landscape design
- Develop sustainable water management plans

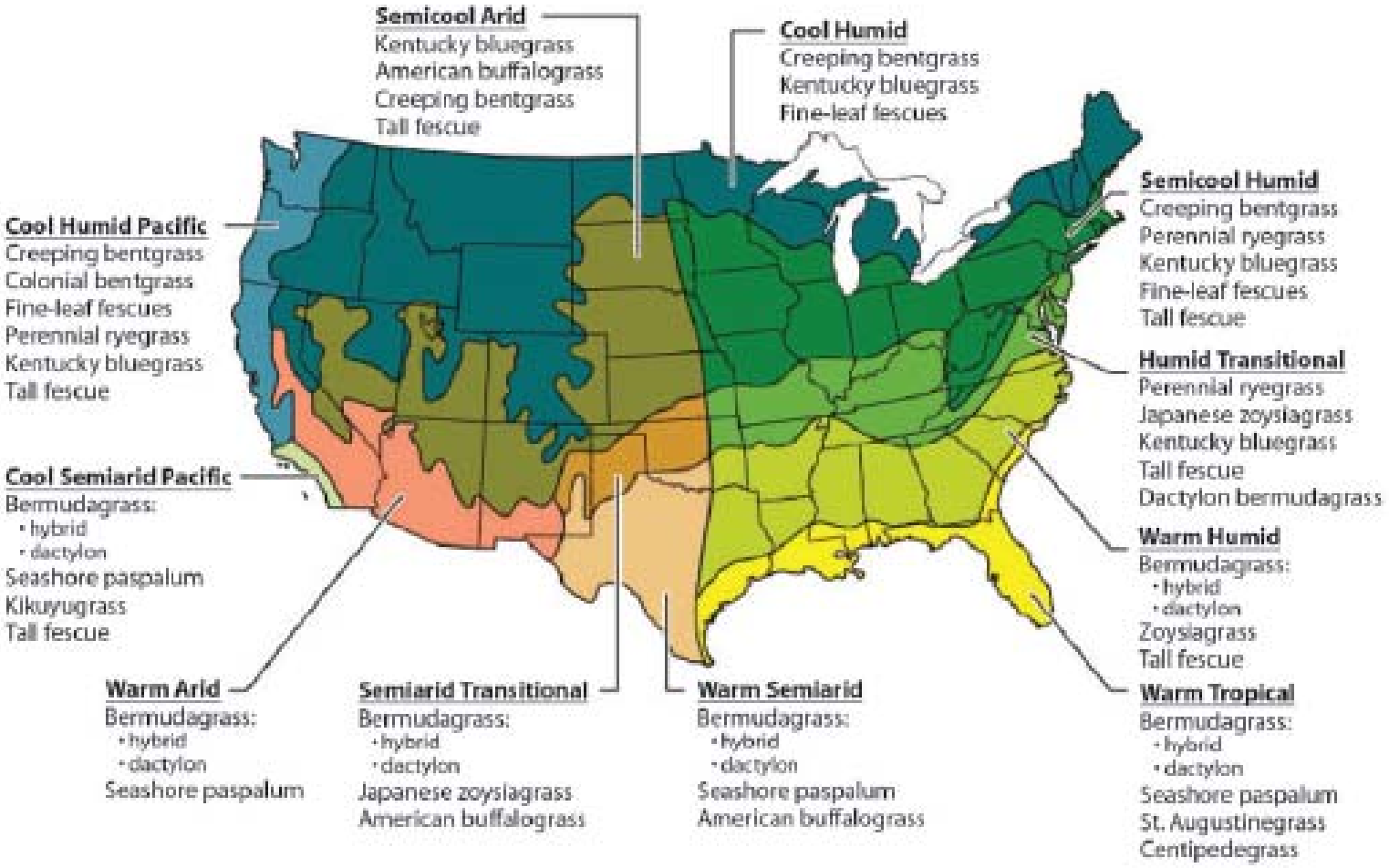


Figure 5.2. Major turfgrass climatic zones and geographic distribution of species in the United States (adapted from Beard 2002).

Development of Native Species

- Limited water, poor quality water, poor soils
- Deep root system reaching 8 feet when mowed at 2.5 inches (4x Kentucky bluegrass)

Improve Adaptation of Major Turf Species

Improve Adaptation of Major Turf Species

Specific Cultural Practices

- Mowing height and frequency
- Turfgrass nutrition
- Turfgrass irrigation
- Soil cultivation
- Topdressing
- Wetting agents
- Plant growth regulators
- Pest management

Irrigation Efficiency

- Rain sensors
- Licensed Irrigation Designers
- Yearly system review
- Designs reviewed and work inspected
- Rebate for design changes

San Antonio, TX - Seasonal Irrigation Program (SIP) Brochure

Seasonal Irrigation Program (SIP)

- Based on PET related to four years of studies
- Simple program – One weather station
- Texas Cooperative Extension
- Newspaper, radio, e-mail, hotline, and phone message
- Recommendation based on turf type
- Master Gardener's and Gardening Volunteers sign folks up
- 5,000 signed up, 20% savings realized

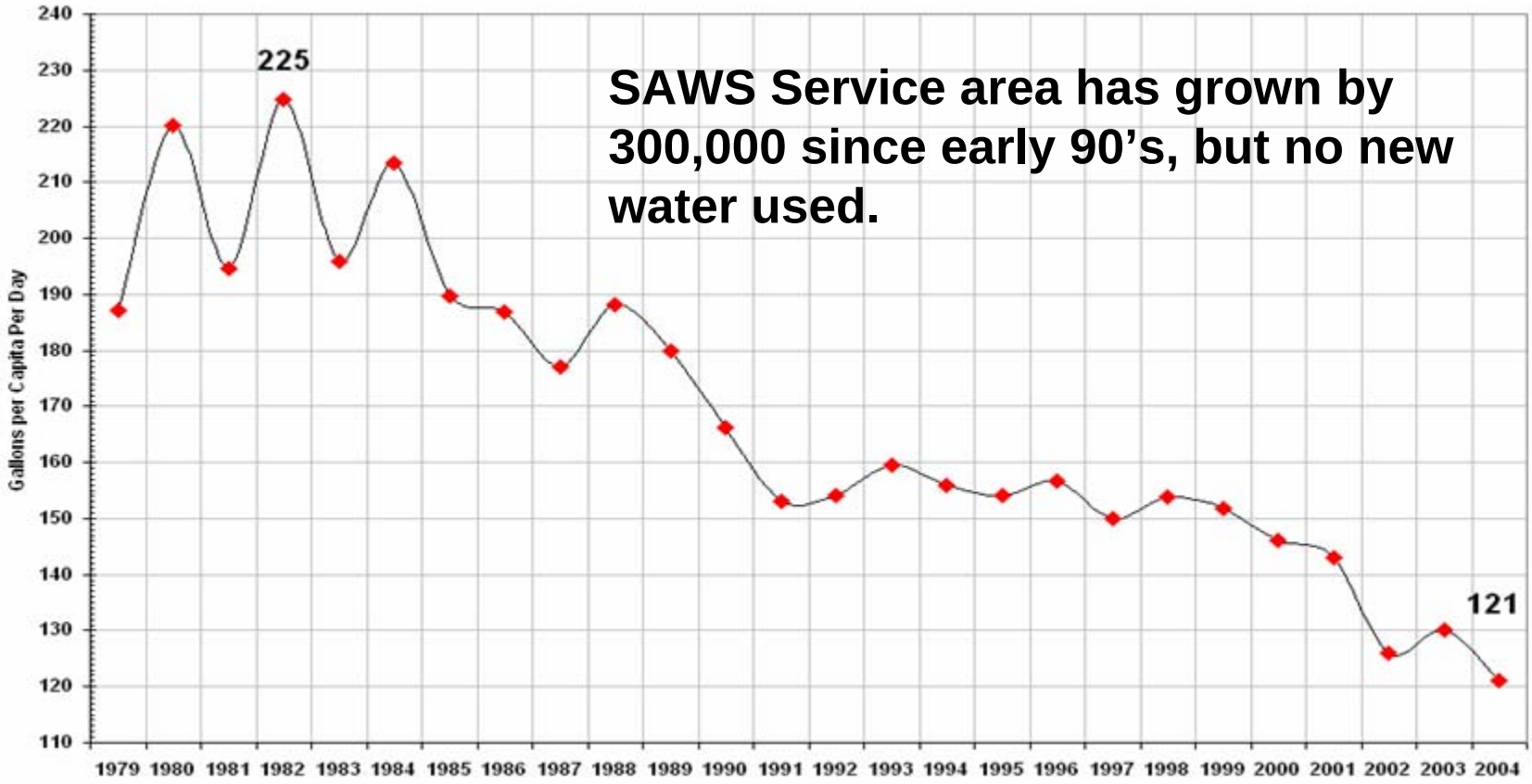
Water Conservation Ordinance

- Passed In January, 2005
  - Unanimous vote with support of turfgrass industry new home builders, car washes, irrigators
- Landscapes on new homes
  - Four inches of soil under turf
  - Zoned irrigation
  - Turf varieties survive 60 days drought
- Rain Sensors

Drought Restrictions and Enforcement

- Designed to reduce water use, but preserve lawn
- Main restrictions – Water lawn one day/week based on address
- Saved 14.9% over six months in 2004
- Stage three (3), water every two weeks
- Five part-time police officers cite violators with misdemeanor ticket

Gallons Per Capita Per Day

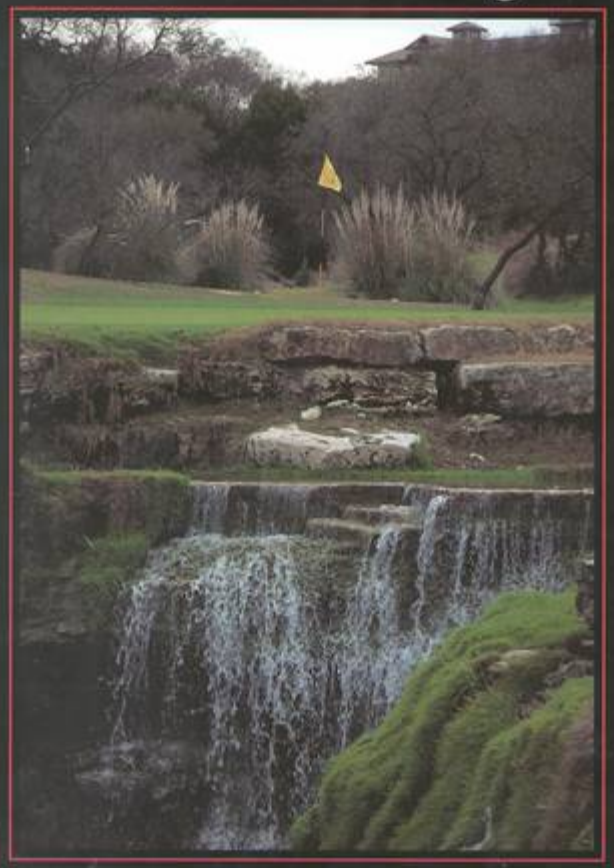


SAWS Service area has grown by 300,000 since early 90's, but no new water used.

Reclaimed Water

- Increased usage by golf courses
- Higher turfgrass growth rates
- Minimal downward movement of nutrients

Wastewater Reuse for Golf Course Irrigation



THE USGA

Using Recycled or Brackish Water

- Efficient and uniform water application
- Filtration of suspended matter
- Groundwater quality monitoring programs may be required
- Protect adjacent properties or bodies of water from irrigation runoff or overspray.

Pesticide and Nutrient Fate

The research shows that *under most conditions*, the *small amounts* of pesticides and nutrients that *move* through the soil are found *at levels below* the health and *safety standards* established by the U.S. EPA

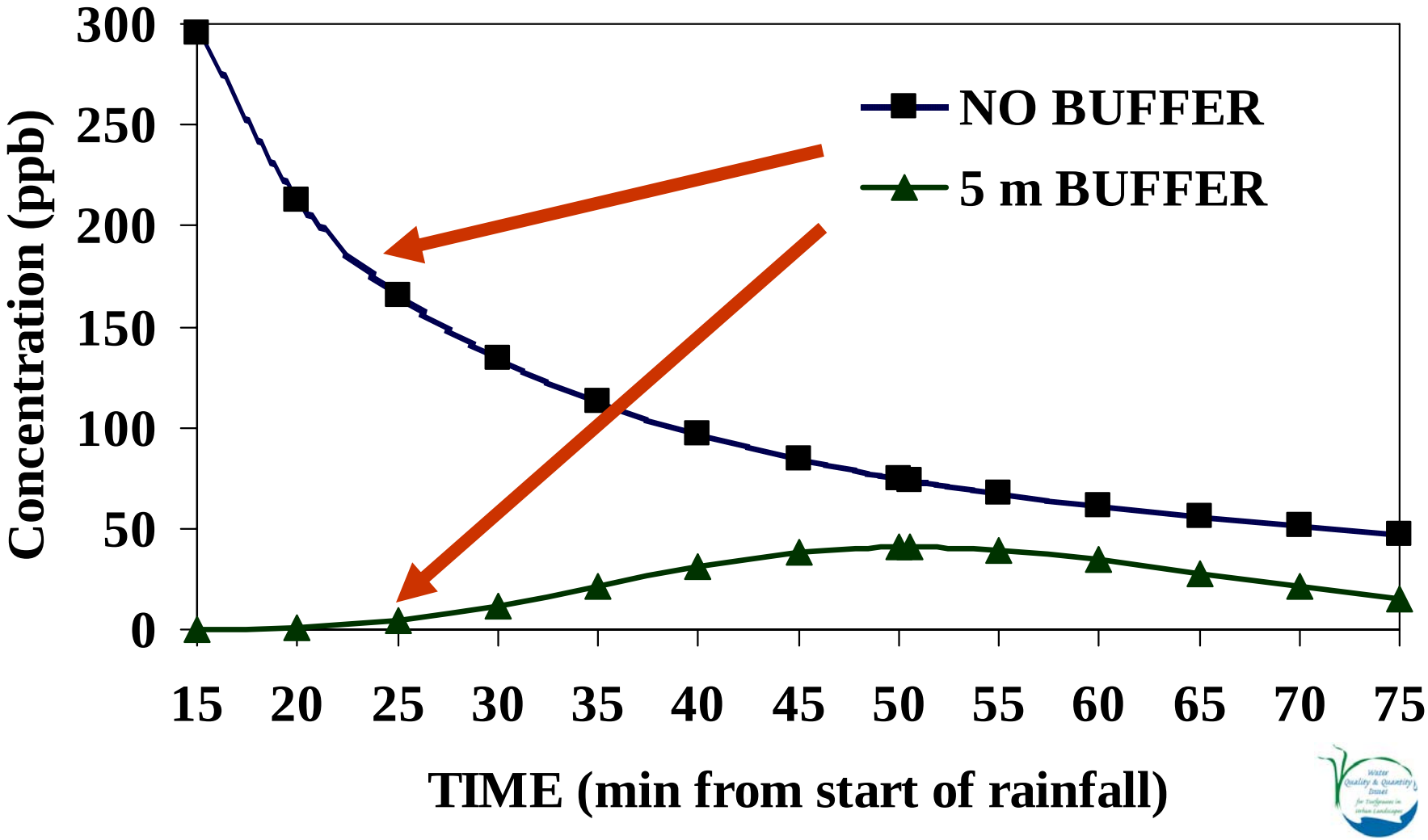
Thatch layer in a typical turfgrass

Runoff

- Climate
  - temperature, evapotranspiration, and volume, intensity, and duration of precipitation
- Site and Soil Conditions
  - soil texture and organic matter content, bulk density, hydraulic conductivity, thatch layer presence, landscape slope, and proximity to water resources
- Management
  - irrigation, drainage, fertilizer and pesticide application, and cultural practices.

Turf Chemical Runoff

Effect of buffer on 2,4-D concentration in surface runoff



Vegetative Filter Strips for Runoff

Blue Flag Iris
(*Iris versicolor*)

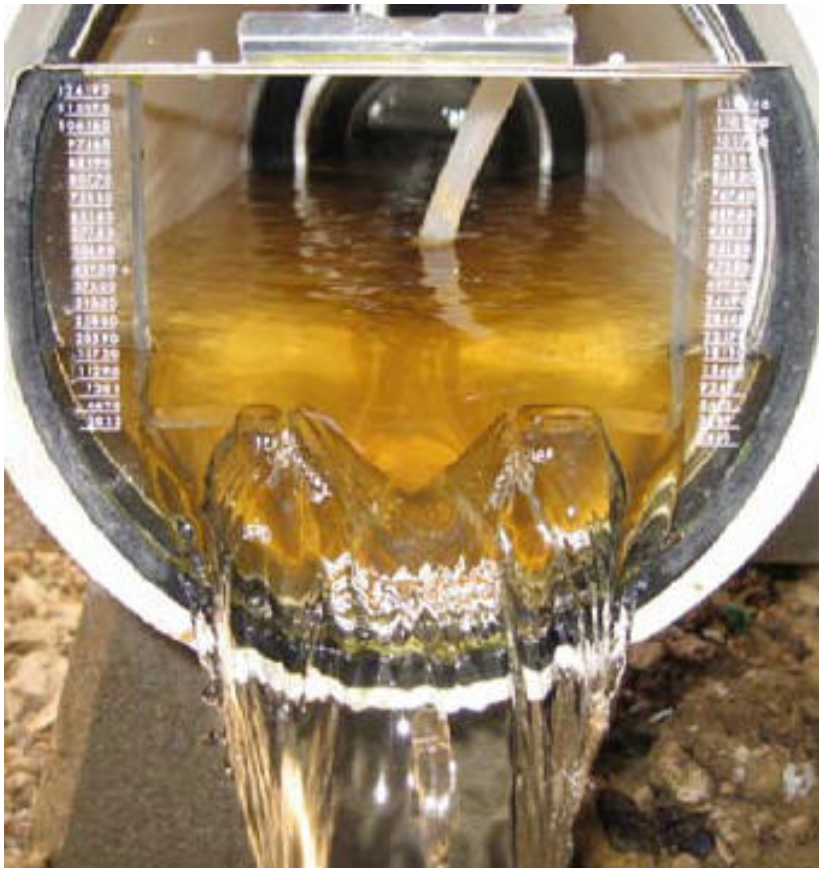
Woolgrass (*Scirpus cyperinus*)

Prairie Cord Grass
(*Spartina pectinata*)

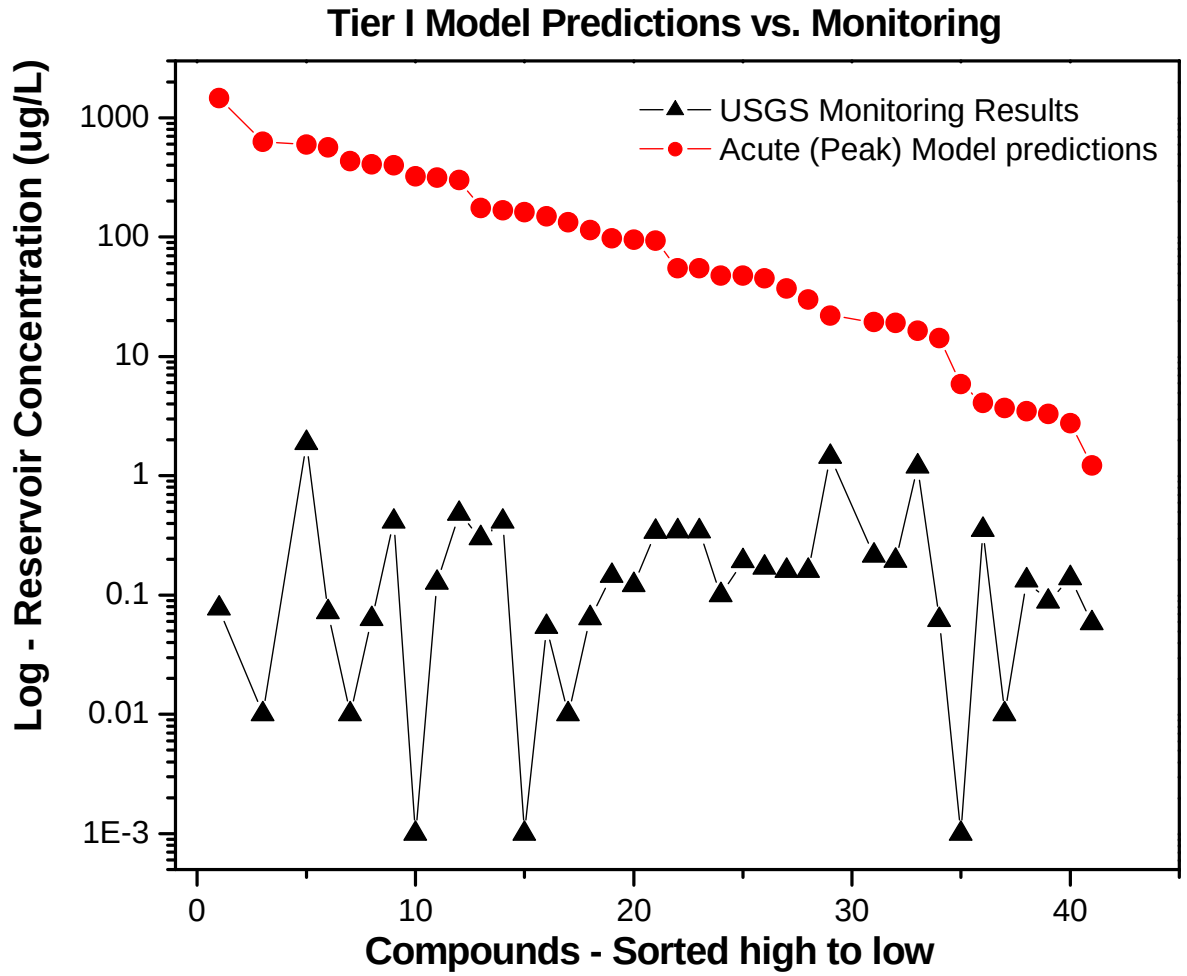
Big Blue Stem
(*Andropogon gerardii*)

Eastern Gama Grass
(*Tripsacum dactyloides*)

Filter Materials for Tile Drainage Outlets



EPA PRZM-EXAMS Scenarios vs. Monitoring



Maximum Measured Value from Study

Comprehensive Approaches - BMPs

- Science-based
- Incorporates all strategies in the ecosystem
- Embodies all stakeholders and their social, economic, and environmental concerns
- Values education and communication outreach
- Allows integration of new technologies and concepts
- Applied at the regulatory, watershed, community, and site-specific levels, as well as in educational realms
- Maintains flexibility to adjust to new situations.

Benefits of BMPs model

- Move forward in a positive and unified manner
- Excellent environmental model
  - Demonstrates a high degree of environmental stewardship
- Provides for research, education, and extension needs to serve the turfgrass industry and society

The tendency is to use a simplistic approach for eliminating certain water uses by enacting public laws. A single- issue approach, however, can lead to other potentially serious problems.

Water issues need to be addressed:

- In an integrated manner
- Fiscal realities facing the nation need to be recognized in order to effectively coordinate the actions of federal, state, tribal, and local governments
- Perceived environmental problems must not be addressed in isolation, but in terms of all the interrelationships and stakeholders associated with these landscapes

The ultimate goal is to provide quality urban areas for activities and recreation while conserving and protecting our water supply.


Water
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Thank you…