



**DENVER WATER**

**Urban Drought Management  
Vulnerability & Impacts  
Jeff Tejral**

# Questions

- **What are the impacts of drought to a water provider?**
- **How are water systems vulnerable?**
- **Why do Water Providers focus on irrigation during drought?**
- **Are there other areas we can focus on and get the reductions needed?**

# Outline

- **Impacts of drought**
- **Water provider vulnerabilities**
- **Denver Waters drought stages and decision making**
- **Opportunities for improving the system**

# Impacts of drought

## Increased staff time

- Meetings
- Phone calls
- Reports to councils or board
- Changes to normal operations

## Increased costs

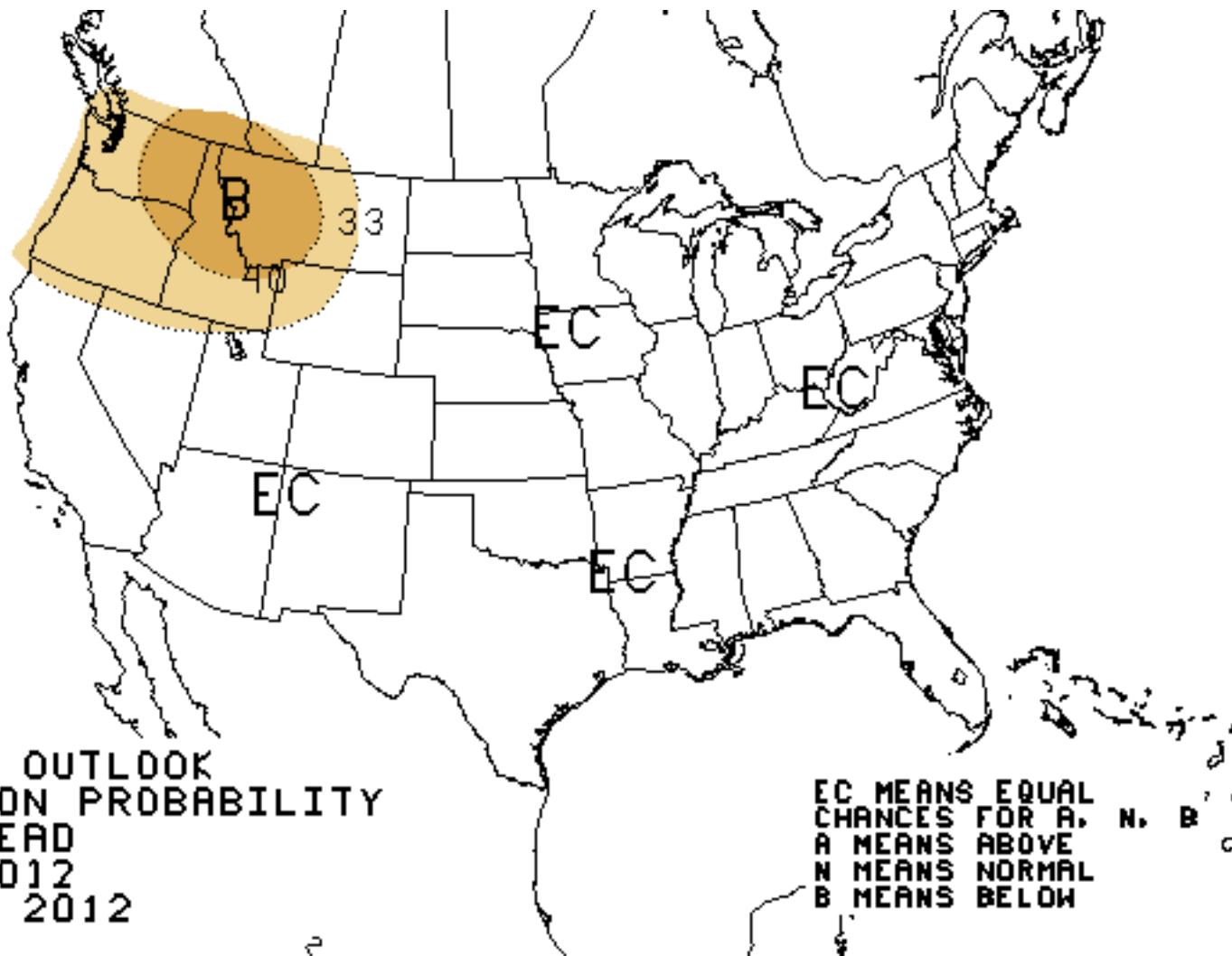
- Advertising
- Signs
- Bill inserts
- Patrolling for water waste
- Technology for enforcement

## Decreased revenue

- Less overall water sold
- Fewer customers in higher tiers

# Vulnerability

- **Limited supply**
- **Predicting the weather is hard**
  - One week
  - Three month?
- **Collection systems in fire prone areas**
- **Climate Change**

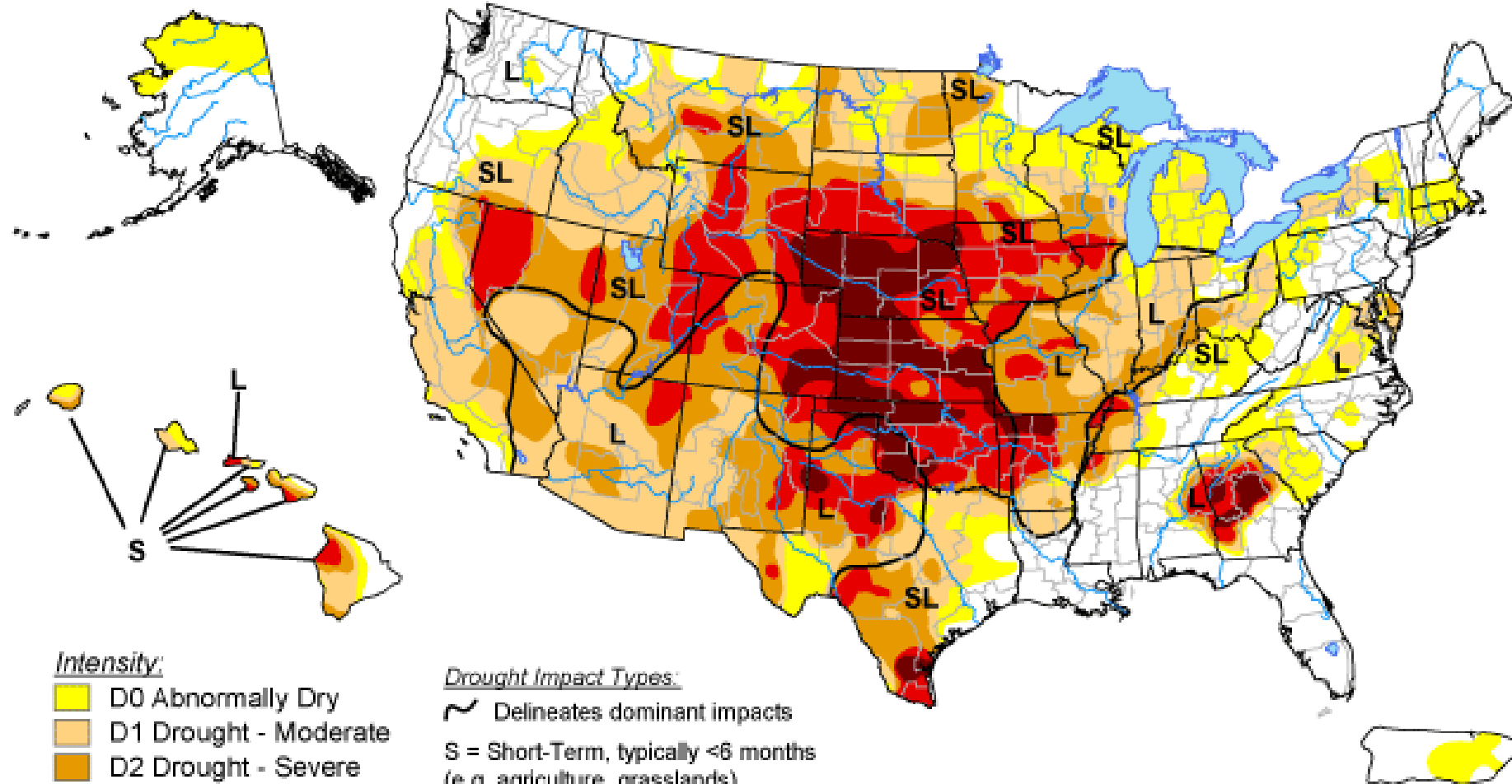


## NOAA Forecast for June – August Precipitation

# U.S. Drought Monitor

September 11, 2012

Valid 7 a.m. EDT



## Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

## Drought Impact Types:

- Delineates dominant impacts
- S = Short-Term, typically <6 months  
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months  
(e.g. hydrology, ecology)

*The Drought Monitor focuses on broad-scale conditions.  
Local conditions may vary. See accompanying text summary  
for forecast statements.*

<http://droughtmonitor.unl.edu/>



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**Author: David Simeral, Western Regional Climate Center**



# Forest fire / Erosion

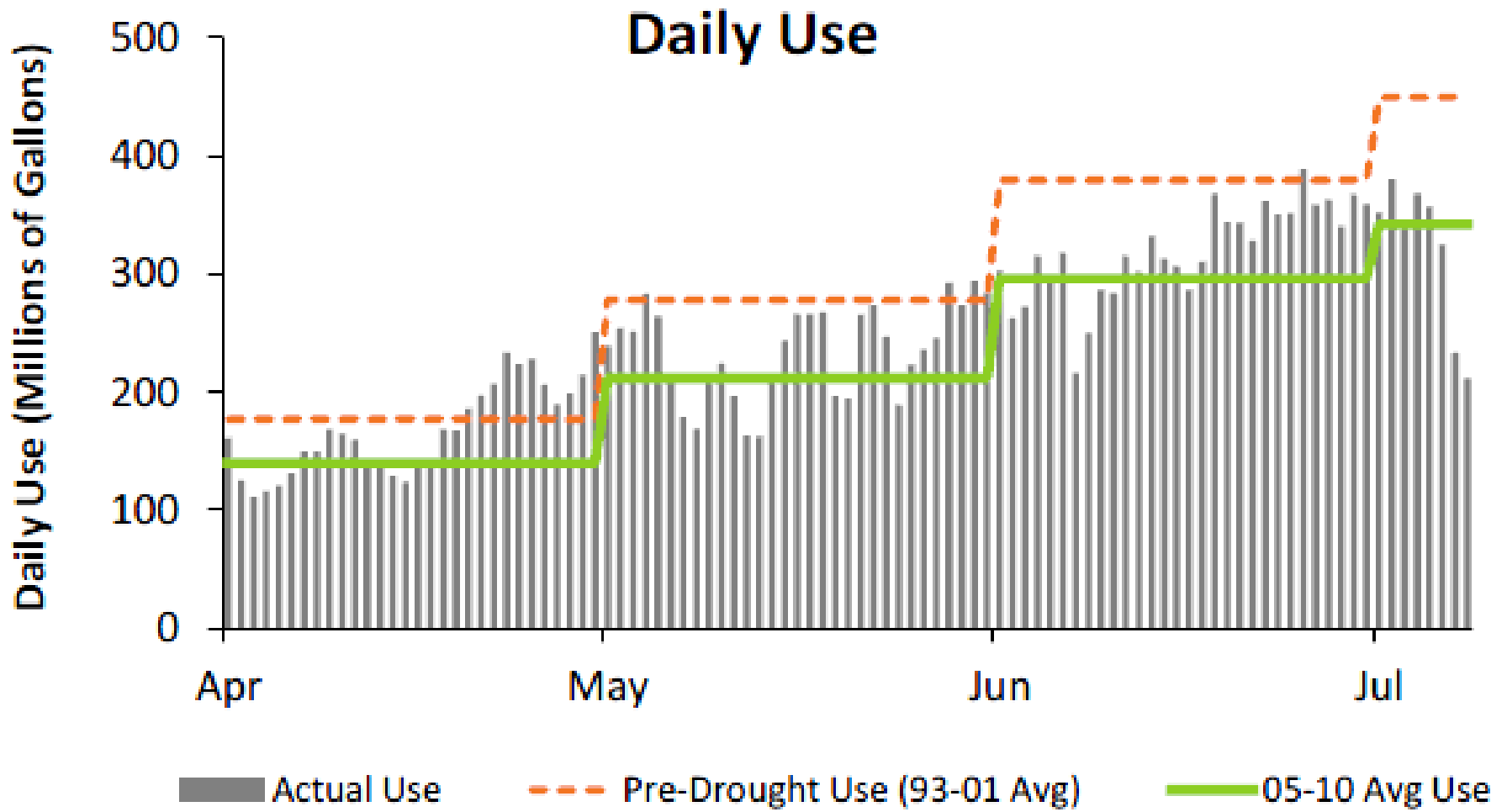


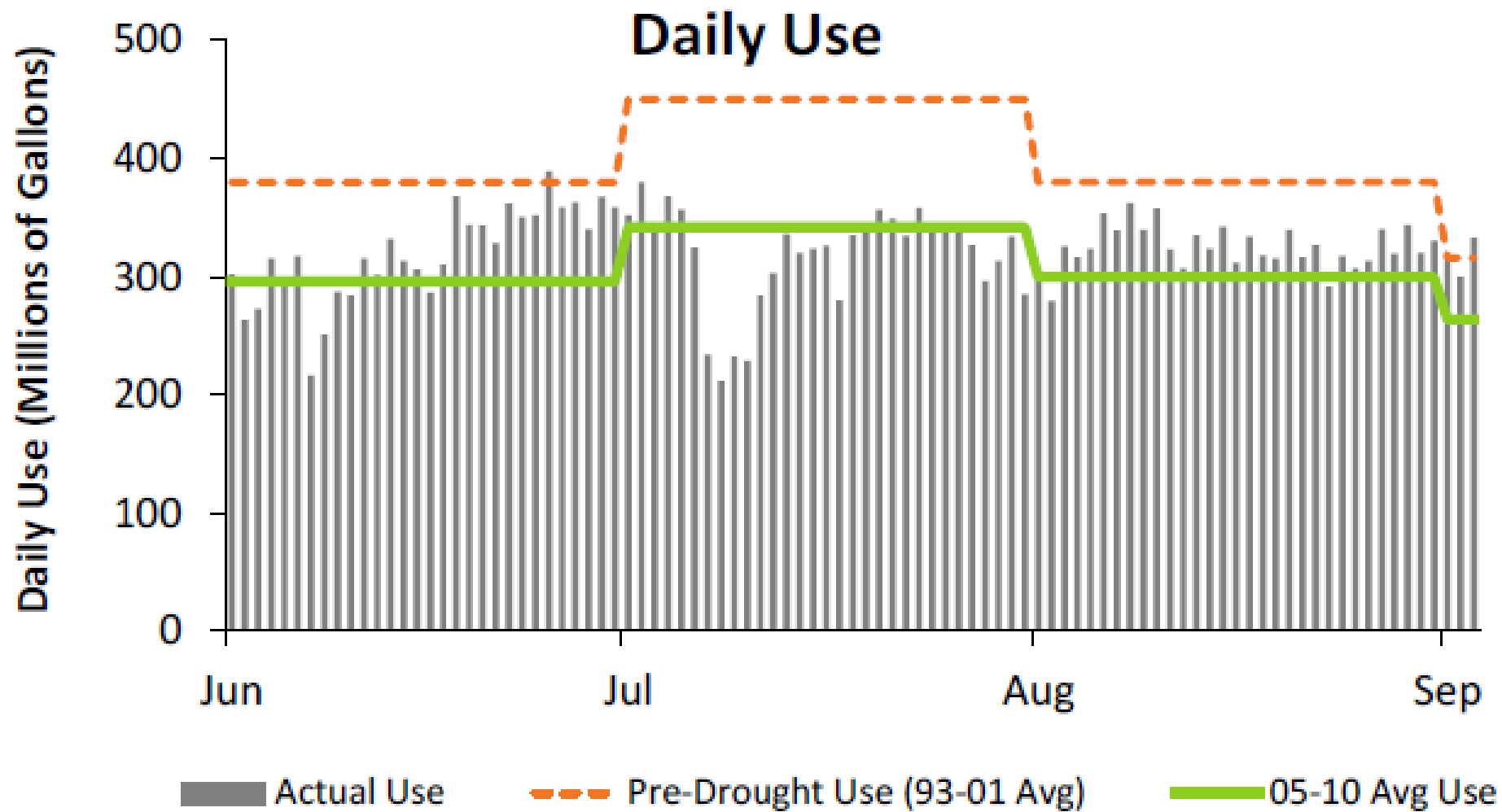
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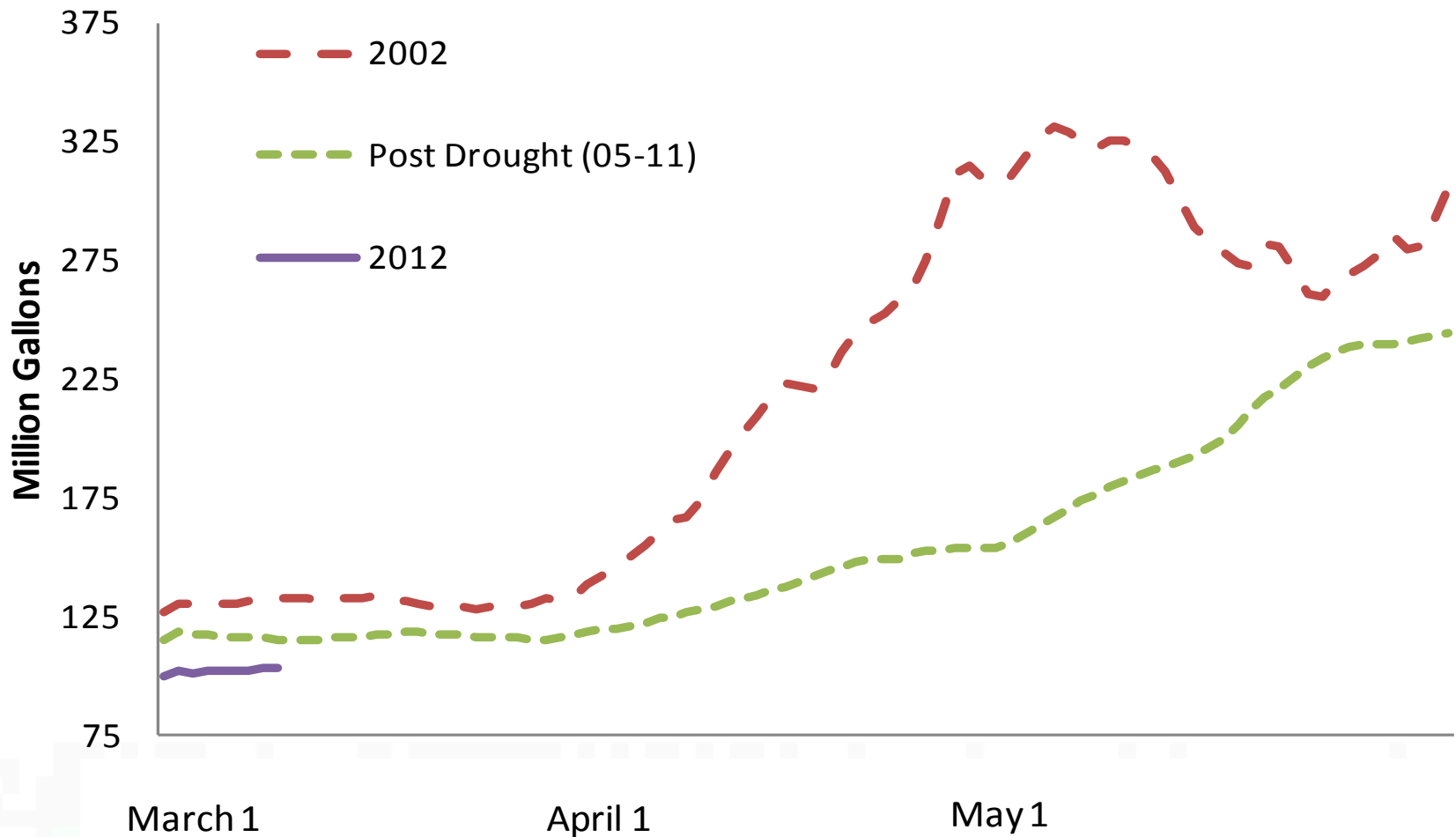
# Focus on Outdoor Use - Irrigation

- Half of all yearly water use is irrigation
- Not seen as essential as drinking, bathing, washing (public health and safety)
- Irrigation begins as drought becomes apparent
- Irrigation is easy to spot





## Average Daily Demand: March - May

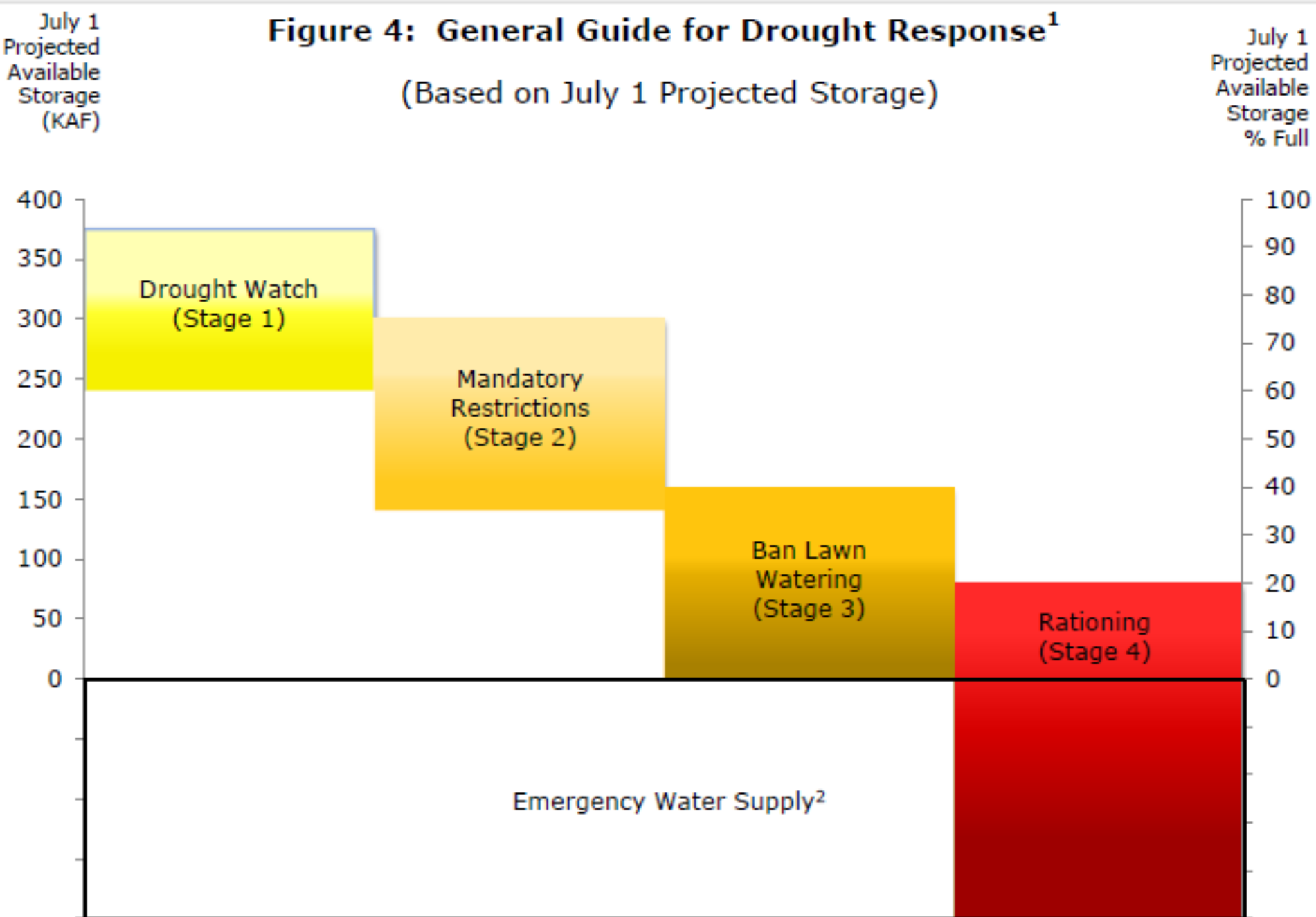






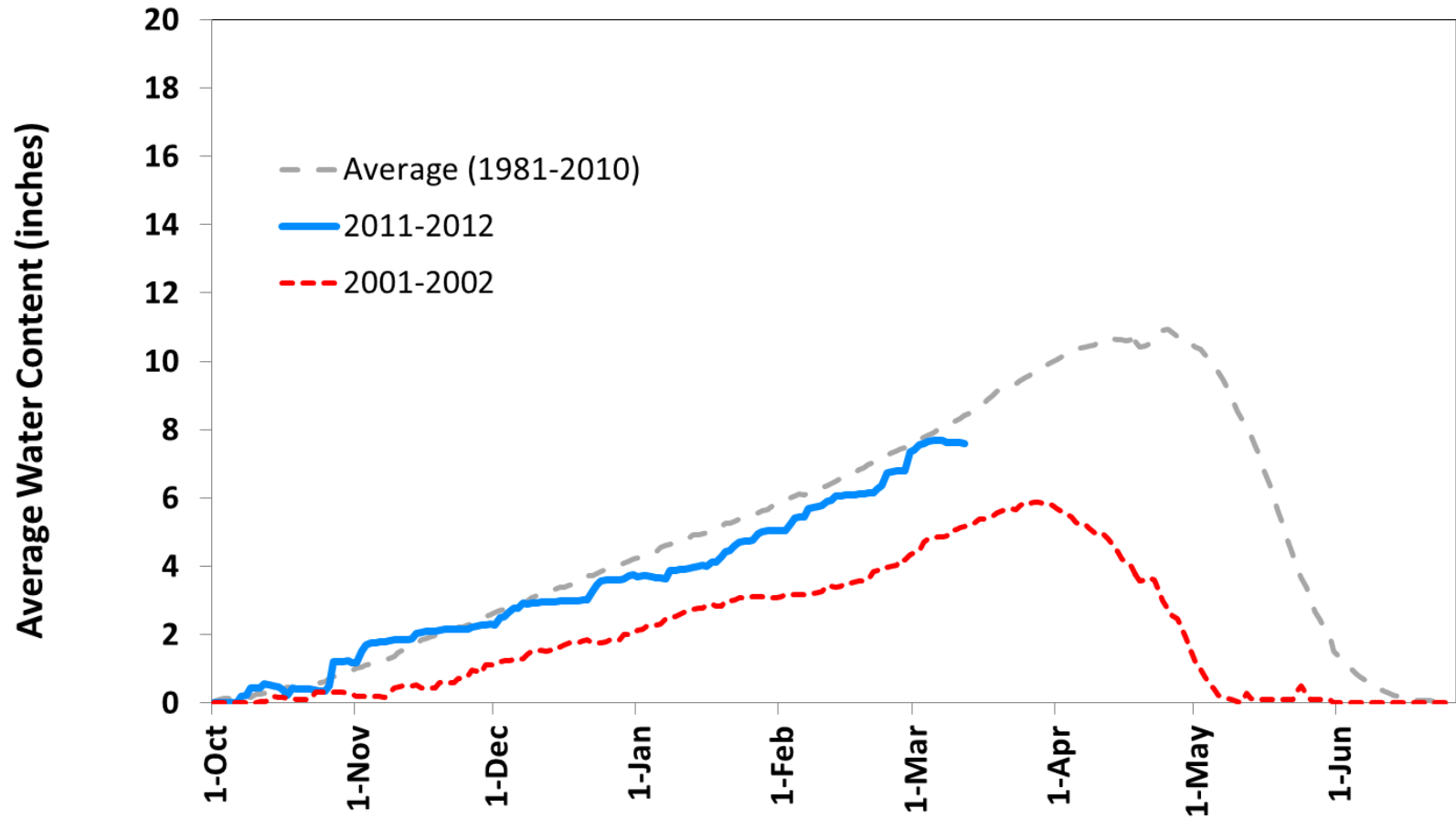
# Water Use Restrictions

- **Avoid irretrievable loss of natural resources**
- **Impact the individual before impacting whole society**
- **Minimize adverse financial effects**
- **Inform the public**
- **Assure equity and logic for surcharges**



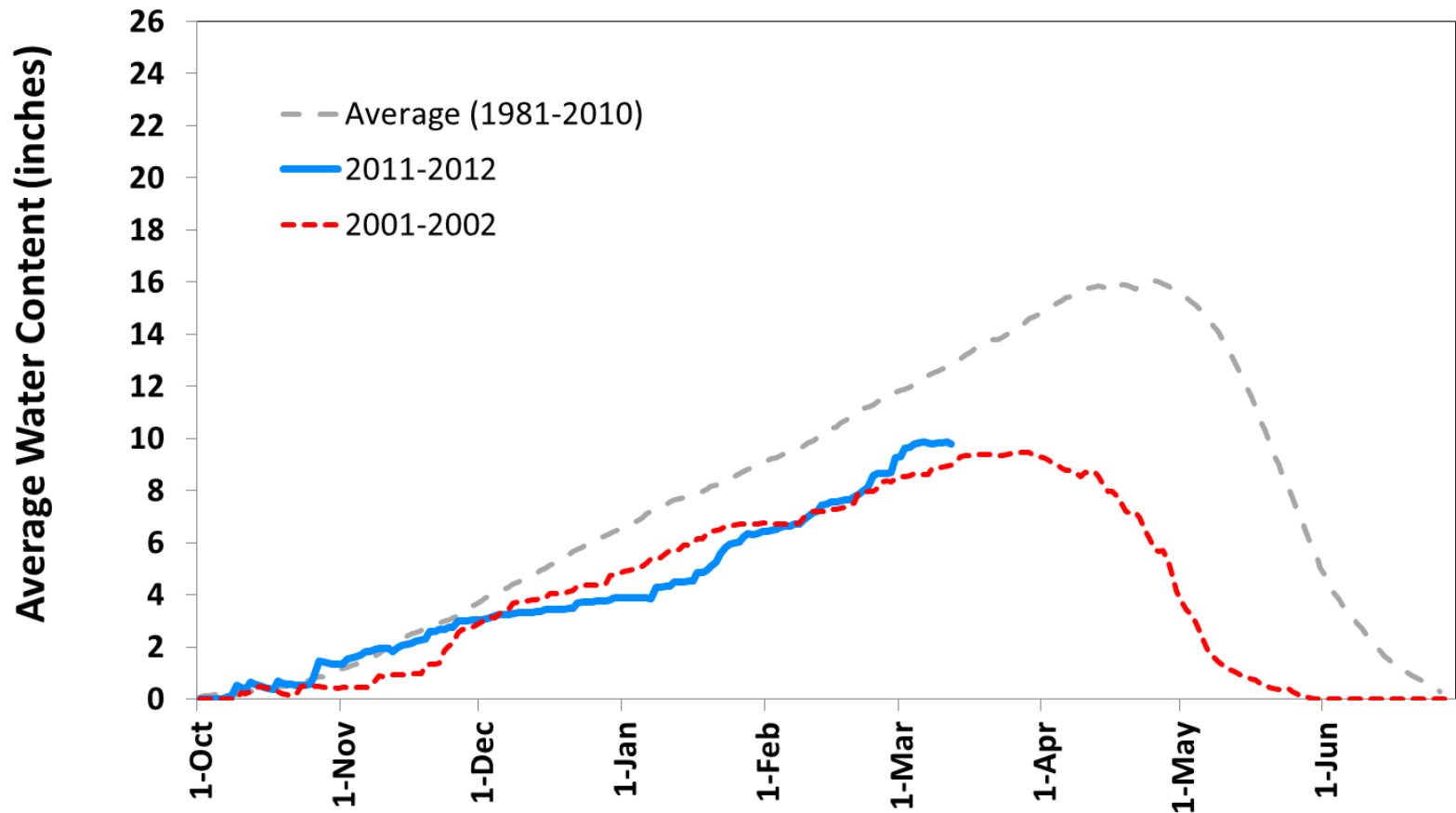
<sup>1</sup> In addition to reservoir storage, the Board may consider other factors in determining drought response. These

# Snowpack: South Platte River Watershed (liquid water content)

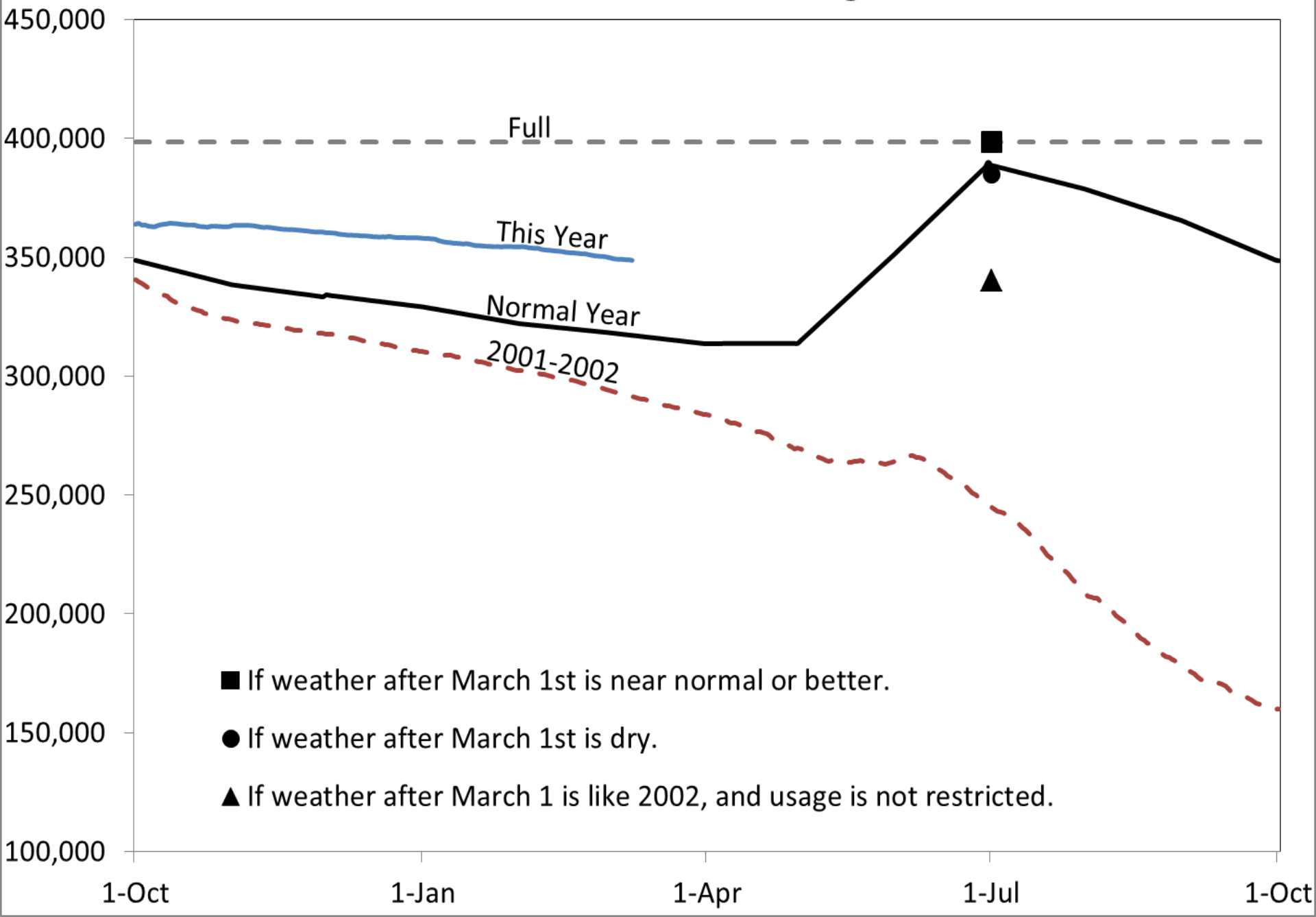




# Snowpack: Colorado River Watershed (liquid water content)



# Available Reservoir Storage, AF



# Impacts to Customers



# Opportunities

- Continued push for efficient use
- Increased communication between Water providers and water intensive industries
- Move toward drought tolerant systems not just low-water systems



USE ONLY WHAT YOU NEED.



DENVER WATER



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# Current Steps

- **Monitoring conditions continuously**
- **Drought response preparations**
  - Updated Drought Response Plan (2011)
  - Drought response committee meetings
- **External outreach**
  - Stakeholders
  - Metro water utilities, State, other utilities
- **Operations**
  - Limiting treatment rate at Moffat WTP.

# Customer Recommendations

- **Continue to do a great job conserving**
- **Move cautiously into spring by limiting outdoor use**
  - **Watering grass once a week or once every two weeks should suffice**
  - **Hand-water trees and shrubs**
- **Check for irrigation leaks**