

Preparing for Drought

Seven Steps for Drought Management

STEP 1 Knowing and Understanding Water Regulations

- ✿ Understand local, regional or state regulations related to managing irrigation water use during drought conditions.
- ✿ Public agencies regulations may govern the timing, volume, and even areas of irrigation applications (or some combination thereof) under different levels of drought. Ensure that you understand what specific guidelines apply to your location.
- ✿ Understand whether recycled (or reclaimed) water used for irrigation may be exempt from water restrictions.
- ✿ Ideally public agencies will set the maximum allowable volume for water use in a drought condition based upon a percentage of historical data and allow the irrigation manager to prioritize which areas of the course will receive water.
- ✿ Take a proactive approach to work with local water authorities.
- ✿ Develop a drought management plan specific to your facility.

STEP 2 Grass Selection

- ✿ If selecting grasses for a project, the type and extent of grassing can greatly affect the ability of the superintendent to successfully manage through a drought condition.
- ✿ Understand which turfgrass species have plant-water requirements suitable for your climate in order to ensure grass quality when drought occurs.

Successfully preparing a golf course for drought conditions involves much more than just turning off, or turning down the water. This summary has been developed to provide some insight on drought management for a golf course well in advance of a drought condition. Many of these recommendations will apply to existing courses as well as new construction projects. Please consult a professional agronomist or irrigation manager for additional detailed information and recommendations specific to your golf course.

- ✿ Consider soil type when selecting grass species to enable turfgrass to better survive in drought conditions

STEP 3 Measuring Devices

- ✿ Weather stations should be used to calculate an Evapotranspiration (ET) rate to understand how much water must be replaced through rainfall or irrigation to ensure adequate moisture is available for the plant.
- ✿ Sensors are used to measure soil moisture, temperature and salinity. Knowing these factors enables the user to adjust irrigation levels based on soil conditions.

STEP 4 Soil and Plant Tissue Testing

- ✿ Frequent soil testing will assist the superintendent to understand the soil's ability to support the grass under a variety of situations.
- ✿ Monitor key factors like sodium, calcium and bicarbonates to help turfgrass survive more successfully in a drought.
- ✿ Plant tissue testing enables the superintendent to understand the health of the plant under the specific growing conditions.
- ✿ Applications of various soil amendments like wetting agents, growth regulators and bio-stimulants may be increased during drought to manage plant growth.
- ✿ Turfgrass can be pre-conditioned to better survive the stress situation experienced in drought through the use of amendments and with proper management.



STEP 5 Irrigation System Efficiency

- When installing a new irrigation system the designer should establish sprinkler spacing and nozzle selection to ensure the irrigation system applies water as uniformly as possible.
- Individual sprinkler control and state-of-the-art control systems are valuable to help the user to manage water effectively.
- Ensure that all components of the system are properly adjusted and in good working order. This may include the review and adjustment of the following:
 - The sprinkler is level and operating correctly.
 - The correct nozzle is installed.
 - The sprinkler arc is properly adjusted.
 - The computer software is communicating with all field devices.
 - The weather station and other measuring devices are functioning properly and communicating with the irrigation software.
 - The irrigation software is properly updated with accurate station information.
 - Irrigation programs are written to manage water precisely in drought.
 - The irrigation software is using weather station data to accurately calculate ET rates.

STEP 6 Irrigating Effectively

- Apply irrigation water at a rate low enough to ensure that water infiltrates completely into the soil without run-off.
- Use "Cycle & Soak" (repeat watering cycles in short time increments) to enable water to infiltrate and percolate into the soil over a period of time.

- Ensure irrigation system operators are properly trained by the manufacturer so that they understand how to properly operate the system at maximum efficiency.

STEP 7 Managing through a Drought Condition

- The initial step in drought management should be to consider reducing all irrigation by 10-20% across the course, or "skip every 10th day" etc.
- If further restrictions are implemented, identify and prioritize locations to reduce irrigation, starting with areas of minimal impact on the golfer. These can include areas in deep rough, out of play areas, or perhaps the first 80-100 yards in front of each tee complex.
- If the drought worsens, consider inducing dormancy in the lowest priority areas.
- Emerging from drought conditions also requires careful consideration to ensure that dormant or damaged grass are recovered or repaired for successful long term plant health.

Regular consultation with experienced golf course agronomists and irrigation professionals during times of drought will support the efforts of local personnel to manage successfully.

The above material has been prepared for the American Society of Golf Course Architects by Shawn Emerson, Director of Agronomy at Desert Mountain, Scottsdale, AZ in collaboration with Stuart Hackwell, Global Specification Manager at Rain Bird Corporation, Tucson, AZ.



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