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Promoting Turf Recovery Following a Hurricane[1]

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Devastation from hurricanes can cause multiple problems for turfgrass managers, sod producers, and homeowners. Damage may include visible factors such as prolonged periods of standing water, uprooted trees, shading and obstruction from demolished structures, deposition of silt or mud, and damage to irrigation systems. Less visible problems may include damage to root systems resulting from compacted soil from heavy equipment used during cleanup and recovery, reduced drainage, and injury resulting from effects of saltwater intrusion. Suggested guidelines for correcting these problems include the following:

1. Once tidal surges and flooding have receded, immediately remove uprooted trees and debris from turf areas. On golf courses, prioritize efforts to remove debris from putting greens, tees, and fairways first. Of lesser importance is damage to roughs, driving ranges, and out-of-play areas. Indentations in putting surfaces from trees or buildings can be corrected by weekly light topdressing (0.5 to 1.0 cu yd) with sand for two to three months. Incorporate topdressing by dragging in. For deeper indentations, sod may need to be replaced. Be sure to properly grade the surface prior to laying new sod.

2. Tidal surges or flooding may leave debris or layers of mud or silt on the turf. These should be removed immediately to allow sunlight to reach the turf. Any larger debris should be removed by hand, and any mud layers should be removed with a flat-headed shovel. Then, the area should be washed with a stream of fresh water to remove material from the surface of the turf. Heavier irrigation should be used to flush any remaining material from the leaf surfaces. Since much of this material is fine-textured, be careful to remove all material from the surface and avoid washing it into the soil – especially on golf course putting greens. This will aid in minimizing potential drainage problems in the future.

3. Test salinity levels of all irrigation water sources prior to irrigating the turf. If the water tests high (i.e., > 4.0 dS/m), pump down the contaminated irrigation lakes and refill with fresh water until acceptable levels are achieved.

4. Elevated salinity levels may damage turf, so the soil should be flushed thoroughly with fresh irrigation water to move the salts through the soil profile. Blending fresh sources with saline sources may be required to produce acceptable irrigation water. Salinity levels may also be managed by improving drainage. Verticutting and aerification programs should be utilized on golf and sports turf venues.

5. Soil should also be tested for salinity and sodicity levels. Electrical conductivity (EC) of soils measures their salinity and could be two to ten times greater than that of the irrigation water applied to them. EC readings between 4 and 12 dS/m are moderate, while anything higher than

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12 dS/m has excessive levels of salt. If only saline water is available, irrigate at rates exceeding evapotranspiration (ET) to leach excess salts through the soil. If the soil is allowed to dry out, salt deposits may form on leaf or soil surfaces, which will dehydrate the turf. This watering should be approximately 30% in excess of the amount normally used to meet ET demands.

6. Gypsum (calcium sulfate) may be used to remove excess sodium from the soil cation exchange sites and replace it with calcium. Exchangeable sodium percentage (ESP) measures the sodicity (i.e., amount of Na) of a soil and may represent a problem when it is higher than 10. Sandy soils will hardly deflocculate, and gypsum applications may not always be necessary to reclaim soil after a storm. Due to its low water solubility, gypsum works best when incorporated directly into the soil. Core aerification from 6 to 12 inches deep, depending on the depth of the desired reclamation, preceding gypsum application provides for effective incorporation of gypsum into the soil profile. Once the gypsum reaches and reacts with the salinity in the soil, a minimum of 1 foot of water is required to leach the salts through the soil. More water will be required on soils with higher sodium levels. To determine the effectiveness of gypsum application, carry out the following steps.

   - **Step 1.** Take a 1-quart soil sample from the soil surface. Thoroughly dry and pulverize the sample until the largest particles are approximately the size of coffee grounds. Add a heaping teaspoon of powdered gypsum to 1 pint of the soil and mix thoroughly. Leave an equal amount of the soil sample untreated.
   - **Step 2.** Prepare two cans, each 3 to 4 inches in diameter and 4 to 6 inches in height. Cover one open end of the can with a wire screen to allow water, but not soil, to percolate through. Put treated soil in one can and untreated soil in the other. Fill each can approximately three-fours full with soil, and then pack the soil by dropping the can from a height of 1 to 2 inches onto a hard surface several times.
   - **Step 3.** Fill the cans with the irrigation water in question, being careful not to disturb the soil. Collect at least a ½ pint of the water as it drains through the treated sample, and then compare this with the amount obtained in the same time from the untreated sample.
   - **Step 4.** If less than half as much water has passed through the untreated sample as has passed through the treated sample, your soil contains excess exchangeable sodium. In this case, adding gypsum will improve permeability and soil condition.

7. The amount of gypsum that must be used to reclaim soil depends on the depth of desired reclamation, the sodicity of soil after the storm, and the purity of the gypsum. Increments of approximately 50 pounds of No. 8 sieve gypsum should be applied per 1000 sq ft until ESP is reduced. Irrigate with at least 1 inch of water following each application.

8. Seashore paspalum has the best salt tolerance of any warm-season turfgrass. If you are using this species, several of these salinity reduction programs may not be needed. If dealing with bermudagrass, St. Augustinegrass, or zoysiagrass (medium salinity tolerance), these practices would be recommended following saltwater intrusion.

9. Areas of compacted soil should be aerified and top-dressed to improve drainage and air circulation to the roots. Avoid using heavy equipment or any other type of traffic on these areas until the turf has begun to regrow.