



# Flooding of Turf

Dr. Kevin W. Frank  
Department of Crop and Soil Sciences  
Michigan State University



ORNAMENTALS TEAM

**S**everal factors determine turf survival under water: turfgrass species, submersion duration, submersion depth, water temperature and light intensity.

**Turfgrass species** vary in submersion tolerance. Unfortunately, there are no hard, fast numbers such as Kentucky bluegrass will survive 35 days and creeping bentgrass 38. Instead, turfgrass species have been given relative submersion tolerance rankings (Beard, 1973).

Relative submersion tolerance:

Creeping bentgrass — excellent.

Kentucky bluegrass, tall fescue — medium.

*Poa annua* and perennial ryegrass — fair.

Red fescue — poor.

**Submersion duration** relates closely to turf species submersion tolerance rankings. For example, if *Poa annua* is submerged for several weeks, the rankings suggest that its survival ability will probably be less than that of creeping bentgrass. As we discuss further, the complexity of predicting survival will become evident.

**As submersion depth** increases, the potential for injury increases. If the leaf tissue is above the water line - even just a little bit — the turf will probably survive. Have you ever observed creeping bentgrass floating on the edge and even growing out into a lake? That's a perfect example of turf surviving when partially submerged.

The final two factors affecting survival are **water temperature** and **light intensity**. Turfgrass injury from flooding increases as water temperature increases from 50 to 86 degrees F (Beard, 1973). During cooler

times of the year, such as spring, the degree of turfgrass injury will likely be less because of lower water temperatures and light intensity.

## Assessing Damage

As flood waters recede, the turf may be yellow or brown. The discoloration is related to several factors, including the turf's loss of chlorophyll, loss of soil nitrogen through denitrification and leaching, and loss of the ability to take up nutrients due to a compromised root system. It doesn't take long once turf is submerged for soil oxygen levels to decline and root hairs to begin to die. As the root system becomes impaired, nutrient extraction and water uptake will be limited. Keep this in mind, once the water has receded — the turf may benefit from a light fertilizer application. To assess whether submersion has caused injury, extract several plants from the flooded area and cut a horizontal cross-section through the crowns. If a plant's crown is white and firm, it has survived. If the crown is brown and mushy, it's dead.

For areas flooded because of a stream or river overflowing a bank, the main problem associated with flooding is often the silt or soil deposition on the turf. Removing sediment can be difficult. Once soil conditions are dry enough, soil cultivation, whether by core aeration or slicing, will benefit the turf by breaking through deposited soil layers. Aeration or slicing will facilitate turf rooting and water infiltration.

## References

Beard, J.B. 1973. Turfgrass: Science and Culture. Englewood Cliffs, N.J.: Prentice-Hall.



MSU is an affirmative-action, equal-opportunity institution. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, marital status, or family status. • Issued in furtherance of Extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Thomas G. Coon, Extension director, Michigan State University, E. Lansing, MI 48824. • This information is for educational purposes only. References to commercial products or trade names do not imply endorsement by MSU Extension or bias against those not mentioned. This bulletin becomes public property upon publication and may be printed verbatim with credit to MSU. Reprinting cannot be used to endorse or advertise a commercial product or company.