Removal and management of volcanic ash deposits in turfgrasses

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The following precedures were presented at the Turfgrass Field Day at the Western Washington Research and Extension Center in Puyallup.

The May 18, 1980 eruption of Mount St. Helens deposited over one cubic mile of ash over large portions of Washington, and to some extent in western Idaho and Oregon. This amount of ash would cover over 10,-176,000 acres to a depth of four inches. Not all of the ash fell in this region since finer particles travelled around the world. The deposition was variable with some areas receiving over four inches of loose ash and some areas only a minor dusting.

Chemical composition

There is some variability in chemical compostion of the ash. Much of the ash contains useful levels of potassium, sulfur, iron, phosphorus and calcium. Other constituents contained in the ash are generally not at levels considered injurous to turfgrasses. The pH does vary somewhat but absolutely nothing to worry about for turfgrasses. The lowest pH's recorded are somewhere around 4.7, and the highest is running up almost to 7.0.

At the time of the preparation of this article, there is little indication of the ash material being phytotoxic. The material does not have the ability to hold large amounts of nutrients; therefore, you can expect any chemical elements contained in the ash or applied fertilizers to leach rapidly below the ash layer.

Physical composition

Composition of the ash varied with distance from the mountain in a westerly to easterly direction. The heavier or coarser particles fell in the proximity of the mountain and in the Yakima region and became finer in the Moses Lake-Ritzville and areas east. A particle size distribution analysis of a sample collected at Moses Lake revealed the following particle sizes:

Sand-sized particles	47%
Silt-sized particles	40%
Clay-sized particles	13%

The material is gritty to touch, finer particles cling readily, and is very abrasive in nature. Finer particles, when in a dry state, are easily carried by wind and dust clouds and commonly and frequently obscure vision. The material is not considered injurous to health except for individuals who have respiratory problems or eyes sensitive to dust, although it is recommended that respirators and

"Greens should be mowed with old mowers without baskets for the first few mowings. . . Smooth all ridges left before they become stabilized and cannot be rolled out. . . New ash is very abrasive to moving mechanical parts. . . Follow preventative maintenance practices outlined."

dust protection masks be used when dust is heavy.

The waterholding capacity of the ash is quite high due to a high percentage of fine particles in many areas. Fresh material forms an unmanageable slurry when wet and cakes and crusts upon drying. Shrink cracks occur after drying and grasses will emerge through these although the stand may not be dense.

Methods of handling fresh ash deposits on turfgrass

It appears from observations and available data that gently settled, loose ash will compact to about 50 percent of its original volume from rain or irrigation. The depth of ash, mowing height of turf, and use of the turf area are factors to consider with respect to whether to remove or leave in place.

If it is deemed necessary to remove the ash, it is advisable to do so when in a loose, dry, powdery form. It is lighter and easier to handle. Respirators or dust masks should be worn for personal protection.

Golf course putting greens

1. Remove as much ash as possible when work can be resumed. Deep ash layers can smother greens and result in total grass loss, but early removal leaves the grass virtually undamaged. If the compacted depth is expected to be over 3/16 to ¼ inch, it should be removed dry to prevent perched water tables later as well as puddled and compacted surfaces resulting in slow water infiltration.
2. Three-point hitch box scrapers, preferably outfitted with a durable, flexible rubber edge will help prevent excess damage to the turfgrasses.
3. After removal, thoroughly water the greens to wet the dry ash, provide water to the grass rootzone and wash all ash from the grass leaves.
4. Apply non-ionic organic wetting agents to green surfaces to aid in ash wetting and water penetration.
5. Mow greens with **old mowers without baskets** the first few mowings to help stabilize ash which could not be removed.
6. Mow in the morning after night irrigation to prevent dry ash damage to equipment.
7. Aerify greens with ½-inch hollow tines and remove cores and topdress with six to eight cubic feet of specified sand per 1000 square feet. This will help cover the ash and reduce equipment wear. Repeat this operation three or four times if necessary, the first season if possible.
8. Maintain normal fertility and watering programs.
9. Overseed damaged or thin areas.

Fairways

1. Follow the same procedure as in Step 1 for putting greens, if practical. Size of area may influence your decision. Shallow deposits may be dragged or floated into the surface with any type of equipment practical or even a length of garden hose.
2. If ash becomes consolidated from rain or irrigation, it may be necessary to loosen the layer before attempting removal. Spring-tined harrows or even spike-toothed harrows with teeth layed well back, may be employed on large areas to bring the ash up or to sift and mix it into the turf. Power rakes make moist ash easier to rake or scape.
3. Float, drag or hand-smooth all ridges left before they become stabilized by new stem and root development. Otherwise, they will become permanently bumpy. **They cannot be rolled out.** If properly managed, the remaining ash can serve as a smoothing agent on uneven ground.
4. If ash has been scraped from the turf, it is important to loosen the matted grass by power rakes, spring-tined harrows or any other innovation that will not tear out the sod. It is important to expose the grass leaves to light as quickly as possible, especially if the temperature is warm.
5. Ash layers may interfere with water infiltration and aerification may be essential. Wetting agents (surfactants) may be beneficial.
6. Ash removal may not be feasible or possible in some areas. If it is not, irrigate to settle and stabilize the material. Use rotary hoes (not rotovators) to scarify the surface, break crusts, and punch holes. Grass in sufficient quantity may find its way through.
7. If sufficient grass for a stand does not recover, scarify the surface for a loose seedbed and reseed with a Brillion or other acceptable grass seed drill. Use a blend of 30 to 40 percent turf-type perennial ryegrass with 60 to 70 percent Kentucky bluegrass or other adapted grasses for your area. A broadcast application of 35 pounds of available nitrogen per acre following seeding will hasten seedling growth and establishment.
8. After turf is growing normally, several hollow-tined aerifications may be helpful in root and rhizome development and water movement.

Maintaining equipment

New ash is very abrasive to moving mechanical parts. Turfgrass maintenance equipment is generally not as dirt-proof as many types of farming equipment and may sustain heavy damage. The following suggestions may be useful in preventing heavy equipment loss.

1. Grease all fittings regularly to flush out grit.
2. Change or clean air and oil filters often to minimize engine wear.
3. Obtain special filters if available.
4. Employ older equipment where possible. Do not run new and expensive equipment if possible.
5. Mow large turfgrass areas the first few times with large rotary mowers, or flail-type, to save wear on expensive reel-type gang mowers.
6. Mow turf slightly higher (1 ¼-inch). Mowing height can be lowered when ash is stabilized. **GB**