

Spray Irrigation of Reclaimed Wastewater for Rural Homes

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Septic systems require deep permeable soil of at least 36 inches to treat and safely disperse wastewater onsite. However, in almost 85 percent of Ohio's land area, the soil is too shallow to seasonal water tables or other limiting conditions. One option for many rural areas is to first treat the wastewater, disinfect it, and then irrigate lawn and landscaping on the lot.

Reusing the water and nutrients in treated wastewater is the goal of an onsite spray irrigation system (Figure 2). As Ohio continues to work to eliminate the discharge of pollutants to lakes and streams, dispersing treated wastewater is one of the options to eliminate discharges.

Consider an onsite spray irrigation system for

- sites where off-lot discharge is not allowed.
- wooded lots where trenches or mounds would damage trees.
- lots with steep slopes where trenches or mounds are dangerous to install.
- sites with shallow soils to a limiting condition—as shallow as 6 inches.
- green buildings—to reuse water and nutrients to obtain LEED credits.

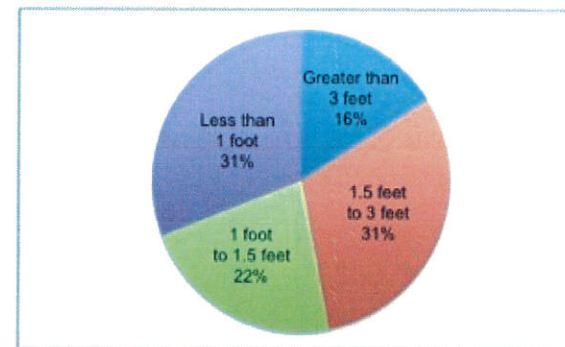


Figure 1. Percentage of the land area of Ohio with various depths to a limiting condition.

Therefore, almost every rural lot in Ohio is suited for spray irrigation of treated wastewater.

Wastewater Treatment

Wastewater must first be treated and disinfected before spray irrigation. The goal is to eliminate odors and prevent the spread of disease-causing organisms. The Ohio Department of Health approves treatment and disinfection systems suitable for onsite spray irrigation. Details on approved systems can be found at odh.ohio.gov/wps/portal/gov/odh/know-our-programs/sewage-treatment-systems/pretreatment-comp.

People are understandably concerned about disease-causing organisms and spray irrigation of treated wastewater in the yard. To ensure the protection of public health, therefore, bacteria levels in wastewater sprayed in public areas—like a lawn—should be 10 times lower than the level considered safe for swimming.

Land Requirements

One goal of onsite spray irrigation is to disperse the treated wastewater while not forming puddles. Puddles could result in odors and create the potential for runoff. Another goal is to provide enough water and nutrients for plants, but not too much. To match Ohio's climatic conditions and plant needs, at most 0.2 inches of water should be applied each day. For a three bedroom home, 2888 square feet is needed to disperse treated wastewater. An additional 963 square feet is needed for each additional bedroom. The sprinklers should be at least 50 feet and the edge of spray area 10 feet from buildings, paved surfaces (e.g., concrete sidewalks, blacktop driveways, paver patios), surface water (e.g., ponds, streams, ditches), property boundaries, and vegetable gardens.



Figure 2. Onsite sprinkler irrigation system serving a three bedroom house.

Irrigation in the Winter

Winter weather in Ohio presents some special concerns for irrigation of treated wastewater. Some of the concerns are irrigating with snow on the ground, protecting equipment, potential impact on plants, and preventing runoff.

Researchers at The Ohio State University have studied all of these concerns under winter conditions. Irrigation sprinklers are installed on risers above the expected maximum snow depth. The risers are designed to swing or bend to avoid breaking. They are also designed to drain between each irrigation cycle, to keep the pipes and sprinklers from freezing. Sometimes in very cold weather, the sprinklers may stick and not start turning right away. This rotational delay will last for a few minutes, until the warmer irrigation water melts any frost caught in the sprinkler so that it starts to turn as expected.

Ohio State researchers also found that irrigation water soaks into cold or even frozen soil. Water and nutrients do not run off except under very severe weather conditions. What does run off on these rare occasions is cleaner than what a city or onsite discharging wastewater treatment system are allowed to discharge.

Operation and Maintenance

All landscape irrigation systems require regular maintenance to protect the investment in the equipment. Wastewater irrigation systems are no different. In addition, proper operation and maintenance are

essential to protecting public health and the environment. Periodic inspection and maintenance of the system ensures it is working as designed and will save the homeowner money by preventing premature repairs to or replacement of the system components.

Every six months:

1. Check the pumps and alarms.
2. Turn on the irrigation system to check spray head function and spray pattern. Repair, adjust, or replace spray heads as needed. Also check for ponding and runoff.
3. Place several rain gauges in the irrigation area to check the depth of application. The system should apply no more than 0.2 inches per day to prevent ponding or runoff.
4. Sample the quality of the irrigated water to insure the treatment and disinfection system is working properly.
5. Check for landscaping changes that interfere with system operation. Be especially watchful for standing water, vegetable gardens planted too close (within 10 feet) of the spray area and plant growth that interferes with the sprinkler spray pattern.

For specific information on how to design and construct onsite wastewater spray irrigation systems, see Ohio State University Extension Bulletin 912 *On-Site Sprinkler Irrigation of Treated Wastewater in Ohio* available online at extensionpubs.osu.edu. Learn more at setll.osu.edu.

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