

HOW TO SURVIVE WHEN TRAPPED IN A SEWER

1 Find a light source.

Sewers are usually pitch-black over long stretches and navigation will be impossible without some type of light. Use a flashlight, penlight, LED from a cell phone or car key, matches, or a lighter to see. Although sewer gases are generally not combustible in the concentrations found in mains, use an open flame light source as a last resort. If you have no light source, look upward for daylight reaching the sewer main through storm drain inlets, gratings in the street, or the small holes in (or around the rims of) manhole covers. Head to the light source: Generally it will lead to a way out or a place where you can communicate with the surface.

2 Stand straight and tall.

Bacteria breaking down organic material create hydrogen sulfide (H_2S), which is responsible for the “rotten egg” odor in sewers. While the foul smell is distasteful, in small concentrations the gas is not deadly (though high concentrations can be fatal). In addition, hydrogen sulfide is slightly heavier than air and will tend to be in higher concentrations lower in the sewer pipe. Keep your head as high as possible, near the top (or “crown”) of the pipe. Covering your

nose and mouth with a handkerchief may provide minimal relief.

3 Wait until late at night to move.

Large, combined sewer systems—those that aggregate household wastewater and storm water—generally have their highest flows after breakfast and after dinner, when toilets are flushed and dishes are washed, and during or just after rainstorms. Flows will be lowest, and navigation and movement easiest, in the middle of the night. Wait until 2 or 3 A.M. to begin your escape, unless it is raining and the system is filling with storm runoff. Expect a sewage depth of 12 to 18 inches in the middle of the night, and up to 36 inches during busier periods. The deeper the flow, the greater the forces acting on you will be, making it harder for you to maintain balance.

4 Check the direction of the flow.

Sewers move wastewater downhill, using gravity. Smaller diameter pipes enter the system upstream and connect to larger and larger mains as you move downstream in the system. Locate a larger main (72 or 92 inches in diameter) and establish the directional flow of the sewage.

5 Move upstream.

Though it seems counterintuitive, move upstream toward smaller pipes. Larger mains downstream will contain older sewage, which has been broken down by bacteria over a longer period of time. These

downstream pipes will have much higher levels of hydrogen sulfide, which may be deadly. Instead, move upstream to areas with fresher sewage and lower concentrations of gas.

6 Watch your step.

The floor and walls of the sewer will be coated with slime and will be extremely slippery. There may also be a channel in the center of the pipe to accelerate the flow of sanitary sewage. Walking in this channel will be difficult, so keep to the sides of the main.

7 Observe the behavior of rats and cockroaches.

Though both rats and cockroaches can swim, they prefer dry land and are likely to be on ledges above the sewage flow, on walls (for roaches), and in your path. As you walk, check the concentration of rats and especially roaches: Both serve as your early warning system of danger in the sewer. The presence of rats in large numbers can be a good sign. Rats indicate that the air is safe to breathe, even near the bottom of the sewer main. If you notice a sharp increase in the number of rats and roaches, or see them heading past you upstream, dangerous conditions exist downstream—a broken pipe or a full siphon may be causing sewage to back up toward your position. If they begin scurrying past you, be ready to move upstream quickly, away from the problem.



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8 Locate a lateral storm sewer.

Look for a relatively dry main entering the combined main; this is a storm sewer “lateral” and should be easier to walk in, with lower levels of gas and odor. The lateral pipe may be smaller in diameter (48 inches, perhaps less), so be prepared to kneel or crawl. Look up for an overhead storm sewer grate or inlet. Push it up and to the side, then slide it over and climb out or yell for help. If you cannot find a lateral main, or cannot access the inlet, continue to step 9.

9 **Locate a manhole cover.**

Listen for traffic and street noise above you. If you see light entering the sewer main from above and hear the pounding of cars, you will likely be under a manhole cover. Look for iron rungs built into the wall leading up 10 to 20 feet to the manhole cover. Use caution when climbing: Another byproduct of sewage decomposition is sulfuric acid, which over time may have disintegrated the cast-iron rungs leading to the manhole.

10 **Open the manhole cover.**

The cover may weigh 150 pounds or more. Wait until the traffic noise subsides, push the manhole cover up slightly at one edge, then slide it over. Watch for traffic as you climb out. If you cannot locate or lift a manhole cover, continue to step 11.

11 **Bang on pipes.**

In the main or lateral sewer, look for smaller diameter (12 inches or less) metal pipes emptying into larger mains. These “household” sewer connections enter the sewer from homes and buildings. Bang on one to signal someone on the surface and/or in the connected building. Metal pipe carries sound very efficiently.

12 **Plug a pipe.**

If you cannot escape and banging does not bring rescuers, use your shirt, a piece of wood, or another object to block a household pipe where it enters the

sewer. The sewage will begin backing up into the building, and eventually someone will access the sewer to investigate the blockage.

Be Aware

- Water and sewer department personnel are more likely to be working on smaller pipes further up the system than larger (72- or 92-inch) mains near the downstream end. Your best chance of finding people is in the smaller pipes.
- In high concentrations, hydrogen sulfide deadens your olfactory senses. If you smell hydrogen sulfide (rotten egg smell) and then suddenly stop smelling it—particularly if you are moving downstream—the concentration of the gas may have increased dramatically. Speed up your efforts to escape.
- Do not drink any liquids found in the sewer, even if the sewer carries only rainwater runoff. If sewage inadvertently enters your body through an orifice, or via cuts or skin abrasions (no matter how minor), seek medical treatment as soon as you escape.