Using pumps in Flood Protection

LSU AgCenter Research & Extension

If you protect a building with a floodwall, sealant, plastic wrap or any other barrier, you will need to pump water during floods.

Rainwater that falls inside the flood barrier or water that seeps under the barrier must be pumped to the outside. Water that comes in through leaks in the barrier or around gates and other closures also must be pumped out.

You can reduce seepage and leakage with careful design, construction and maintenance, but water will get in. The flood protection system you put in place should include an area (a sump) where water can collect and be pumped out before it causes damage.

Cost and Considerations

The first rule in selecting a pump is "know what you want the pump to do." Then your pump dealer can assist you in choosing a suitable pump.

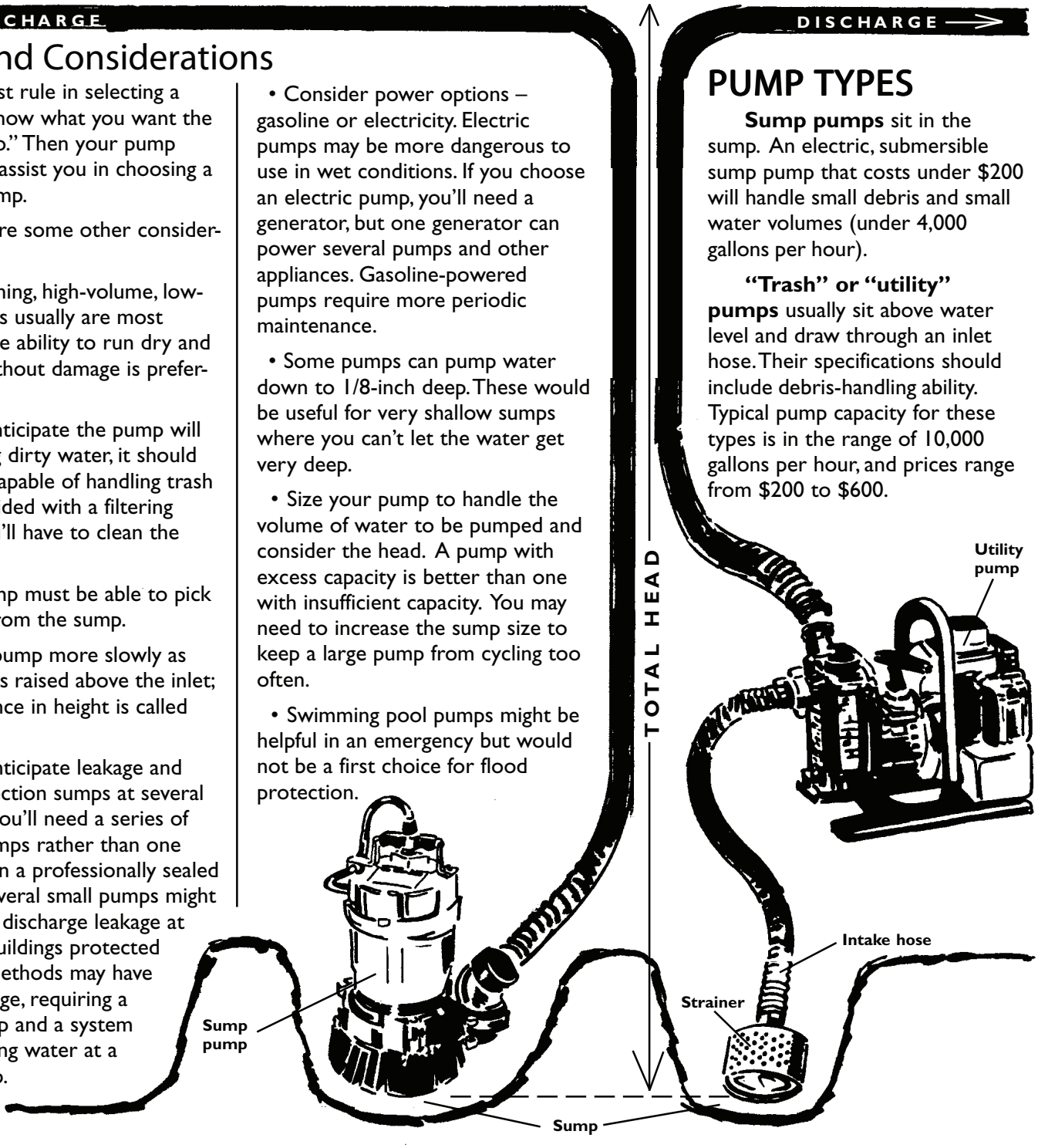
Here are some other considerations:

- Self-priming, high-volume, low-head pumps usually are most suitable. The ability to run dry and shut off without damage is preferable.
- If you anticipate the pump will be handling dirty water, it should either be capable of handling trash or be provided with a filtering system. You'll have to clean the filter.
- The pump must be able to pick up water from the sump.
- Pumps pump more slowly as the outlet is raised above the inlet; the difference in height is called the "head."
- If you anticipate leakage and water collection sumps at several locations, you'll need a series of smaller pumps rather than one large one. In a professionally sealed building, several small pumps might be used to discharge leakage at closures. Buildings protected by other methods may have more leakage, requiring a larger pump and a system for collecting water at a single sump.
- Consider power options – gasoline or electricity. Electric pumps may be more dangerous to use in wet conditions. If you choose an electric pump, you'll need a generator, but one generator can power several pumps and other appliances. Gasoline-powered pumps require more periodic maintenance.
- Some pumps can pump water down to 1/8-inch deep. These would be useful for very shallow sumps where you can't let the water get very deep.
- Size your pump to handle the volume of water to be pumped and consider the head. A pump with excess capacity is better than one with insufficient capacity. You may need to increase the sump size to keep a large pump from cycling too often.
- Swimming pool pumps might be helpful in an emergency but would not be a first choice for flood protection.

PUMP TYPES

Sump pumps sit in the sump. An electric, submersible sump pump that costs under $200 will handle small debris and small water volumes (under 4,000 gallons per hour).

"Trash" or "utility" pumps usually sit above water level and draw through an inlet hose. Their specifications should include debris-handling ability. Typical pump capacity for these types is in the range of 10,000 gallons per hour, and prices range from $200 to $600.



Design to Minimize Pumping Requirements

Source of Water You Need to Pump	To Minimize Water From This Source
Rain inside the barrier Two inches of rain on a 1,600-square-foot roof will produce 1,984 gallons per hour of runoff.	Place a flood barrier where rain on the roof can fall naturally to the water side of the barrier. Use gutters to collect roof runoff and channel it over the barrier.
Water seeping under the flood barrier.	Use underground barriers to increase the distance water must travel to get under the barrier.
Water coming through cracks, leaky closures and inadequately blocked drain pipes	Use well-designed, tight-fitting panels instead of sandbags or loose plywood for closures. Maintain barriers and back-flow valves annually.

Estimate all the significant sources of water intrusion in terms of gallons per hour. If your barriers are in good condition, the seepage and leakage should be small. To determine the pumping capacity required to handle rainfall, calculate gallons per hour of rainfall this way:

Determine area of rain collection in square feet.

Estimate the rain intensity in inches per hour. Gallons per hour equals square footage of area times inches per hour of rainfall times 0.62.

To be prepared for a 2-inch-per-hour rain inside a 50 foot by 80 foot floodwall, you'd need a pump that would pump (4,000 x 2 x 0.62) 4,960 gallons per hour.

Pumps may be used to fill water-inflatable barriers. You'd be interested in a high-volume pump; debris and head may or may not be a problem, depending on where you're getting the water.

Additional flood protection and recovery information is available from parish offices of the Louisiana Cooperative Extension Service or from our website at

www.louisianafloods.org

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Tips

- Design your flood protection system to minimize seepage and rain collection. Then be prepared to collect and pump water.
- A second pump will provide increased capacity and act as a backup for the first.
- Use float-switches to turn pumps on and off automatically.
- Use strainers to protect pumps from large debris.
- Always use clean, fresh fuel of the proper type for your pump or generator and have enough on hand to get you through a flood. Don't store fuel in the generator; it could deteriorate and cause damage. Use a fuel stabilizer such as Sta-Bil.
- Never run gasoline-powered pumps or generators indoors; carbon monoxide poisoning can result. Opening doors and windows is not adequate protection.
- Never use pumps and barriers to create a water-level difference of more than 3 feet without proper design by a competent professional.