DELAWARE DEPARTMENT OF
NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL

Rainwater Harvesting (rain barrels, cisterns, and downspout disconnections)

Rain barrels and cisterns are "rainwater capture" systems that collect and store rainwater from a roof that would otherwise be lost to runoff and diverted to storm drains and streams. The collected rainwater can be reused for gardening, landscape irrigation, and other nonpotable water activities (water not used for drinking). A rain barrel is usually a 55-gallon drum placed under a residential gutter downspout. A cistern holds up to several hundred gallons of water that is distributed using a small pump.

In communities where gutters and downspouts discharge to the public storm sewer, downspout disconnections can reduce sewer volumes. Redirecting stormwater to lawns, rain gardens, or other landscaping allows water to filter into the soil, which reduces stormwater volume and increases infiltration to groundwater.

Design Considerations

- Rain barrels must be placed higher than your target infiltration area to allow water to flow out by gravity.
- For disconnected downspouts and rain barrels with overflow valves, ensure the water drains away from structures and does not flow onto pavement, sidewalks, or neighboring properties.
- Rain barrels are usually designed for small storms and hold about 55 gallons of water. To prepare for larger storms, the system design can include added capacity or overflow valves/structures.
- Downspout disconnections require a receiving area with good infiltration, such as a garden, planter, or vegetated swale.
- Cisterns can be above or below ground. A pump is usually used, so emergency overflows may be needed in case of power loss.
- Rainwater collected from rooftops may be contaminated by debris or by the breakdown of roofing material and should not be used for drinking, cooking, or bathing.

Benefits

- Reduces stormwater volume by capturing roof runoff.
- Redirects runoff to infiltration areas instead of storm sewers.
- Decreases/delays peak runoff by storing rainwater for later use.
- Lessens water pollution by reducing the stormwater that carries pollutants such as sediment, oils, bacteria, and harmful nutrients.
- Conserves water and lowers water bills by reducing the use of potable water for landscape irrigation, washing cars, etc.

Top: *Commercial cistern* **(Source: ©AdobeStock)**. *Bottom: left, disconnected* **downspout (Source: ©istock); Right: Residential rain barrel (Source: ©AdobeStock)**

Maintenance

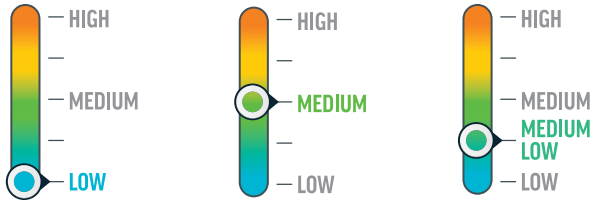
- If rain barrels and cisterns are not equipped with a bypass system, empty them between storm events to prevent overflow.
- Drain and disconnect rain barrels in winter to prevent ice damage. Consider removing the existing downspout and elbow unit in late fall, storing it, and reinstalling it in the spring (recommended).
- Place a fine mesh screen over rain barrel openings to exclude debris, small animals, and insects. For more mosquito protection, add a tablespoon of vegetable oil to the water or use a mosquito dunk that kills mosquito eggs but is nontoxic to plants and animals. Periodically clean screens and check for holes.
- Periodically inspect valves, hoses, and screens for clogs or leaks.

Limitations

- Rain barrels can attract insects that lay eggs in water, especially mosquitoes. See the maintenance section for control methods.
- A small cistern can be a do-it-yourself project, but larger, more complex cisterns might need professional installation.
- Stored water is for nonpotable uses only (i.e., watering lawns).
- A rain barrel's small size limits the volume of water collected. Although it may support garden irrigation, it won't reduce overall runoff volumes, especially if it isn't drained between storms.

Residential downspout extension and rain barrel (Source: flickr, Mississippi Watershed Management Organization, CC BY-SA 2.0)

Implementation Considerations



Cost

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Environmental and Homeowner Benefits

Additional Resources:

Delaware Post Construction Stormwater BMP Standards & Specifications, February 2019. https://documents.dnrec.delaware.gov/Watershed/Sediment-Stormwater/Regulatory-Guidance/BMP%20Stds%20and%20Specs%20-%20EFF%20FEB%202019.pdf

Green Infrastructure Primer A Delaware Guide to Using Natural Systems in Urban, Rural, and Coastal Settings, January 2016. https://documents.dnrec.delaware.gov/GI/Documents/Green%20Infrastructure/Green_Infra_Primer2016_FINAL%20web%20version.pdf

Standard Guidelines for Operation and Maintenance of Stormwater BMPs, February 2019. https://documents.dnrec.delaware.gov/Watershed/Sediment-Stormwater/Maintenance/Std%20Guidelines%20for%20OandM%20_EFF%20FEB%202019.pdf