



Best Management Practices for Stormwater Runoff

PONDS

Retention vs. Detention

Two different kinds of ponds are often used for flood control and stormwater runoff treatment: wet ponds and dry ponds. Both systems function to settle suspended sediments and other solids typically present in stormwater runoff. Wet ponds are also called retention ponds and they hold back water similar to water behind a dam. The retention pond has a permanent pool of water that fluctuates in response to precipitation and runoff from the contributing areas. Maintaining a pool discourages resuspension and keeps deposited sediments at the bottom of the holding area.



Retention ponds maintain a pool of water throughout the year and hold stormwater runoff following storms.



Detention ponds hold water for a short period of time; this pond temporarily holds water before it enters the stream.

Detention ponds are more common in the arid west and serve as important flood control features. They are usually dry except during or after rain or snow melt. Their purpose is to slow down water flow and hold it for a short period of time such as 24 hours. Urban areas rely on these structures to reduce peak runoff rates associated with storms, decreasing flood damage.



On-channel detention ponds reduce peak storm flows and provide flood control for downstream neighborhoods.

Dry ponds can be designed for a variety of storm events and purposes. The land area available for construction, slope of the site and contributing area are all factors to be considered. Also, an emergency spillway is usually required to allow for safety during flood events.

Although detention ponds can vary in size and shape, they all function to settle stormwater particles and reduce peak flows. All of the ponds are designed to be separate from local groundwater supplies to prevent movement of dissolved pollutants from surface water to groundwater sources.

Best Management Practices, or BMPs, are methods that prevent or reduce pollution from nonpoint sources. Structural and non-structural projects as well as changes in management or cultural practices are all considered BMPs. Usually a combination of these types of practices is needed to impact nonpoint source pollution. This publication is provided by the Laramie County Conservation District with partial grant funding from the Wyoming Department of Agriculture and the U.S. Environmental Protection Agency through the Wyoming Department of Environmental Quality.



Both types of ponds assist with flood management and can improve water quality. Sediment and associated pathogens, nutrients and metals settle out of stormwater runoff in the ponds. If pollutants enter streams or lakes during storm events, ponds interrupt the transport process. While both types of ponds provide a water quality benefit, retention ponds allow for additional biological interactions that assist in improving water quality for nutrients. Detention ponds usually hold storm water long enough to settle sands and larger silt particles. Fine silts and clays will not have a chance to settle and will continue down the water course. Retention ponds hold stormwater for longer periods of time and allow even the fine sediments to settle to the bottom of the pond.

The U.S. Environmental Protection Agency (EPA) estimates the following pollutant removal rates for *dry* detention ponds:

Total suspended solids: 61%
Total phosphorus: 19%
Total nitrogen: 31%
Nitrate nitrogen: 9%
Metals: 26 - 54%

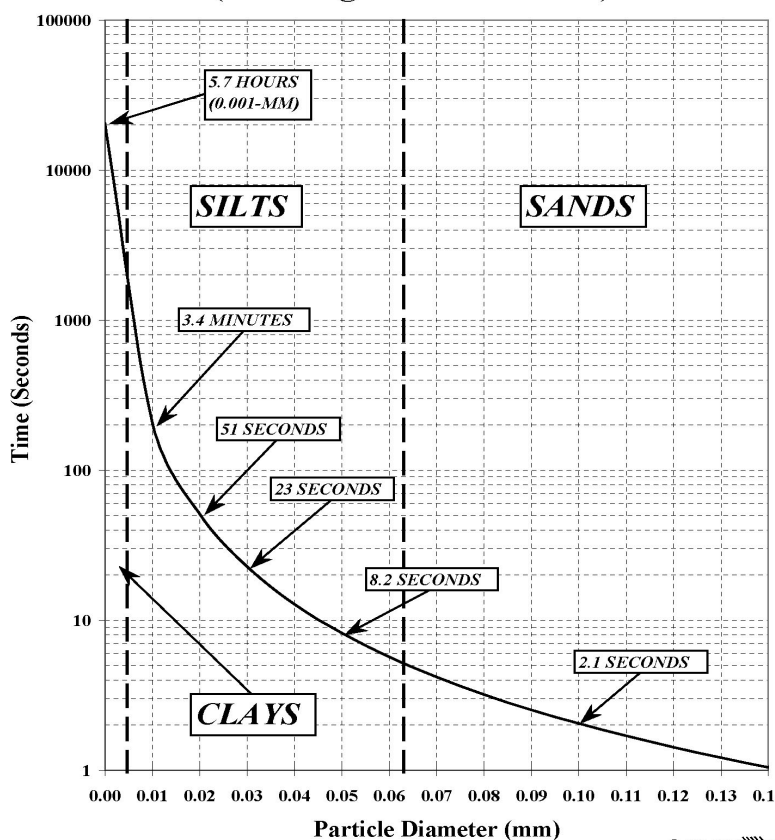
(Source: <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>. "Dry Ponds")

A variety of factsheets for stormwater Best Management Practices are available on the National Menu of Best Management Practices (address listed above). Browse the menu to help select the appropriate practice for controlling stormwater runoff.

For more information on the stormwater permitting process and requirements in Wyoming, please visit the following site:

http://deq.state.wy.us/wqd/WYPDES_Permitting/WYPDES_Storm_Water/stormwater.asp

Time for Suspended Particles to Fall 10 mm (0.40 in.) in Water at 0.0 Degrees Celsius (32.0 Degrees Fahrenheit)



Used with permission from HydroDynamics in Parker, Colorado.



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