

# Detention / Retention / Infiltration Basins

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Detention basin.<sup>1</sup>Retention basin.<sup>2</sup>

DESCRIPTION	<p><b>Detention basins:</b> An area that has been excavated so that during storms excess water can be held helping prevent runoff. They are designed to dry out between flood events.</p> <p><b>Retention basins:</b> An artificial pond with vegetation around the perimeter and a permanent pool of water with additional capacity for use during floods. Sometimes called a wet pond, wet detention basin or stormwater management pond.</p> <p><b>Infiltration basins:</b> A retention basin designed to direct stormwater to groundwater through permeable soils.</p>		
HOW DOES IT MITIGATE FLOOD RISK?	<ul style="list-style-type: none"><li>+ <b>Flood storage:</b> The holding of floodwaters during a flood which are then gradually released into the drainage system.</li><li>+ <b>Flood attenuation:</b> The reduction in peak discharge of a flood by temporary storage of water or the slowing of channel flows.</li><li>+ <b>Groundwater recharge (infiltration basins):</b> Downward movement of water from the surface to subsurface aquifers.</li></ul>		
WHAT OTHER BENEFITS DOES IT PROVIDE?	<p><i><b>Note:</b> Basins are not necessarily nature-based solutions and the provision of other benefits is dependent on the design and local setting of the feature.</i></p> <ul style="list-style-type: none"><li>+ <b>Habitat restoration/enhancement:</b> Changing the physical, chemical, or biological characteristics of a site with the goal of returning or improving the natural functions to the lost or degraded native habitat.</li><li>+ <b>Improved water quality:</b> Increasing suitability of water for a particular use based on selected physical, chemical, and biological characteristics.</li><li>+ <b>Carbon sequestration:</b> The process by which carbon dioxide is removed from the atmosphere and held in solid form in the landscape.</li><li>+ <b>Recreation:</b> Providing recreational opportunities such as birdwatching and hiking.</li><li>+ <b>Open space:</b> Lands where there are no buildings, storage, fill, significant pavement, or other encroachments to flood flows.</li></ul>		
SCALABILITY	Cumulative effects require coordinated planning.		
Advantages Relative to Traditional Flood Management	Potential Barriers or Issues Relative to Traditional Flood Management	Potential Synergies with other NBS	
<ul style="list-style-type: none"><li>+ Proven approach if hydrologic conditions are favorable and design is site appropriate.</li></ul>	<ul style="list-style-type: none"><li>+ Large space requirement.</li><li>+ Potential for mosquitos—especially for retention and infiltration basins.</li><li>+ For detention and retention basins, must ensure drainage in areas with low slopes/high groundwater.</li></ul>	These basins may be locally designed and implemented to include additional NBS elements. The potential for synergy is dependent on local conditions.	

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RESOURCES	
EVALUATION TOOLS	DESIGN SUPPORT
<ul style="list-style-type: none"> <li>+ <b>National Stormwater Calculator:</b> <a href="https://www.epa.gov/water-research/national-stormwater-calculator">https://www.epa.gov/water-research/national-stormwater-calculator</a></li> <li>+ <b>USGS Software and Models, Methods for Estimating Groundwater Recharge In Humid Regions:</b> <a href="https://water.usgs.gov/ogw/gwrp/methods/software/">https://water.usgs.gov/ogw/gwrp/methods/software/</a></li> <li>+ <b>USACE Ecosystem Restoration Model Library:</b> <a href="https://cw-environment.erd.c.dren.mil/model-library.cfm?CoP=Restore&amp;Option=Search&amp;Type=Restore&amp;Id=ALL">https://cw-environment.erd.c.dren.mil/model-library.cfm?CoP=Restore&amp;Option=Search&amp;Type=Restore&amp;Id=ALL</a></li> <li>+ <b>INVEST Habitat Quality:</b> <a href="http://releases.naturalcapitalproject.org/invest-userguide/latest/urban_flood_mitigation.html">http://releases.naturalcapitalproject.org/invest-userguide/latest/urban_flood_mitigation.html</a></li> <li>+ <b>INVEST Carbon Storage and Sequestration:</b> <a href="http://releases.naturalcapitalproject.org/invest-userguide/latest/carbonstorage.html">http://releases.naturalcapitalproject.org/invest-userguide/latest/carbonstorage.html</a></li> <li>+ <b>INVEST Coastal Blue Carbon:</b> <a href="http://releases.naturalcapitalproject.org/invest-userguide/latest/urban_flood_mitigation.html">http://releases.naturalcapitalproject.org/invest-userguide/latest/urban_flood_mitigation.html</a></li> <li>+ <b>Automated Geospatial Watershed Assessment (AGWA) Tool:</b> <a href="https://www.epa.gov/water-research/automated-geospatial-watershed-assessment-agwa-tool">https://www.epa.gov/water-research/automated-geospatial-watershed-assessment-agwa-tool</a></li> <li>+ <b>How to Map Open Space for Community Rating System Credit:</b> <a href="https://coast.noaa.gov/digitalcoast/training/crs.html">https://coast.noaa.gov/digitalcoast/training/crs.html</a></li> </ul>	<ul style="list-style-type: none"> <li>+ <b>RECARGA:</b> <a href="https://dnr.wisconsin.gov/topic/Stormwater/standards/recarga.html">https://dnr.wisconsin.gov/topic/Stormwater/standards/recarga.html</a></li> </ul>
CASE STUDIES	<ul style="list-style-type: none"> <li>+ <b>Coulee Mine East Detention Project:</b> <a href="https://www.theadvocate.com/acadiana/news/article_02a3d842-bf06-11eb-86e3-034655841be4.html">https://www.theadvocate.com/acadiana/news/article_02a3d842-bf06-11eb-86e3-034655841be4.html</a></li> <li>+ <b>Jones Creek Detention Project:</b> <a href="https://www.wbrz.com/news/east-baton-rouge-parish-secures-funding-for-jones-creek-detention-project/">https://www.wbrz.com/news/east-baton-rouge-parish-secures-funding-for-jones-creek-detention-project/</a></li> </ul>

1 <https://www.manuelbuilders.com/blog/retention-pond-vs-detention-pond>2 <https://connectorcomments.blogspot.com/2016/05/how-big-will-i-49-connector-retention.html>