

# Water detention sites help with flood prevention and water quality



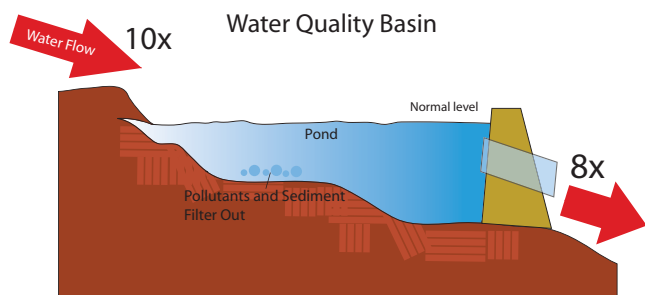
## Water detention sites of different sizes slow water to prevent flooding while improving water quality.

Water detention basins are the most-used tool for preventing flooding. They are usually the least expensive and most reliable tool for this purpose, according to the Environmental Protection Agency (EPA) and Natural Resources Conservation Service (NRCS). They also provide recreation and green area.

- Wet detention sites have a permanent pool of water and provide both flood control and water quality benefits, according to the EPA.
  - Detention sites began appearing commonly to control runoff in North America in the late 1960s.
  - In the last 30 years, engineers have begun designing detention sites to extend beyond stormwater control to include water quality improvement such as sediment control, according to the EPA.

Water detention sites can significantly vary in size, for example, the Partnership is studying the following:

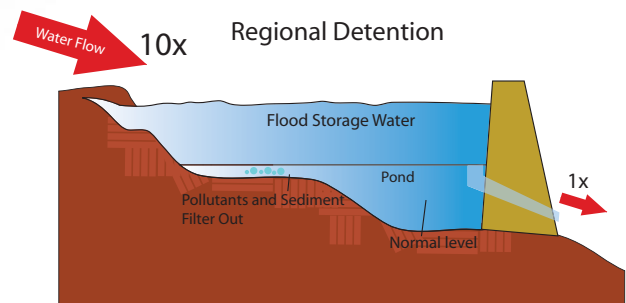
- Water quality basins – Water quality basins reduce runoff velocity to catch suspended solids in the basin before they get downstream. Basins help control nonpoint source stream pollution, which is pollution that comes from many areas. Basins capture and hold the first flush of runoff,



Water quality basins slow water so pollution can be filtered out.

- which has the most pollutants.
- Regional detention – Regional detention sites primarily are for flood control and can offer recreation. They are designed to capture a large amount of water, well in excess of the first flush, and are larger sites. A local example is Walnut Creek Lake and Recreation Area.

Water detention sites are effective for removing stormwater pollutants, according to the Center for Stormwater Protection. Their studies show effective removal of suspended sediment, phosphorous, nitrogen, nitrogen oxides, metals and bacteria.



Regional detention sites slow and hold water to help remove pollution and prevent flooding.

## Our watershed is running out of viable locations for water detention sites.

- Our watershed is quickly urbanizing. This means we will soon run out of area on which to build detention sites. The need for water quality improvements and additional flood control becomes more vital as urbanization in the watershed continues.
- Our watershed has a history of flooding, and the existing water detention sites only control runoff from approximately 15 percent of the watershed.
- A result of urbanization is a greater risk of flooding, especially downstream – even where flooding was not previously a large threat, according to the NRCS.
  - An urban or urbanizing watershed means that a significant area is covered with surfaces through which water cannot seep. These impervious surfaces include roads, sidewalks, parking lots and buildings.
  - As a result, rain and snowmelt run more quickly into waterways and at a larger volume since it cannot seep into the ground, the NRCS says. This quicker, larger runoff also carries more pollutants.
- Studies show that decisions to move forward

with water detention sites are often made based on cost effectiveness, long-term protection and multiple benefits of conserving or setting aside land that is still available, according to the Trust for Public Land.

### Other Important Information

#### Cost to build and maintain

The cost to build and maintain a water detention structure varies.

- According to the EPA, the average costs for wet detention ponds range from 50 cents to \$1 per cubic foot of storage area.
- Annual maintenance costs, including regular inspections of the pond embankments, grass mowing, nuisance control, debris and litter removal, inlet and outlet maintenance and inspection, and sediment removal and disposal, can range from one to six percent of the construction costs, according to the EPA.

#### Changes to the current environment

Water detention sites change the current environment. The EPA says that while these sites are documented to help remove pollutants, the current flow of water is changed, affecting ecosystems.

- The natural environments for local plants and animals are changed. Water temperature, fish migration, habitats and more are affected. The natural ebb and flow of streams and rivers are altered.

#### Sources:

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- Natural Resources Conservation Service (NRCS), Urban Hydrology for Small Watersheds TR-55 manual, [www.wcc.nrcs.usda.gov](http://www.wcc.nrcs.usda.gov)
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- U.S. of Agriculture (USDA) – Natural Resources Conservation Service (NRCS), "Watershed Sites Prevent Greater Flooding Damage" news release, May 2007, <http://www.ne.nrcs.usda.gov/>
- U.S. Federal Emergency and Management Agency, "Benefits of Dams," April 2006, <http://www.fema.gov/hazard/damfailure/benefits.shtm>
- WOWT Channel 6 Papillion Creek Watershed background story, July 20, 1989

## Over time, water detention sites are proven to save lives and property.

Water detention sites, according to Federal Emergency Management Agency (FEMA) and EPA, provide a range of economic, environmental and social benefits, including:

- Flood control
- Water Quality improvement
- Ecosystem restoration
- Recreation
- Wildlife habitat

Case studies on the benefits of water detention sites are plentiful and include:

- In 1964 and 1965, the Papillion Creek Watershed experienced extensive flooding resulting in the loss of seven lives and \$5.5 million in property damage, according to the Army Corps of Engineers. As a result, lakes Cunningham, Standing Bear, Wehrspann, Zorinsky, Candlewood and Walnut Creek were built and improvements were made to the creek's channel. This resulted in reduced flooding, according to sources such as WOWT Channel 6 and the Papio-Missouri River Natural Resources District.
- USDA's Natural Resources Conservation Service (NRCS) reported in 2007 that with nearly 900 water detention sites constructed in Nebraska, the total benefits to the state exceed \$27 million each year.
- The Nebraska Game and Parks Commission recognized Walnut Creek Lake in Sarpy County as one of the top three fisheries in the region due to good water quality and aquatic vegetation.

**Papillion Creek  
Watershed Partnership**  
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Photos: (Front) Water quality basin upstream of Zorinsky Lake; (Back) Walnut Creek Lake and Recreation Area in Sarpy County

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