

Practice Title

Setback Berming

Photo(s)



Summary of Practice

A berm is a mound of earth, gravel, rock or other materials, usually linear, constructed along a stream, road or other area to protect against flooding. Berms are often constructed to protect land from flooding or eroding, or to control water drainage. Building a berm is relatively cheap, but often offers only a false sense of security for streamside residents. Berming along the stream acts to increase the water's velocity and erosion potential during high flows, often leading to catastrophic failure and/or downstream erosion.

Impact on Stream and Floodplain Processes and Functions

Streamside berms often interfere with other stream processes such as floodplain function and habitats, and can exacerbate flood-related erosion and stream instability. With high steep banks the stream's energy is confined within the banks instead of allowing for the flow to dissipate throughout the floodplain. This causes an increase in bank erosion both downstream, and of the berm itself. It also increases the risk of more severe flooding, particularly downstream, and locally if the berm fails. The stream should remain connected to its floodplain to allow the water and energy to spread out onto adjacent land, so it's not such a powerful flow through the channel. Allowing the stream and floodplain to interact also keeps streamside habitats in tact.

When analyzed in the context of a watershed approach, there may be locations where protections are necessary due to floodplain encroachment. Best case scenario would be to stay out of the 100-year floodplain, but as a last resort some communities have built set-back dikes, which allow for floodplain function, while providing flood control.



*Flood control dike that allows the stream's water to spread out over floodplain, but still provides protection for nearby development (note- this riparian buffer could use enhancement)
(Photograph by Scott Rodabaugh, NYSDEC)*

Impact on Your Property

In rural areas and along small streams, the expense of building engineered flood control levees to protect floodplain development is generally not cost effective (project costs would greatly exceed the value of the development to be protected). Property owners in these areas may support the less expensive alternative of bulldozing sediment from the stream onto the bank to create a berm. Once vegetated, these structures look like flood control levees and give residents the secure feeling that they are protected from flooding—but it is a false security. The berms are frequently breached by the stream and therefore do not supply permanent flood protection.

Impact on Neighbor's Property

Removing material from a streambed in order to construct a berm can have adverse effects on your property as well as neighboring properties. Stream forces are increased during flood events by the removal of sediment from the channel (fire-hose effect) and can make flooding problems worse. Even in the event that setback berming does succeed in alleviating flood issues on your property, the excess flood waters which are sent downstream could cause flooding on neighboring properties. As part of a watershed planning effort, important flood storage areas should be identified and protected.

Recommended Use

Some berms are constructed as a byproduct of stream channel dredging, whereby streambed sediment is pushed out of the channel and mounded on (and along the length of) the streambank. These berms are frequently breached by the stream and should not be relied on for

flood control. Berming is therefore generally not recommended where other techniques are possible. Methods such as re-creating channel meander patterns, which take into account important aspects of stream morphology, are preferred over setback berming. It is important to consider the critical roles of the floodplain when considering flood control projects. To simply create a larger, deeper stream channel with setback berming will more often than not result in failure. This method is therefore only recommended where minimal or temporary flood control is needed, and other methods are not possible.

Permits Needed

In-stream work will require a DEC Article 15 Stream Disturbance Permit. An ACOE permit is required when more than 25 cubic yards of fill material will be used below the “ordinary high water mark” (the approximate yearly flood level); the DEC can advise you about determining these limits. Please contact info@catskillstreams.org to schedule a site visit from a local resource professional that can advise on the best options for your streamside.

Resources (Links, Articles, etc.)

http://gsa.confex.com/gsa/2002CD/finalprogram/abstract_35244.htm

Text Sources

Thigpen, Janet. 2006. Stream Processes: A Guide to Living In Harmony with Streams. Chemung County Soil & Water Conservation District. Available on web: <http://www.chemungcountyswcd.com/homepage.html>.

Exo, John. 2006. Lower Wisconsin River Basin: Otter Creek Educational Field Study.

Available on web: <http://basineducation.uwex.edu/lowerwis/pdf/060806-Field-notes.pdf>

Photo Sources

Steuben County Emergency Management Office

New York City Department of Environmental Protection