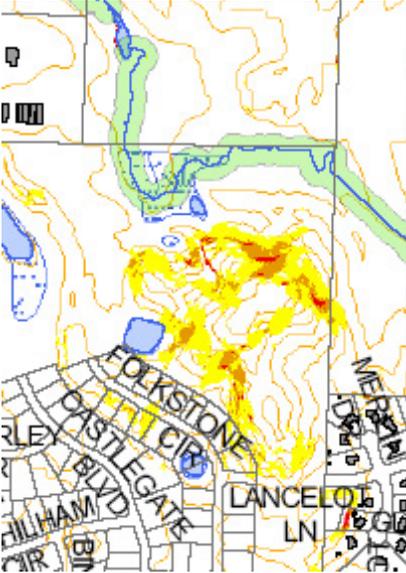


Chapter 6



Above: Stream setback area shown on a community map.
(map: City of Green Planning Commission)

Above Right: Avenbury Lakes in Avon, Ohio.
(photo: Scaletta Development Corp.)

STREAM, FLOODPLAIN, & WETLAND PROTECTION

Stream and floodplain preservation is the most cost-effective means of minimizing flood damage and controlling erosion

(Chagrin River Watershed Partners, Inc. 2006).

Background

Why are streams, floodplains, and wetlands important?

Streams and wetlands, and their associated floodplains and active stream corridor areas, when left in their natural and functionally sound state, are important components of a community's natural storm water management infrastructure. They can play important roles in controlling flooding, limiting erosion and protecting water quality. However, the impacts of land development projects that remove natural vegetation, modify channels and increase impervious ground cover impair this natural infrastructure. Such impacts can alter the hydrologic response of local watersheds and increase storm water runoff rates and volumes that lead to flooding, stream channel erosion and sediment transport and deposition, and contribute to increased quantities of pollutants in water resources. The cost savings, property protection, and quality of life benefits provided to immediate and adjacent/downstream communities and property owners by streams, wetlands and their floodplains are worth maximizing through appropriate regulations that protect these resources.

Wetlands ease the water treatment burden of human-made systems. A 2.5 acre protected wetland provides over \$4,000 in avoided water treatment costs, with up to \$10,000 in other benefits annually.

(Krop, Hernick, and Frantz 2008)

Most communities and counties in Ohio have floodplain regulations that enable them to participate in the National Flood Insurance Program (NFIP) that makes available affordable flood insurance for their residents (homeowners insurance does not cover losses from flooding). However, the minimum floodplain management standards of the NFIP have been accepted by many as the default flood control standards for communities, even though they were designed to manage risk exposure for an insurance program and not to control escalating flooding. Since the minimum standards do not require protected stream setbacks, currently a large majority of communities in Ohio do not yet have stream setback provisions, leaving these critical stream areas unprotected. Many local governments assume the minimum NFIP standards provide acceptable flood protection, and are then surprised when flooding continues to be a local problem.

How do communities benefit from Stream, Floodplain and Wetland Protection?

One of the most obvious benefits is cost savings by way of reduced costs associated with flood damage. In addition, stream setbacks can provide monthly savings to property owners in the form of discounts on flood insurance premiums. When a community goes above and beyond the NFIP minimums by installing stream setbacks and other higher standards, the community qualifies for participation in the NFIP's Community Rating System (CRS). This program provides anywhere between a 5 – 45% discount on property owners' flood insurance premiums.

Another form of cost savings is in infrastructure costs. As long as floodwaters are accommodated by vegetated stream areas, need for man-made infrastructure such as dams, dikes, levees, and basins is reduced. Also, because vegetated stream setbacks provide superior pollution filtration, communities enjoy cleaner streams and reduced costs associated with meeting regulatory requirements for clean water.

In addition to cost savings, another benefit to communities includes higher real estate values for properties in proximity to these natural amenities as a result of the vegetated open space and cleaner water. Conserved natural amenities also tend to encourage community-wide growth. (CRWP, "Technical Information", 35-37)

Stream protection and set backs also help communities prevent the substantial homeowner problems associated with changing flood patterns or higher flood elevations. When development and its associated increase in storm water runoff take place anywhere in the watershed, not just near the stream, it will influence flood patterns and flood elevations. Property owners in proximity to streams in



a Bioregional Map

Lake Erie Watersheds of Northeast Ohio

Including the watersheds of the Vermilion River, Black River,
Rocky River, Cuyahoga River, Chagrin River and Grand River

developing areas who never had routine flood problems eventually will; many not previously required to purchase flood insurance are suddenly burdened with heavy premiums when floodplain boundaries are updated. A stream setback helps to avoid such concerns by slowing and naturally storing floodwaters away from existing buildings, and by avoiding construction of new buildings and structures in stream areas that are subject to higher variations in flood patterns. In this way, stream, floodplain and wetland protection can be an important contributor to community resiliency in light of increasing storms and flood events.

How does stream, floodplain and wetland protection relate to Balanced Growth?

Stream, floodplain and wetland protection has a direct role to play in environmental protection and in the economic health of a community, aligning it with the dual goals of Balanced Growth. Stream, floodplain and wetland protection regulations reduce the impact of flooding on property, business activity, health and safety. By protecting water quality, they help to protect a community's quality of life, and our Ohio water assets which draw businesses, residents, tourists and visitors. Stream, floodplain and wetland regulations are important tools for implementation of Priority Conservation Areas as may be designated in a Balanced Growth Watershed Plan. Often floodplains and stream corridors are the primary areas designated for targeted implementation of incentives as part of a Balanced Growth Watershed Plan.

Issues

- **Natural watershed function and service.** Our approach to managing storm water and flooding has traditionally been a reactive one, mitigating problems as they arise through structural and regulatory solutions. However, innovative and sustainable design techniques that are currently being developed take a proactive approach to defining critical watershed functions and services, and taking steps through project design to maintain, enhance and reestablish those services. Such design approaches can reduce development costs, and reduce costs over the long term for communities, property owners, and taxpayers through reduced property damage and better management of water at the source. This approach is becoming especially important as the frequency and intensity of storm events increases over time.

- **Special Flood Hazard Areas (SFHAs).** A Special Flood Hazard Area (SFHA) is an area identified by FEMA as land that has a 1% chance of flooding in any given year. These floods can also be referred to as The Base Flood or The 100-Year Storm Event. SFHAs can be observed on

Lake Erie Watersheds of Northeast Ohio Map. Painted by Mary Kelsey for EcoCity Cleveland.
(Cleveland Museum of Natural History)



FEMA created maps called Flood Insurance Rate Maps, or FIRMs. It is from these maps that determinations of flood risk are established for insurance purposes.

As part of the requirements of the National Flood Insurance Program (NFIP), development must be regulated within the SFHAs. A structure's lowest point cannot be below the Base Flood Elevation level, or BFE. This is the computed elevation to which floodwater is anticipated to rise during a base flood.

There may be situations where FEMA has not yet fully assessed a community for its Special Flood Hazard Areas. In these communities, the floodplain management regulations that are regulating development within the SFHAs may or may not be adequately protecting their floodplains. It is the communities' responsibility to know whether or not they have been fully assessed by FEMA and, if not, to make preparations for any undesignated floodplains. Failing to do so may result in construction inside a future SFHA that which would require immediate purchase of flood insurance if the loans are federally backed - a situation property owners and the community would clearly want to avoid.

In addition, SFHAs are subject to change. SFHAs are not usually studied by FEMA very frequently - some SFHAs are over 30 years old. Development and other contributing factors change the characteristics of floodplains, which may put previously excluded construction within a SFHA.

- **Higher Standards: Going Above and Beyond the NFIP** Substantial benefits exist for communities that go beyond the minimum standards set forth by the NFIP. Not only will communities reduce flood risk, but property owners will be eligible for discounts on insurance premiums. These discounts are available through the Community Rating System (CRS) and range from 5 to 45%.

Each community which is meeting the NFIP minimum standards is given a Class 10 rating by the CRS. The community can request a CRS credit once a higher standard is implemented. When the community meets the requirements as outlined in the CRS Manual, a new Class Rating will be assigned. Every point deducted from the rating is equivalent to a 5% insurance premium discount. For example, a Class 5 rating results in a 25% discount for property owners.

Stream Setbacks can be a higher standard that will result in CRS credits. Another is the inclusion of a freeboard requirement in a floodplain regulation. Communities participating in the NFIP cannot allow structures to be built under the Base Flood Elevation (BFE). A freeboard (space between the BFE and the structure) is a figure given in a number of feet above this BFE. This extra spacing reduces the risk of flood damage by taking into account unknown factors that may increase flood water height such as future development, ice dams, wave action, obstructed bridge openings or other forms of encroachment. Therefore



*First-order Stream , Broughton Nature Preserve, Washington County, Ohio.
(Photo: Joe Cornwall, Fly Fish Ohio)*

a floodplain regulation with a 2-foot freeboard might be written as “A structure’s lowest point must be 2 feet above the BFE.” For this extra level of flood safety, the community is awarded CRS credits. Additionally, the lower flood risk associated with a 2-foot freeboard translates to approximately 50% in insurance premium savings over those structures whose lowest point is exactly at the BFE.

Other common ways to increase standards and gain CRS credits include improved foundation design, future conditions mapping, use restrictions, and stormwater management practices and public outreach efforts. See the CRS Manual (see resources) for more information on credit opportunities.

- **Regional and Local Differences:** Unique geographic factors should be taken into consideration when implementing Floodplain Management planning. Some areas in Ohio have rolling terrains and steep slopes. In these areas, local communities might want to require different standards such as higher freeboard requirements. On the other hand many northwestern communities can be very flat, and in these areas a lower freeboard might be more appropriate.

Development patterns in the region should also be considered in the planning process. If there are many actively growing communities or many large tracts of developable lands, communities in that region should consider more stringent freeboard, fill, and stormwater management standards that will anticipate future floodplain alterations.

- **Natural Stream vs. Functional Stream:** It is important to note that leaving a stream in its “natural” state does not mean it still has its full functional capability. What may have been a healthy stream could have been degraded into a down-cut eroding channel that does not perform the same critical functions as a healthy stream. Streams can also be subject to sedimentation that reduces the stream’s capacity within its banks. These unstable and unhealthy streams may need to be restored or rehabilitated.

- **Dual floodplain authority over certain development projects:** Jurisdiction over development projects is complex and may include multiple authorities. If a State agency is involved in the funding, development, or pursuit of a development project, it may preempt local authority in granting of the floodplain permit. Similar restrictions occur over oil and gas development, and mobile home parks. Although any State agency would still be required to comply with minimum federal Flood Insurance Rate Program standards as required by R.C. 1521.13(A), it is important to note that the local permit will not apply on such projects. If the local regulations are more strict than the minimum federal standards, it is likely that they will not apply on such projects. It is recommended that the community consult with their legal advisor, and with the ODNR Division of Floodplain Management, with regard to questions of local authority on floodplain management.

Recommendations

1. Work to understand functions and services provided by streams, floodplains, wetlands and riparian areas: All of these natural elements provide essential services in controlling the quality and the flow of water within the watershed. The goal is to approximate natural function to the extent possible.

2. Maintain, enhance or reestablish critical stream functions and services: Protecting streams that are already severely degraded and have poor functional use may not be enough. The community should assess which active stream areas are healthy enough to be maintained in their natural state, and which areas might need stream restoration efforts to improve the functionality. When incorporating setbacks for the streams, the regulation language should allow for, or even encourage rehabilitation or restoration of vertically unstable channels and unhealthy streams.

3. Apply your floodplain regulation to the entire 100-Year Floodplain Area, not just FEMA designated SFHAs: Many floodplain regulations state that the regulation applies to “all areas within SFHAs.” This type of code language places undue reliance on FEMA’s designation of the flood hazard areas, which may not be up to date or complete. By having language that says the regulation applies to “all areas within the 100-year floodplain,” communities ensure regulation of flood hazard areas regardless of the FEMA designation.

If a Flood Insurance Rate Map (FIRM) exists for that site, then the developer may use that data to apply the floodplain regulation. If no FIRM or other flood data exists, then a community can require the developer to pay a certified engineer to perform an analysis. Sometimes enough flood data exists (USGS maps, soil surveys, county performed flood mapping, etc) that the community’s floodplain administrator can designate a flood hazard area the new floodplain regulation will apply to.

4. Implement higher standards and participate in the Community Rating System: The NFIP minimums are conservative standards. Room was given to communities to improve upon the standards by accounting for the unique characteristics of their communities and applying higher standards when necessary or desired. Using unique and more stringent standards goes a long way in bolstering long-term flood hazard mitigation.

Flood insurance can be a considerable burden for many homeowners and businesses. Communities offer a substantial benefit to their residents by participating in the CRS and providing them with insurance premium discounts. Higher standards realize savings from CRS credits and future savings by lowering insurance premiums due to decreased flood risks.

Riparian setback zoning has no negative effect on values of homes or vacant land and has been shown in some markets to have a positive effect.

(Mikelbank 2006; Qiu, Prato, and Boehm 2007)

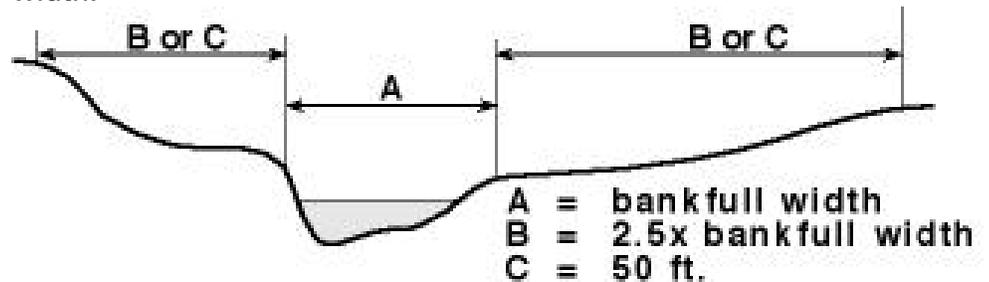
In addition to stream setbacks, adding a freeboard requirement is a higher standard that should be strongly considered by communities. When communities adhere to the NFIP minimum by keeping a structure's lowest point at the base flood elevation, there is no allowance for future floodplain alterations. Structures built at the base flood elevation may be safe from the base flood in the present, but any future activities that alter the base flood elevation, such as encroachment from new development, may result in those structures suddenly finding themselves below it. Freeboard provides a level of security from any future flood elevation changes. The appropriate size of the freeboard should be determined by each individual community, but they typically range from 6 inches to 2 feet and are influenced by factors such as regional topography and development potential of surrounding communities in the stream's watershed.

5. Adopt a stream setback code, either standalone, or within the Floodplain Management regulation: Stream setbacks are first and foremost a flood hazard mitigation technique. Therefore the stream setback code can be placed within the floodplain management regulation. It is there the stream setback code can be better understood by the public as a flood mitigation measure. However, many communities have codes that are standalone, and this can be an acceptable method of adopting the code. It should be noted that stream setbacks are becoming a common requirement in Ohio EPA general construction permits for certain watersheds.

When it comes to determining the appropriate size of the setback, there are a variety of methods. One such method is to size the setback according to the drainage area of that section of the stream. The Chagrin River Watershed Partners have created a model based on this method that has been adopted by many Ohio communities:

- A minimum of 300 feet on either side of all watercourses draining an area greater than 300 square miles.
- A minimum of 120 feet on either side of all watercourses draining an area greater than 20 square miles and up to 300 square miles.
- A minimum of 75 feet on either side of all watercourses draining an area greater than ½ square mile and up to 20 square miles.
- A minimum of 25 feet on either side of all watercourses draining an area less than ½ square mile and having a defined bed and bank.

Another method involves sizing the setback in relation to the width of the stream, or the “bankfull width”: One such standard is a setback on each side of the stream equal to two and one-half times the bankfull channel width or 50 feet, whichever is less. This distance is then measured away from the bankfull channel to arrive at the standard buffer width.



Additional information on this method is included in ODNR’s online materials, including the Ohio Stormwater Control Guidebook, and the Rainwater and Land Development Manual. (see resources)

The morphological condition of the streams being protected should also be considered when developing setback standards for new development and for riparian areas in the watershed. Streams and channels will go through a succession of morphological conditions that may dictate different intensities and locations of setbacks and other riparian protection. For more information, refer to EPA’s “Channel Process: Stream Channel Succession” in the resources.

Regardless of which method communities choose, it is preferable communities in a watershed are consistent in their setback sizing method. Communities should take note of their surrounding communities’ setback regulations and consider using a similar method, reducing confusion among local officials and the development community.

6. Wherever possible, preserve any wetlands within the community and apply a setback: Wetlands act as natural sponges that slow and store stormwater. Every acre of a wetland that is one foot deep can retain over 330,000 gallons of water. When wetlands are filled in for development purposes, this water becomes displaced and enters the stream, contributing to rising flood waters.

Preserving wetlands ensures natural flood mitigation functions that wetlands provide for the community and the surrounding region can be sustained. Applying setbacks to these wetlands helps to ensure structures and impervious surfaces do not inhibit any of its natural functions. It is recommended Class 2 wetlands have at least a 75 ft. setback and at least 120 ft. for Class 3. It is also important to work with developers on options, such as conservation development, for



Riparian Setback Diagram
 (map: Eric Booth)

conserving wetlands on development sites. Conservation development regulations provide flexibility for lot layouts to accommodate resource protection while maintaining development potential. Chapter 2 of ODNr's Rainwater and Land Development Manual has additional wetland setback provisions.

7. Collaborate on floodplain management efforts with nearby communities: Few issues substantiate the benefit of community collaboration more than flood hazard mitigation. Even if a community creates the soundest of floodplain management plans, they can still be affected by upstream communities not embracing flood hazard mitigation efforts. One of the best ways to collaborate with your neighboring communities is to create a cross-jurisdictional hazard mitigation plan. The Ohio Department of Natural Resources has created a resource titled "Multi-Jurisdictional Mitigation Planning" that provides suggestions to local governments for preparing multi-jurisdictional hazard mitigation plans. Other benefits include cost savings for plan preparations and shared staff and resources.

Example Regulations

The following example codes are outlined in the Example Regulations Matrix (link):

Chagrin River Watershed Partners, Model Ordinances (2011)
<http://www.crwpp.org/index.php/member-services/model-regulations/riparian-setbacks>

Licking County, Ohio, Floodplain Management
<http://www.lcounty.com/Planning/Floodplain/default.aspx>

NOACA Model Ordinance <http://www.noaca.org/ripwet12706.pdf>

TMACOG Model Ordinance http://www.tmacog.org/Environment/TMACOG_Stormwater_Standards_Manual_.pdf

See the Example Regulations Matrix for comparisons of these examples.

The example regulations **should never be adopted without careful local review** to assure that they are adapted to fit the needs of the specific local government. They will need to be adapted for use by the specific type of local government: city, village, township, or county. **The law director/ solicitor or county prosecutor should be consulted prior to adoption of any land use controls.** Questions about the examples and recommendations can be directed to the Ohio Lake Erie Commission and/or the Ohio Water Resources Council.

Use of the Guidance and Example Regulations

This example guidance and/or regulations **should never be adopted without careful legal review** to assure that they are adapted to fit the authority and needs of the specific governmental body. They may need to be adapted for use by the specific type of local government and must be independently evaluated against potentially applicable federal or state law. **The law director/ solicitor, county prosecutor or other appropriate qualified legal counsel should always be consulted prior to adoption of any enforceable measures** based upon this guidance document to insure compliance and consistency with any applicable state and federal law, and to consider potential legal ramifications and liability in the implementation of the laws or rules to be adopted. Questions about the models and guidance can be directed to the Ohio Balanced Growth Program.

Resources

Always start by checking with your local resources. Local government agencies and non-government organizations might have the most up-to-date information on these issues and will have the most expertise for the unique characteristics of your region.

- **Your Local Metropolitan Planning Organization**
- **Your Local County or Municipality Planning Commission and Engineer's Office**
- **Your Local County Soil and Water Conservation District**
- **Your Local Watershed Group**
- **Your Ohio EPA District Office**

Chagrin River Watershed Partners, *Riparian Setbacks Technical Information for Decisionmakers* (2006)
http://www.crowp.org/files/riparian_setback_paper_jan_2006.pdf

Chagrin River Watershed Partners, *Hedonic Analysis of Riparian/ Wetland Setbacks* (2006) http://www.crowp.org/files/final_report_hedonic_analysis_riparian_wetland_setbacks.pdf

Ohio Department of Natural Resources, *Rainwater and Land Development Manual* (2010) <http://www.dnr.state.oh.us/tabid/9186/Default.aspx>

Ohio Department of Natural Resources, *Ohio Stormwater Control*

Guidebook (1980) <http://www.dnr.state.oh.us/tabid/9190/Default.aspx>

Ohio Department of Natural Resources, *Stream Conservation* (2011)
<http://www.dnr.state.oh.us/Home/tabid/21567/Default.aspx>

Center for Watershed Protection (2011)
<http://www.cwp.org/>

U.S. Environmental Protection Agency, Division of Water, *Channel Processes: Stream Channel Succession*:
<http://water.epa.gov/scitech/datait/tools/warsss/successn.cfm>

For additional references cited, see the Bibliography in the Appendix,
<http://balancedgrowth.ohio.gov/BestLocalLandUsePractices/BestLocalLandUsePractices2012.aspx>

*Beaver Marsh in the Cuyahoga Valley
National Park
(photo :Tom Jones)*

