

# STREAM BUFFER MITIGATION BANK – GWINNETT COUNTY, GEORGIA

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**Abstract.** Recent regulations to mitigate the impacts of development on the environment have focused on stream buffers. The Metropolitan North Georgia Water Planning District required municipalities in the Atlanta district to have a stream buffer protection ordinance. The uncertainty and subjectivity in the variance procedure of the model ordinance was a discouragement to development and the economic welfare of the local jurisdictions. Gwinnett County developed a mitigation procedure that removes the uncertainty using a spreadsheet model that calculates the difference in the environmental value of the existing buffer and the proposed buffer. This model also calculates the value of on-site mitigation and if needed the in-lieu mitigation fee required. In-lieu fees are paid into a dedicated fund to be used for projects that enhance stream water quality and habitat.

## INTRODUCTION

Development has always impacted the environment. As development became denser and the impacts became more evident and more severe, construction practices, design methods, and regulations changed to mitigate these impacts. One of the most recent changes has been a concerted effort to protect and preserve stream buffers. The Metropolitan North Georgia Water Planning District (District) included a Model Stream Buffer Protection Ordinance in their District-wide Watershed Management Plan developed in 2003 (Metropolitan North Georgia Water Planning District, 2003a). The need for a mitigation buffer bank, how it is designed, and the success of the bank will be discussed.

### Need for a Buffer Mitigation Bank

State and federal regulations, impacts on citizens and the environment, as well as economic considerations were drivers for the development of the mitigation bank. The District's District-wide Watershed Management Plan is one of several regulations requiring metropolitan Atlanta municipalities to address the impacts of development on streams. This management plan has several elements including a Model Stream Buffer Protection Ordinance that was to be adopted by municipalities in the District by April 1, 2005. The management plan also has a require-

ment that Watershed Improvement Plans (WIPs) be developed for impacted watersheds. The WIPs include stream restoration and habitat improvement projects. Gwinnett County also has a Phase I National Pollutant Discharge Elimination System (NPDES) Municipal Separate Stormwater Sewer System (MS4) Stormwater Discharge Permit and NPDES Wastewater Discharge Permits that mandate the County implement WIPs as a part of our Watershed Protection Plan (WPP) (Gwinnett County, 2000). Studies have been done in about 67% of Gwinnett County and we have identified projects with costs totaling over \$150 million to be done.

The District's Model Ordinance provides in article 5.2 (2) that a variance will be considered only when the property's shape or topography prevent development or in the case where unusual circumstances create an extreme hardship (Metropolitan North Georgia Water Planning District, 2003b). Then when granting a variance, the appeals board must consider if the plan is "at least as protective of natural resources and the environment" per article 5.2 (4) f of the model ordinance. These are very subjective criteria and could be difficult for the applicant to prove. These criteria put ambiguity and uncertainty in the development process which discourages development, increases development costs, and adversely impacts the County's economic vitality.

The impacts of development on the stream water quality, habitat, and biota have been documented in studies nationwide as well as in Gwinnett County's WPP. Besides the issues recognized in the WPP, each WIP has further identified problems as well as solutions. These impacts cause problems for property owners and in some cases threaten not only their enjoyment of their property, but also the property value and safety of the residents.

While saving the environment is a good thing, the impact on the property owners, the development community, and the economic vitality of the County must be considered as well. The District's Model Buffer Protection Ordinance can make the development of a property very difficult, especially for commercial developments with large building foot prints since it requires a 75' buffer on both sides of the stream. The stream buffers are needed to protect the downstream property owners, but they reduce the amount of developable land on a parcel which can reduce the value of parcel as well as prevent certain types of development on the land. This may adversely impact

landowners who were planning to sell their land for retirement or developers who are looking for large land tracts on which to build projects that will help improve the economy of the County.

For any practice to be sustainable, it must consider the environment, the public, and the economics. Gwinnett County's Stream Buffer Mitigation Bank Ordinance does all three by providing a mechanism to fund stream improvements which improves the public health, wealth, and safety and the environment, and gives landowners and developers more flexibility to sell and develop the land.

### **Mitigation Bank Design**

The District's Model Stream Buffer Ordinance enlarged the stream buffer from 25' to 75' on each side of the stream. Gwinnett County had two major concerns when adopting the model ordinance. The first concern was to clarify when the buffer applied and the second concern was to clearly identify the buffer variance process. These issues were of great concern to the development community and the environmental community then and those concerns continue today. Clarifying the variance procedure is what drove the idea of having a stream buffer mitigation bank.

About the same time that Gwinnett County was working on adopting the model ordinance, the Georgia Environmental Protection Division (EPD) was revising their buffer variance procedures and criteria found in Chapter 391-3-7 Erosion and Sediment Control of the EPD Rules (Georgia Department of Natural Resources, 2005). The ten variance criteria provided in section 391-3-7.05 (2) were incorporated in Gwinnett's ordinance as either exemptions or variance criteria (Gwinnett County Georgia 2005a). Criteria (i) of this EPD subsection provides that the project should result in maintained or improved water quality. Since there were no models that could easily determine if a project met this criteria, Gwinnett decided to create a Stream Buffer Mitigation Bank and procedure to calculate what mitigation was needed to fulfill this criteria. One of the variance criteria allowed in the Gwinnett County buffer ordinance (Article 4.2.2.5) is for a buffer intrusion that has been minimized to be mitigated using the mitigation procedure in Chapter 9 of our Stormwater Systems and Facilities Installation Standards and Specifications (Gwinnett County, 2006). Incorporating the EPD's criteria and the mitigation bank and procedure into Gwinnett's buffer ordinance eliminates the subjective interpretation and uncertainty found in the District's model ordinance requirements.

In general terms, Gwinnett's stream buffer mitigation procedure is like the United States Army Corps of Engineer's (USACE) wetlands permitting procedure. The applicant must avoid the buffer and minimize the intrusion in the buffer as much as possible. Avoiding the buffer can

generally be done in a residential development, but it is much more difficult in a commercial development with buildings that have large foot prints. Gwinnett's procedure also does not override any jurisdictional areas of the USACE or the State EPD. In the 0 to 75' buffer area along the stream, the USACE has jurisdiction on the stream banks and any wetlands areas and the EPD has jurisdiction in the 0 to 25' area. An applicant must satisfy the requirements of the USACE, EPD and Gwinnett County. The amount of mitigation required by Gwinnett County is based on the ecological value of the buffer lost and the ecological value of the buffer restored.

Mitigation factors used to determine the value of the existing and proposed buffer are area, quality, and proximity of the area to the stream. The quality of the buffer is simplified into three land covers, forest, disturbed pervious, and impervious. The quality of the buffer decreases from categories of forest to disturbed pervious to impervious. The proximity of the buffer is broken up into 4 zones of impact; stream side is 0 to 25', inner zone is 25' to 50', setback zone is 50' to 75', and the extended zone is 75' to 300'. The value of the buffer decreases as the zone moves away from the stream. The area next to the stream has more beneficial value in terms of providing habitat and food to the biota than the zones further away. Also the area next to the stream will be used more frequently for flood storage than the areas further out. Likewise, the area next to the stream will be used more frequently to remove pollutants that might be carried in the stream flow.

The amount of mitigation required equals the value of the existing buffer condition (area times environmental value) minus the value of the proposed buffer condition (area times environmental value) plus a factor of safety. A factor of safety is typically used because of the uncertainty in the calculations. The uncertainty is based on concern that the mitigated buffer areas will survive to maturity, and because it is recognized that the restored areas will take several years before they have the same beneficial value as the existing buffer. The idea of a factor of safety is also used in the USACE wetlands permitting procedure. The next step was to place numerical values on the environmental value of the buffer and the factor of safety.

Instead of trying to determine the absolute environmental value of the buffer, a relative value of the buffer zones was used. The following table shows that the environmental value of the existing buffer decreases as the zone gets further away from the stream and the environmental value of the buffer decreases from forest to disturbed pervious to impervious.

**Table 1. Relative environmental value of existing buffer**

Type	Quality Factor		
	0-25'	25-50'	50-75'
Impervious	0	0	0
Disturbed Pervious	4	3	1
Forest	8	6	2

Table 2 below shows what the mitigated environmental value of the mitigated areas would be using a factor of safety of 4.

**Table 2. Relative environmental value of proposed buffer**

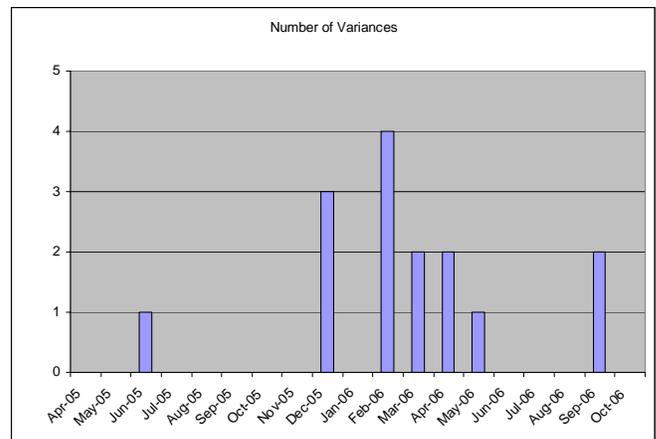
Type	Quality Factor		
	0-25'	25-50'	50-75'
Impervious	0	0	0
Disturbed Pervious	1	0.75	0.25
Forest	2	1.5	0.5

Using these relative values as a guide, a spreadsheet model was developed that calculates the value of the existing buffer that would be disturbed by multiplying the square footage of the buffer to be disturbed in each zone by the existing environmental value and calculating the value of the proposed buffer by multiplying the disturbed square footage of the buffer in each zone by the environmental value of the proposed buffer. The difference between these two calculated values is the amount of mitigation required. The dollar value of the mitigation required was calculated by determining the cost to restore one acre of buffer in the stream side zone from disturbed pervious to restored forest and dividing by the mitigation value. This dollar value was determined to be \$23,000.

The mitigation process allows on-site mitigation as well as an in-lieu payment. The spreadsheet model also calculates the environmental value of on site mitigation areas and subtracts that value from the amount the needed mitigation value. The Stream Buffer Mitigation Bank Ordinance set up a special project in Gwinnett's accounting system that in-lieu payments must be deposited in (Gwinnett County Georgia, 2005b.) The ordinance also specifies that these project funds can only be spent on projects that improve water quality such as stream restoration and buffer restoration projects.

### Mitigation Ordinance Success

When developing the mitigation bank procedure, the concern was that it would either make the variance process too easy and the development community would encroach in the buffer on virtually every project or it would be so difficult that it would not help the variance process for hardship cases. The following figure represents the number of variance applications since the ordinance was approved. The figure shows that there were five variances in 2005 over a period of 9 months and eleven variances in 2006 over a period of ten months. In comparison to the number of Land Disturbance Permits (LDPs) during the same period, there were 391 LDPs in 2005 and 383 in 2006 which corresponds to a rate of 1.3% in 2005 and 2.9% in 2006. The ordinance exempted projects that were already in the development process when the ordinance became effective April 1, 2005, so the rate of variances in 2006 is probably the best indicator of the long term variance application rate. Even though this 2006 rate is twice the 2005 rate, it indicates that the variance process is only being used in hardship cases.



**Figure 1. Number of Stream Buffer Variances**

Of these sixteen variances, one mitigated with on-site restoration and 15 have paid an in-lieu fee. The in-lieu fees have raised \$1,382,447 for water improvement projects. The expenditure of these funds is discussed in the paper by Pete Wright (Wright, 2007).

### CONCLUSION

The development of a mitigation bank has allowed development to proceed in hardship cases and is not allowing buffer encroachments unless it is necessary. The method protects the environment while providing the predictability that good development needs to maintain a strong economy and providing funding for needed water quality improvements.

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