DRAFT- VERSION 1.8

Fiscal Analysis – Alternative Buffer Mitigation Rules (15A NCAC 2B .0295)

Prepared by NC Division of Water Quality staff

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Rule Citation Numbers - 15A NCAC 2B .0295 (Appendix A)

DENR Division - Division of Water Quality

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Impact Summary:

State Government:	Yes
N.C. Department of Transportation	: Yes
Local Governments:	Yes
Federal Government:	Yes
Small Businesses:	Yes
Substantial Impact:	Undetermined

Authorizing Statutes: G.S. 143-214.20 Statement of Necessity

I. Executive Summary:

The proposed rules would providea variety of new mitigation options for applicants and mitigation providers in addition to traditional buffer mitigation which consists of planting trees along streams which presently lack wooded buffers. In addition, the rules address related mitigation issues to ensure that the replacement for the unavoidable impacted buffers will reduce future nutrient loading. The proposed rules are authorized by G.S. 143-214.20 which state (in part) "Construction of an alternative measure (of buffer mitigation) that reduces nutrient loading as well as or better than the riparian buffer that is lost."

We are unable to determine the overall fiscal impact of these proposed rule changes at this time. Many of the proposed alternative measures will not be required but are additional options that could be utilized by applicants on a case-by-case basis. These were developed to give regulated parties greater flexibility and potentially lower cost of compliance by providing additional options for buffer mitigation. Other proposed changes to the buffer mitigation rules could reduce the cost of mitigation on a case-by-case basis (for instance the allowance of buffer preservation) depending on the extent to which the regulated community and mitigation providers take advantage of this new provision in the rule. Similarly the proposed rules on mitigation location could increase cost depending on which option the

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Environmental Management Commission (EMC) chooses following public hearing. Finally the portion of the rule on accounting for buffer, nutrient offset and stream mitigation credit (.0295 (k)) may or may not increase mitigation cost depending on which option the EMC selects following public hearing and comment. The department is in the process of obtaining additional information to better analyze these proposed rule changes and will have a more complete version for review in July.

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II. Background and Description of Proposed Rules:

Could you include a paragraph of information about the purpose of the existing rules and what types of project and people need to use mitigation? This would provide some context to the rest of the note.

This fiscal analysis for the Alternative Buffer Mitigation rules was prepared to assist members of the NC Environmental Management Commission (EMC) and the public in their review of the proposed Alternative Buffer Mitigation Rules (15A NCAC 2B .0295). Division of Water Quality (DWQ) staff developed these rules with extensive input from stakeholders meetings held on February 9, 2009, December 9, 2009 and April 6 and 19, 2010. The draft rules were presented to the Water Quality Committee of the EMC on September 2009, November 2009, November 2010, and January 2011 with approval by the Committee in March 2010 pending development and review of this fiscal analysis.

The rules have the following main provisions. An economic analysis of each of these provisions follows in the next section of this fiscal analysis compared to the present practice of buffer mitigation based on an analysis of the average Division of Water Quality requirements for buffer mitigation from 2006 thru 2010 from the Division's Basinwide Management System permit tracking system.

- A. New provisions in the rules that apply to all buffer mitigation options. There are several provisions in the rules that will apply to any proposed approach for buffer mitigation. These are:
 - a. Conservation easements
 - b. Completion bonds
 - c. Non-wasting endowments for long term operation and maintenance

These provisions are standard requirements of compensatory mitigation for wetland and stream mitigation for 404/401 permitting under the Clean Water Act for many years but have not been required consistently to buffer mitigation requirements for the state's riparian buffer protection programs. As such, these requirements may or may not increase the cost of buffer mitigation compared to the present cost of mitigation as outlined in Section III below. The proposed rules require these new measures provide equivalent types and levels of protection.

B. Approaches in the Rules that would apply to all mitigation proposals.

There are several measures in the proposed rules that would apply to all mitigation required for unavoidable impacts. These measures are presented as options to the EMC and public for consideration during the public hearing process.

- a. Mitigation Location. The present rules require location of the mitigation to be as close or closer to the impact "as feasible". DWQ staff and the mitigation banking community have long interpreted this rule to mean that mitigation will be required in the standard 8-digit Hydrologic Unit (HUC) as used for the 404/401 permitting programs¹. The proposed rules have two options as follows:
 - i. Mitigation within the 8 digit HUC.
 - ii. Mitigation on-site (at a reduced ratio) with the 12-digit HUC (at the standard ratios), within the 8-digit HUC (at a higher ratio) and within the adjacent 8-digit HUC (at a still higher ratio). The purpose of this process would be to encourage mitigation closer to the impact.
- b. Accounting for buffer, nutrient offset and stream mitigation credit. The rules propose three options to address this issue. The current rules do not address accounting for buffer, nutrient and stream mitigation credit. DWQ staff currently use the first option outlined below but this issue has generated considerable controversy. Comparing these different proposals will give the regulated community and others more information about the benefits and drawbacks to each option.
 - Option 1 Buffer (or nutrient offset) and stream mitigation credits can be counted for both sets of credits on a particular mitigation site. However, buffer and nutrient offset credits cannot be provided at the same location on the same site nor can sites that are offering wetland mitigation also provide buffer or nutrient offset credit. DWQ staff presently use this option for the existing rules.
 - ii. Option 2 Buffer (or nutrient offset) and stream mitigation credits could only be counted for both sets of credits if the impact also was to both streams and buffers. This option would require DWQ staff to determine if impacts were to buffers only (impacts which are parallel to streams) rather than to both streams and buffers (impacts which cross streams). Presently Division staff make no such distinction. The type of required mitigation would then be matched up with the type of mitigation (stream and buffer versus buffer only). This would complicate the tracking of buffer and stream mitigation by mitigation providers and may result in some stream mitigation credits which could not be used for compensatory mitigation in instances where only buffer mitigation is required.
 - iii. Option 3 Buffer (or nutrient offset) and stream mitigation could not overlap at all in this option. In this case, the buffers planted next to stream mitigation sites could not be used for buffer credit unless the mitigation provider was willing to completely forego stream credit at the site. Since in many cases stream mitigation is needed to have an effective buffer mitigation project, there would be unrecoverable costs for the stream

¹ Note that a single 8-digit HUC occupies a larger area that a single 12-digit HUC. For instance, there are four 8-digit HUC's in the Neuse basin and several hundred 12-digit HUCs in the same river basin.

channel work with this option, which would have to be offset by higher mitigation fees as outlined below in Section III of this report.

- C. Optional methods of buffer mitigation allowed in the proposed rules. There are several optional measures to the traditional buffer mitigation of planting trees in non-wooded buffer adjacent to streams. None of these options would be required. Rather, applicants and mitigation providers would pursue these options on a case-by-case basis. These additional options are being proposed to give the regulated community more flexibility in achieving the required mitigation in a cost effective manner.
 - a. Non-structural options
 - i. Coastal Headwater Stream Mitigation This involves a relatively new way of conducting stream mitigation in subtle stream valleys in the outer coastal plain where extensive earth moving and engineering design are limited to filling of any existing ditches and planting appropriate trees. This practice has been done at about ten sites in the past five years with good success in replacing functioning riparian wetlands while minimizing mitigation cost.
 - ii. Restoration of buffers along unmapped streams Presently Division of Water Quality staff interpret the existing rules such that acceptable mitigation sites must be along steams shown on the most current version of the 1:24,000 United States Geological Survey (USGS) topographic map or published County Soil Survey. Division of Water Quality staff has estimated that about 95% of the stream length in any given area is captured by the use of these maps. However, the remaining approximate 5% of the stream length cannot be used as mitigation sites. The proposed rules would allow buffer mitigation along these streams which are not depicted on these maps, thereby providing additional sites for buffer mitigation.
 - iii. Preservation of stream buffers along mapped streams The proposed rules would allow mitigation credit for preservation of wooded buffers along streams shown on the USGS or County soils survey maps at a 10:1 ratio. There would still be a requirement for 1:1 restoration or enhancement in order to make certain that the amount of buffers along streams in these watersheds is at least stable. Since protection of these buffers would be determined on a case-by-case basis, it is not clear how much this alternative would be used by developers in these watersheds.
 - iv. Preservation of stream buffers along unmapped streams The proposed rules would allow mitigation credit for preservation of wooded buffers along unmapped streams in these watersheds at a 5:1 ratio. Again, there would still be a requirement for 1:1 restoration or enhancement to ensure the amount of buffers along streams in these watersheds is not diminished. Once again, since protection of these buffers would be determined on a case-by-case basis, it is not clear how much this alternative would be used by developers in these watersheds. However given the more favorable ratio it is likely that developers would pursue this option more frequently that the

option which allows preservation of buffers along mapped streams in the approximately 5% of the stream length in these watersheds that are not depicted on these maps.

- v. Restoration of narrower buffers along urban streams- This option allows restoration of 30 foot wide buffers along urban streams rather than the required 50 foot wide buffer if appropriate on-site stormwater management is provided. It is believed that this option may be pursued by selected municipalities who desire to develop a mitigation bank for their own impacts or by the NC Ecosystem Enhancement Program when they are pursuing buffer mitigation in public parks.
- vi. Enhancement of grazing areas The present rules do not allow buffer mitigation in wooded areas regardless of whether these areas are grazed by livestock with coverage by scattered mature trees. The proposed rules would allow buffer mitigation credit to be given for exclusion of livestock from these areas with limited tree planting. This option would provide credit for selected sites which today cannot get buffer mitigation credit. Although these sites are not widespread throughout these watersheds, this option would have a significant impact on reducing nutrient input into streams where livestock can be removed from locations adjacent to streams.
- b. Structural options Stormwater Best Management Practices. The proposed rules allow engineered solutions to nutrient removal including constructed wetlands, bioretention areas, infiltration devices and sand filters, as well as wet ponds followed by measures for diffuse flow. These practices are likely only to be proposed in areas where other options are limited since these engineered approaches tend to be more expensive than planting trees along non-wooded streams. However these stormwater Best Management Practices are standard designs with which the engineering and regulatory communities are very familiar based on several decades of experience in designing, reviewing, constructing and maintaining these facilities especially in urban areas.
- c. Other options as approved by the EMC. The rules contain a provision for applicants or mitigation providers to develop other alternative approaches for nutrient reduction and propose them to the EMC for buffer credit. The proposed method of mitigation would have to be placed out to public notice and comment by Division of Water Quality staff before presentation to the EMC for formal approval.

III. Potential Economic Impact Associated with 15A NCAC 2B .0295 – Alternative Buffer Mitigation Rules

Baseline cost of buffer mitigation – The baseline cost for buffer mitigation was determined by searching the Division of Water Quality's Basinwide Management System (BIMS) database, which tracks buffer impacts and corresponding buffer mitigation requirements. For the purpose of this analysis, the

mitigation requirement for past five year (2006 through 2010) were determined annually and then for an average amount of mitigation over those years (Table 1).

Year	Amount of buffer impact	Amount of buffer mitigation	
	approved	required	
2005 (7/1 to 12/31)	3,192,513	1,320,759	
2006	6,269,646	10,014,325	
2007	4,005,858	585,160	
2008	6,506,069	7,511,487	
2009	4,927,865	1,407,728	
2010 (1/1 to 6/30)	1,439,789	135,617	

 Table 1 – Buffer impacts and mitigation required from 2006 to 2010

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Since the cost of buffer mitigation is established in the rules (for instance in the Neuse basin, 15A NCAC 2B .0242 (7)(a)) at \$0.96 per square foot, this means that the average annual cost of required buffer mitigation from 2006 through 2010 was \$4,027,215.

House Bill 119 makes a change in the provision for requiring buffer mitigation that could affect these calculations. The Bill essentially states that mitigation will not be required for construction of a single family lot adjacent to salt marsh. In order to determine the effect of this provision on the amount of mitigation required, BIMS was searched for all projects in this timeframe (July 2005 thru June 2010) which were adjacent to SA,SB or SC waters which we assume could have salt marsh buffers. A total of 35 projects (from a total of 343 projects adjacent to these waters which required buffer mitigation) were identified which required a total of 40,882 square feet of buffer mitigation. In general, these impacts are relatively small with correspondingly small buffer mitigation requirements. Since this amount is a very small percentage of the total mitigation required over this timeframe (0.2%), the above numbers were not adjusted to reflect the impact of this new law.

The cost derived from Table 1 was used in the following analysis to determine the potential additional cost of other options.

The same timeframe was queried to determine who is providing buffer mitigation across the state. This analysis shows that 54.73% of the buffer mitigation is provided by DOT, 35.48% provided by private development (other than single family residential lots accounted for below), 4.52% by local government, 4.15% by federal government, 1.11% by single family residential lots and 0.01% by state government other than DOT. Therefore the vast majority of buffer mitigation was provided by DOT and the private development sectors.

Additional cost for various provisions in proposed rules

The rules contain three provisions which would apply to all mitigation proposals - Conservation easements, Completion bonds, and Non-wasting endowments for long term operation and

maintenance. Conservation easements are already required on all mitigation sites and completion bonds (or their equivalent) are standard practices for all mitigation sites including buffer mitigation. Therefore these two provisions will have no additional cost compared to the present cost of buffer mitigation.

Non-wasting endowments (or equivalent measures) are becoming more common for a. mitigation sites but are not universally required for buffer mitigation. The purpose of non-wasting endowments is to make certain that funds are available to hire staff to periodically visit sites in the future to make certain that the sites remain as buffers functioning to remove nutrients from urban and rural stormwater runoff. The cost of non-wasting endowments varies from location to location with the level of oversight required so it is very difficult to find one number to represent the cost of the nonwasting endowment. However based on data from sites in California (San Bernadino County ordinance), estimates from the NC Ecosystem Enhancement Program and discussions with private mitigation bankers in North Carolina, an average of no more than about 3% of the overall cost of mitigation seems defensible. Therefore requiring non-wasting endowments (or equivalent measures) could add about \$120,816 annually to the cost of buffer mitigation. The mitigation location and accounting for buffer, nutrient offset, and stream mitigation credit rule changes would apply to all new mitigation proposals.

b. Mitigation Location

Two options are presented in the proposed rules – Option One is for mitigation within the 8 digit HUC and then an approach (Option Two) which would encourage mitigation on the property being impacted with a more favorable mitigation ratio and then allow mitigation in the 12 digit HUC at the present ratio followed by mitigation at a higher ratio in the 8 digit HUC. The first option (mitigation within the 8 digit HUC) is similar to the present process so would have no additional cost. Option Two (on-site or 14 or 8 digit HUC) would only require 75% of the mitigation if it is done on site, the present amount of mitigation would be required in the 12 digit HUC and then 50% more mitigation would be required if the mitigation was in the 8 digit HUC but not in the 12 digit HUC where the impact occurred. Data on the availability of mitigation sites is not readily available so the following analysis is based on Division of Water Quality staff's beliefs based on the review of many buffer projects over many years. On-site mitigation is usually very limited since most streams have existing wooded buffers. In addition, data on the location of impact sites relative to the location of mitigation sites is also very limited. However the small size and relatively large number of 12 digit HUC units (for instance, there are about seventy-five 12 digit HUC's in the Neuse and Tar-Pamlico basins in contrast to the four 8 digit HUC's in those basins) leads to the staff conclusion that mitigation in the 8 digit HUC would still be the norm with a few exceptions of on-site mitigation and mitigation within the 12 digit HUC. Therefore Division staff believe that this option would increase the cost of mitigation around 50% which is the multiplier provided in the rules. Based on the average cost of mitigation outlined above, this option for location of buffer mitigation sites would then cost about \$2,013,607 annually.

c. Accounting for buffer, nutrient offset and stream mitigation credit.

Three options are presented in the proposed rules. These options were developed during a stakeholder meeting held in Raleigh on December 9, 2009. The Division of Water Quality and Ecosystem Enhancement Program staff reviewed these options in January 2011 and estimated the additional cost associated with the options. The cost varied depending on whether stream restoration is needed on any particular site or whether simply planting trees would suffice. For option two, the accounting that would be required by the Division and mitigation providers (including private bankers and the Ecosystem Enhancement Program) would be very complex but possible. The following costs were estimated for each option compared to the present approach that Division of Water Quality staff use. **Option One**- would allow the counting of buffer and stream mitigation credits on a site. Nutrient offset credits and buffer credits could not occur on the same site. Similarly, wetland mitigation credit could not also be counted as buffer or nutrient offset credit. All of these procedures are consistent with the process currently followed by the Division of Water Quality staff so there is no additional cost associated with this option.

Option Two would allow buffer and stream mitigation at the same site if the impact was to both streams and buffers. For instance, an impact from the construction of a road crossing of a stream channel could do mitigation at a stream and buffer mitigation site. However if the impact was to buffers only (for instance for a sewer line that runs parallel to a stream rather than crossing the stream), then mitigation would be at a buffer only site. Any stream mitigation credit associated with that site would not be available for 401 Certification. This option could be more expensive since many buffer mitigation sites also require grading of the landscape to create a stream channel and this cost could not be recovered from the site. The higher cost also reflects the fact that the site costs could not also be used to support stream mitigation credit. Based on Division of Water Quality and Ecosystem Enhancement Program staff estimates of the cost of mitigation and what percent of buffer projects also require channel and 41% for an unstable channel. For the purpose of this analysis, Division staff will use the estimate of a 41% increase in cost.

Option Three would not allow buffer mitigation to occur on sites where stream mitigation credits are generated. This is a rather simple option to track in existing accounting systems but would greatly increase the cost of mitigation. Division of Water Quality and Ecosystem Enhancement Program staff estimate that this option would increase costs by about 41% for stable streams and 99% for unstable streams since any work done on the channel could not be covered without raising mitigation fees. For the purpose of this analysis, Division staff will use the estimate of a 41% increase in cost.

The proposed rules also would create optional methods of buffer mitigation to allow the regulated community greater flexibility and potentially lower cost of compliance. The three categories of methods include non-structural options, structural options, and other options as approved by EMC.

d. Non-structural options:

Coastal Headwater Wetland mitigation – This type of mitigation is somewhat cheaper than standard stream mitigation since less engineering and site manipulation is needed. The

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Ecosystem Enhancement Program has restored about five of these streams while PCS Phosphate has restored about five of these streams. Compared to traditional mitigation, coastal headwater mitigation costs about 10% less according to these sources.

Restoration of buffers along unmapped streams – The cost of this mitigation would be the same as mitigation along mapped streams since the costs of design, land acquisition, planting, stream work, and monitoring would be exactly the same. The advantage of this option is that it would expand the possible number of buffer mitigation sites. However, since the use of the two maps covers about 95% of the stream length, the number of additional sites would be limited.

Preservation of stream buffers along mapped streams – This option would allow mitigation credit at a 10:1 ratio for preservation but would require a 1:1 buffer restoration or enhancement. The practicality of this option varies widely depending on the site but it could be a valuable option for large, private developments that will preserve the remaining streams on a site. In this case, the costs for preservation will be the conservation easement and non-wasting endowment along with the required 1:1 restoration or enhancement. Since the typical weighted mitigation ratio is 2.4:1, this option could reduce the cost of mitigation by 58 % (1 minus 1/2.4) for large developments with sufficient amounts of stream to preserve. This estimate does not consider the costs of conservation easements and non-wasting endowments that would be required for the preservation areas. Division staff estimate that the savings could be less than traditional mitigation in those instances where sufficient amounts of buffers are available for preservation on-site. If sufficient buffers are not available onsite to meet this requirement (for instance for road or utility crossings), then this option would not be useful for the applicant.

For the purpose of this analysis, DWQ staff attempted to estimate the savings for buffer mitigation from preservation. We assume that preservation will only be a viable option for residential developments (since only those developments are likely to contain large amounts of buffers to preserve) and possibly for public projects such as sewer lines and greenway since the municipalities that pursue these projects often own land along streams. Projects such as road crossings and commercial development were not considered as likely to utilize this option since the NC Department of Transportation typically only purchases rights-of-way for the road itself and commercial development typically is on a relatively small parcel which would be unlikely to have significant amounts of streams. From the BIMS database from July 2005 to June 2010 (the same time frame used above), we located the 1) residential subdivision and mixed use projects and 2) water/wastewater and utility projects that required buffer mitigation. This amounted to 107 projects (out of 343 projects) and 1,286,929 square feet of mitigation over this timeframe. We then assumed that this mitigation could be reduced to 1:1 (from a weighted average of 2.4:1) and that the project could satisfy the 10:1 preservation requirement in the proposed rules. There would still be conservation easement and non-wasting endowment costs associated with this preservation which would amount to about an additional 4% (2% for the conservation easement and 2% for the non-wasting endowment) of the total cost according to

EEP staff. These calculations yielded a possible decrease in buffer mitigation cost by the inclusion of the preservation option of \$720,680 or \$144,136 per year, which is reflected in Table 2 below. We did not include any reduced cost for preservation of buffers along unmapped streams since DWQ work has shown about 95% of the jurisdictional streams are already mapped.

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Preservation of stream buffers along unmapped streams –This option would allow the preservation of buffers along unmapped streams at a 5:1 ratio along with 1:1 buffer restoration. This option would again only be useful for applicants with large amounts of unmapped streams on their property which will be a very rare occurrence. Since a smaller number of streams will need to have a conservation easement and non-wasting endowment, the overall cost of this option would only be a little less than the preservation of stream buffers along mapped streams. Based on the cost of conservation easements and non-wasting endowments, Division of Water Quality staff estimate that this option would costless than traditional mitigation but believe it could only rarely be utilized.

Restoration of narrower buffers along urban streams – This option would allow 30 foot wide buffers (rather than 50 foot wide buffers) along urban streams. The cost of the buffers would be 40% less (1 minus 30/60) but this would probably be more than offset by the requirement for on-site stormwater management. This cost will vary tremendously with the site and cannot be generally stated. However, Division of Water Quality staff believe that any savings of buffer planting will be more than offset by the cost for construction of on-site stormwater Best Management Practices. The practical benefit of this option is it would increase the number of potential mitigation sites greatly in urban areas. Overall Division of Water Quality staff believe that this option would not be cheaper than traditional mitigation.

Enhancement of grazing areas – This option would allow grazed areas with scattered trees to be counted as buffer restoration or enhancement at a 2:1 ratio. The cost of this option would be about double the cost of traditional mitigation since the only cost that would not have to be borne by the mitigation would be to lower the cost of planting depending on the site. However this option would again increase the number of potential mitigation sites.

e. Structural options

Structural options allowed by this proposed rule include constructed wetlands, bio-retention facilities, infiltration devices and wet ponds followed by wooded filter strips. The costs of these facilities are (in general) much higher than the simple planting of trees along un-wooded stream channels. For instance, the cost of designing, constructing and operating constructed wetlands can be extremely variable (Hathaway and Hunt 2007, Virginia Water Resources Research Center 2011). It is not clear how large a constructed wetland would have to be to be used in place of planting a wooded buffer along streams since the rules require that the proponent get EMC approval for the calculation method for the particular site. In general, Division of Water Quality staff believe that structural options would likely be more expensive than traditional buffer mitigation but that the exact cost would vary tremendously from

site to site. The main advantage of this option is that it would increase the number of potential mitigation options in locations where options may become limited (such as in urban areas or locations such as Tar-Pamlico 04 where stream densities are naturally low).

Other options as approved by the EMC – This provision in the rule would allow an applicant or mitigation provider to propose another type of buffer mitigation that the Division of Water Quality staff nor the stakeholders have anticipated to date. Since this option is so broad, an estimate of the cost of this option is not possible until the exact option is proposed to the EMC. Presumably an applicant or mitigation provider would only propose a less expensive option when compared to traditional mitigation if traditional mitigation options were still available in a certain area.

Summary of Costs and Benefits for Proposed Rules.

The impacts of various options outlined in the rules are described above. These costs are summarized in Tables 2 through 4 below.

The overall cost and benefit of these flexible buffer mitigation rules will vary across the state depending on construction and land costs as well as the availability of traditional buffer mitigation sites. Perhaps the area of the state where these options will be most useful is in coastal plain locations such as Tar-Pamlico 04. This 8-digit HUC is centered on the Washington, NC area and (as is typical of coastal plain areas) is naturally characterized by few streams. In addition, these streams usually have wooded buffers since the buffer areas are often riparian wetlands and therefore too wet for agriculture. Therefore in this area, locating traditional buffer mitigation sites has become problematic. The availability of these options will provide an expanded list of buffer mitigation possibilities that are needed to compensate for unavoidable buffer impact for important development activities such as roadway improvements.

Item	Description	Percent	Estimated
	of option	increase in cost	additional
			annual cost or
			benefit
Conservation		0%	Zero additional
easement			cost
Completion bonds		0 %	Zero additional
			cost
Non-wasting		3 %	\$ 120,816
endowment			estimated annual
			cost

Table 2 – Summary of Annual Costs of Various Options in the Proposed Rules compared to the 2006 – 2010 Baseline: New Provisions that would apply to all buffer mitigation options

Item	Description of	Percent	Estimated
	option	increase in cost	additional
			annual cost or
			benefit
Mitigation	8 digit HUC	0 %	Zero additional
Location			cost
	On-site followed	Up to 50 %	\$ 2,013,607 of
	by 12 digit HUC	increase	additional
	as standard area		annual cost.
	and 8 digit HUC		
	with multiplier	0.01	7
Accounting for	Option 1 – No	0%	Zero additional
buffer, nutrient	restriction on		cost
offset and	accounting		
mitigation			
credit			
credit			
	Option 2 – align	24-41 %	\$ 966,531-
	impacts with	increase	\$1,651,158 of
	mitigation		additional
			annual cost
	Option 3 – not	41 % increase	\$ 1,651,158 or
	allow buffer and		additional
	stream		annual cost
	mitigation on		
	same area		

Table 4 -	Summary	y of Annua	Costs of Vari	ous Option	s in the Pro	posed Rule	s compared to) the
2006 – 20	10 Baselir	ne: Optiona	al methods of	buffer miti	gation allow	ved in the p	proposed rules	5

Item	Description of option	Percent increase in cost	Estimated additional annual cost or benefit
Non-structural	Coastal	-10%	
options	headwater		10 percent
	stream		cheaper than
	mitigation		current

			methods
	Restoration of	0%	There will be no
	buffers along		additional costs
	unmapped		and more sites
	streams		will be available
			for mitigation.
	Preservation of	NA Less costly	Staff estimate
	buffers along	than traditional	that a savings of
	mapped	mitigation.	approximately
	streams	0	\$144,136 would
			have been
			possible per
			vear if this
			provision had
			been in effect
			since 2005.
	Preservation of	NA The cost	This option will
	buffers along	would be lower -	lower costs but
	unmanned	than traditional	can seldom be
	streams	mitigation	used
	Restoration of	Variable and	Overall cost
	narrower	cannot he	implications will
	huffers along	determined	he site specific
	urban streams	since the higher	but will increase
	ui ball streallis	since the higher	the number of
		required on site	
		stormwator	for mitigation
		stonnwater	ioi miligation
		management	
		affect the lower	
		onset the lower	
		with a narrower	
		buller.	
	Ennancement of	100%	The second second
	grazed areas		This method
			would be
			double the cost
			of traditional
			methods but
			would increase
			the number of
		-	available sites.
Structural	Various options	Cost of	This method is
options	including	structural	more costly but
	constructed	option	will increase the
	wetlands,	substantially	number of
	bioretention,	higher than	mitigation sites.

	and infiltration	standard buffer	
	devices	mitigation.	
Other options		Any such option	
as approved by		would be	NA
the EMC		proposed by	
		applicants or	
		mitigation	
		providers and	
		presumably	
		would only be	
		proposed if it	
		were less	
		expensive than	
		traditional	
		mitigation.	

We need to discuss who will be absorbing the costs. For instance, we could estimate the DOT does 60 percent of mitigation, private sector 30 percent, and local governments 10 percent and then apply our cost estimates in the fashion.

IV. Threshold Decision After Preliminary Rules Evaluation-

The total cost of this rule package depends on the specific options selected by the EMC and the actions of future applications. With certainty, annual costs will increase by \$120,618 for the creation of non-wasting endowments. These costs will be proportional to the number of mitigation credits each project needs to purchase. One action the EMC is considering would be to reduce the mitigation area from an 8-digit HUC to the 12-digit HUC. DENR estimates that this change would increase costs by \$2,013,607. There are three different options for buffer mitigation accounting. If Option One is selected, costs will not increase at all. Selection of Option Two would result in an additional costs between \$966,531 and \$1,651,158 each year. Option Three would be the most costly and result in \$1,651,158 of additional annual costs. These options create a range of annual cost from \$120,618 to \$3,785,383. The following chart depicts the flow of decisions and costs.



DENR is unable to estimate any additional costs that may result from optional mitigation actions because we do not know if application will use these methods, which groups may choose to use them, or the frequency and extent of potential use.

Some of the benefits from these proposed rule changes are quantifiable and other benefits have values that we are unable to estimate. The greatest benefit of these rule changes is that they will give land developers, local governments, and state agencies such as DOT, more ways to perform mitigation and to find acceptable mitigation sites closer to the impacted site. Projects that may not have been possible to develop in the past will now be more feasible. DENR has been able to estimate that if the mitigation along mapped stream method had been allowable in the past, annual benefits would have been \$144,136. In general, these options will provide valuable options for applicants and mitigation providers in situations where traditional mitigation options are scarce or exhausted. In those instances, the provision of these options would allow important development to proceed which otherwise would be prevented from occurring by the lack of compensatory mitigation.

V. Uncertainties in Analysis – The main uncertainly in this analysis is due to the number of options available for particular choices as well as the inherently variable cost of land and practicality of options in particular areas. Once the EMC conducts public hearings and then narrows the options, it will be easier to make a more precise estimate of the cost of these rules.

VI. References

- a. San Bernadino County, CA ordinance. <u>http://www.sbcounty.gov/lafco/Protest_Procedures/3113/20090403_lafco_3113_8.p</u> <u>df</u>.
- b. Hathaway, J and W. Hunt. 2007. Stormwater BMP costs. N.C. State University.

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http://www.bae.ncsu.edu/stormwater/PublicationFiles/DSWC.BMPcosts.2007.pdf

c. Virginia Water Resources Research Center. 2011. Virginia Stormwater BMP Clearinghouse. <u>http://vwrrc.vt.edu/swc/BMPCosts.html</u>