WATERSHED AUDIT

IDENTIFICATION & CORRECTION OF SEDIMENT POLLUTION SOURCES WITHIN THE CUCKOLD CREEK WATERSHED

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SUMMARY

In the Cuckold Creek watershed mud pollution is primarily a result of excessive soil erosion occurring on construction sites, cropland, and in gullies. Mud pollution threatens the important and sensitive aquatic organisms inhabiting Cuckold Creek and its tributaries. It can also lower the value of homes located within 2,000 feet of the creek by 11%.

In an effort to curb the impact of current and future mud pollution, the Potomac River Association formed a partnership with those who live along the creek and elsewhere in the watershed. Through this partnership a plan was drafted for identifying and correcting existing sources of mud pollution. Work completed thus far under this plan will eliminate the first and third largest sources of mud pollution in the watershed. But future growth could easily undo these successes.

At this point in time there are 14 proposed development sites located within the Cuckold Creek watershed. Without greater care than has been exercised in the past each of these projects could severely damage the Creek. Fortunately there are a number of steps which can be taken that will not only prevent harmful effects, but could actually use future growth as a tool to curb current sources of mud pollution.

It would be a mistake to assume that mud pollution prevention measures will be fully implemented. In fact, the experience with current and past development argues against this assumption. Nevertheless, there are excellent examples of how a mobilized citizen constituency has provided government with the support needed to fully protect a sensitive aquatic resource such as Cuckold Creek. In other words, the future of the creek depends upon the actions of those who treasure this unique waterway.

INTRODUCTION

In July, 1994, the Potomac River Association (PRA) retained Community & Environmental Defense Services (CEDS) to prepare an assessment of the impact of existing and future land use upon the quality of the 57 tidal creeks and rivers located in Saint Mary's County, Maryland. This effort was funded through a grant from The A.S. Abell Foundation and other sources. The product was a 203-page report entitled *Opportunities to Preserve & Enhance the Quality of the Saint Mary's River and the County's Tidal Creeks*. While the report showed that future development could have a devastating impact upon the County's tidal waterways, it also showed that alternative management policies would accommodate the need for growth while minimizing adverse environmental effects. In many cases, growth could actually improve water quality.

The Association recognized that implementing the alternative growth management policies would require some rather substantial changes. Bringing these changes about would necessitate dramatic shifts in the development review process administered by the Saint Mary's County Department of Planning & Zoning. Rather than calling for immediate implementation of the policies countywide, the Association opted for a more gradual and focused approach.

Cuckold Creek, one of five waterways addressed in detail in the report, was selected as the testing ground for the alternative growth management policies. This is one of the highest quality tidal creeks in the County. The 7.5-square mile watershed of the creek is also slated for a considerable amount of growth. The creek also benefits from an active constituency which has been working for many years to preserve its quality. These factors prompted the Association to focus its efforts on Cuckold Creek.

Beginning on June 20, 1995, a series of meetings were held at Hollywood Elementary School. Every resident of the Cuckold Creek watershed was invited to the meetings. Approximately 10% of all watershed residents attended the first meeting. This tremendous showing of interest clearly demonstrated widespread public concern about the future of the creek.

After reviewing what was known about the values and problems of Cuckold Creek, the Association asked the watershed residents to consider what specific issues were of greatest concern. To facilitate this process a questionnaire was circulated to all those in attendance as well as to those who could not make the first meeting. During subsequent meetings the residents reviewed the responses to the questionnaire. Eventually the residents decided to focus upon mud pollution as the principle issue of concern. They felt that this issue impaired the quality of Cuckold Creek more so than any other.

The Association directed CEDS to develop a plan for identifying and correcting mud pollution sources impacting Cuckold Creek. The CEDS plan was set forth in a letter to Erik Jansson, president of the Potomac River Association, dated February 15, 1996. The plan consisted on 14 specific actions and was funded through another grant from The A.S. Abell Foundation. The plan focused on the watershed of two tributaries to Cuckold Creek. One of the tributaries is known as Back Creek and the other is unnamed. The location of both watersheds is shown in Figure 1.

The results of the 14 actions are set forth in this report. But before getting into the findings it would be helpful to review why mud pollution is such a concern to those who treasure Cuckold Creek

WHY MUD POLLUTION IS A PROBLEM

Mud pollution occurs when eroded soil or other sediment particles enter a waterway in quantities injurious to aquatic life and other values. Mud pollution is primarily a product of excessive soil erosion, but it can also be caused by any other factor which increases the quantity of particles suspended in a waterway or the rate at which these particles accumulate upon the bottom.

Mud pollution has been cited as a primary factor in the decline of a number of important living resources inhabiting the Chesapeake Bay system. Living resources impacted by mud pollution include submerged aquatic vegetation, oysters, shad, herring, perch, striped bass, and others.[1] Mud pollution also robs boating channels of depth.

Weems Creek, located in Annapolis, provides a startling example of the harm mud pollution can do. In the mid 1980's U.S. Route 50/301 was upgraded where it crossed the headwaters of Weems Creek. Poor erosion and sediment control on the highway construction site allowed thousands of tons of mud to enter the creek. Channels which formally had six feet of depth were reduced to just a few inches of water.

[1] Funderburk, S.L., S.J. Jordan, J.A. Mihursky, and D. Riley, 1991. *Habitat requirements for Chesapeake Bay living resources.* Chesapeake Bay Program, U.S. Environmental Protection Agency, 401 Severn Avenue, Annapolis, MD 21401.

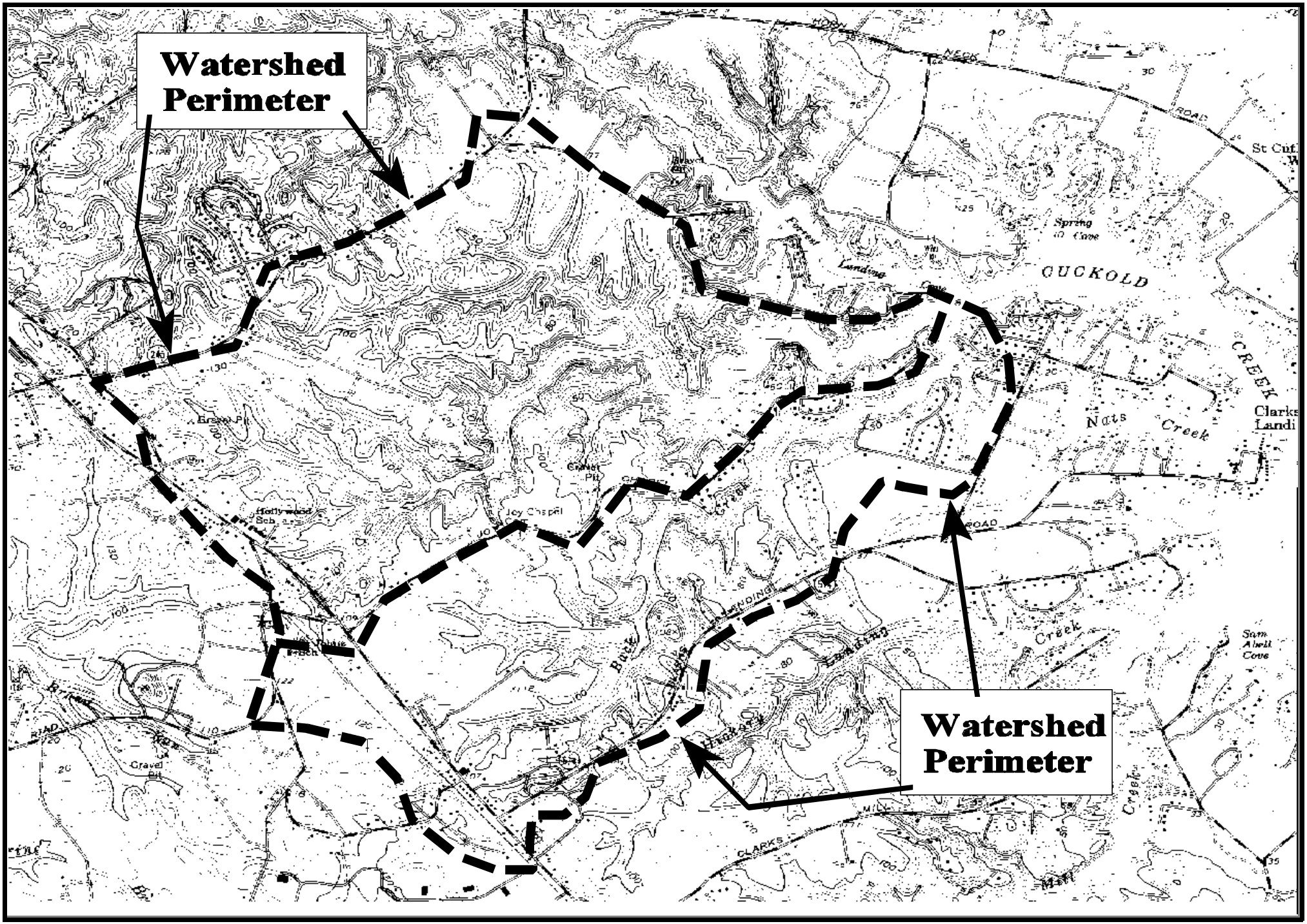

Figure 1: Watershed of the Tributaries to Cuckold Creek

Homes located near a high quality waterway, such as Cuckold Creek and its tidal tributaries, enjoy enhanced value. But mud pollution can cause a dramatic decline in the value of these properties.

A recent study by the National Association of Home Builders found that homes located within 300 feet of a waterway sell for 28% more than comparable homes located elsewhere.[2] The Maryland Department of Economic & Employment Development found that homes located within 2,000 feet of the Chesapeake Bay were worth $50,000 more than other homes.[3] Many of the virtues which increase the value of homes located near the Bay likely apply to properties located within view of Cuckold Creek and its tributaries.

While proximity to a high quality waterway adds to property value, homes located near a polluted waterway suffer a loss. If a waterway is noticeably "polluted" then the value of nearby homes will decline by 11%.[4] Mud pollution is very noticeable. It imparts a cloudiness to a waterway which is obvious long after the last rain has occurred. If mud pollution is severe, as in the case of Weems Creek, then the economic impact can far exceed an 11% decline in property value.

CURRENT SOURCES OF MUD POLLUTION IN THE CUCKOLD CREEK WATERSHED

Though soil erosion occurs on all lands, not all lands are sources of mud pollution. The soil erosion occurring in forests and on pasture land is generally low enough that no significant harm is done.[5] In fact, this "natural" rate of soil erosion is essential to preserving the overall integrity of aquatic systems.

Studies conducted in Maryland and elsewhere have shown that, in general, only cropland, timber harvesting sites, construction sites, and mining sites release sufficient eroded soil to cause mud pollution.[5] The soil erosion occurring on well-managed cropland does not appear to cause a significant impact, but cropland under conventional tillage or located upon steep or highly-erodible soils can release sufficient eroded soil to cause mud pollution. It is also possible to apply control measures to timber harvesting, construction, and mining sites which will eliminate much of the adverse effects of mud pollution. But it would be a mistake to assume that these measures are effectively applied at all sites.

In Table 1a and 1b, a comparison is provided of the various land uses within the watershed of the two tributaries to Cuckold Creek.

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[2] *Location, Neighborhood Most Important Factors When Buying A Home*, Housing News Service, National Housing Center, 1201 15th Street, N.W., Washington, D.C. 20005-2800.

[3] *Economic Importance of the Chesapeake Bay*, Office of Research, Maryland Department of Economic & Employment Development, 217 East Redwood Street, Baltimore, MD 21202.

[4] *The effects of San Francisco Bay water quality on adjacent property values*, Journal of Environmental Management, 27:263-274.

[5] *Effects of sediment pollution upon the aquatic environment*, Klein, R.D., Maryland Tidewater Administration, Tawes State Office Building, Annapolis, MD 21401.

Construction
Table 1a, shows that one land use, construction, accounted for 59% of the soil erosion occurring within the watershed of Back Creek. When CEDS encountered the 3-acre construction site, which is located off of Clarks Landing Road, we found a lack of erosion and sediment control measures. CEDS reported this violation to the Maryland Department of the Environment (MDE). After investigating the complaint, MDE issued a warning to the owner of the site and directed the immediate application of a number of control measures. These measures were applied shortly there after and reduced the soil erosion and mud pollution rate from the site by approximately 90% to 95%. The rate of soil erosion occurring on the site is probably no longer pollutional, though it remains far higher than the rate for forest and other land uses.[5] By winning corrective action on this construction site, the Association has eliminated the largest single source of mud pollution in the Back Creek watershed.

Cropland
Both Table 1a and Table 1b shows that cropland is the dominant source of eroded soil after construction. In the watershed of the unnamed stream cropland accounts for 12% of the land area and 93% of the soil erosion. Much of the soil in the two watersheds is located on soils considered highly susceptible to erosive forces. Since most of the watershed soils are highly erodible much of the cropland is also located on highly erodible soils. In fact, 78% of the croplands are on highly erodible soils *(see Table 2)*.

A number of options are available for minimizing soil loss from cropland. One of these options involves the method used to till the soil. Conventional tillage methods result in substantial disturbance of the soil and leaves little residue on the surface, both of which increases the erosion rate. Conservation tillage methods require minimal disturbance and tend to leave substantial amounts of crop residue and other plant parts on the soil. Conservation tillage methods can reduce soil erosion by up to two-thirds when compared to conventional tillage. About 40% of the cropland in the Cuckold Creek watershed benefits from conservation tillage.

Another option that must be considered is to take cropland out of production if it is located on highly-erodible soils. Converting cropland to hay, residential lots, or pasture would reduce the erosion rate by 50 times. Allowing cropland to revert to forest would slash the erosion rate by more than 300 times!

The Association should meet with the District Conservationist for the Saint Mary's Natural Resources Conservation District to explore options for shifting more cropland to conservation tillage and taking highly-erodible soils out of crop production. The Association will likely learn that the District has embarked on a long term plan for achieving this goal, but that it will take a number of years to fully implement. By lobbying for better funding of the District, the Association could accelerate implementation of the plan.

Gullies
Next to construction and cropland, gullies are the most significant source of mud pollution in the watershed. CEDS surveyed both watersheds in search of active gullies. During the survey we

Table 1a: Soil Erosion in the Back Creek Watershed

Land Use	Area Occupied By Land Use		Average Soil Erosion Rate (tons/acre/year)	Total Annual Erosion Per Land Use (tons/year)	Percent of Total Erosion
	Acres	Percent of Watershed			
Forest	465	52.2%	0.03	13.44	0.90%
Meadow	39	4.4%	0.08	3.11	0.21%
Cropland	172	19.3%	3.06	526.32	35.37%
Residential	199	22.3%	0.07	14.30	0.96%
School/Church	11	1.2%	0.06	0.70	0.05%
Commercial	2	0.2%	0.05	0.10	0.01%
Construction *Before Control*	3	0.3%	293.34	880.02	59.14%
After Control	3	0.3%	14.67	44.01	6.75%
Mining	1	0.1%	0.00	0.00	0.00%
SWM Pond Gully [1]	0.02	0.0%		50.00	3.36%
TOTAL *Before Control*	891			1,487.99	
After Control				651.98	

1. This is the gully which has formed below the Storm Water Management (SWM) pond serving Hollywood Elementary School.

Table 1b: Soil Erosion in the Watershed of the Unnamed Stream

Land Use	Area Occupied By Land Use		Average Soil Erosion Rate (tons/acre/year)	Total Annual Erosion Per Land Use (tons/year)	Percent of Total Erosion
	Acres	Percent of Watershed			
Forest	939	75.7%	0.03	27.14	5.14%
Meadow	30	2.4%	0.08	2.40	0.45%
Cropland	148	11.9%	3.31	489.88	92.85%
Residential	107	8.6%	0.07	7.69	1.46%
School/Church	3	0.2%	0.06	0.19	0.04%
Commercial	6	0.5%	0.05	0.29	0.05%
Construction	0	0.0%	293.34	0.00	0.00%
Mining	7	0.6%	0.00	0.00	0.00%
TOTAL	1,240			527.58	

Table 2: Cropland Erosion In The Watershed of Back Creek & the Unnamed Stream

Map Symbol	Soil Name	Average Slope	Length/ Slope Factor [1]	Erodibility Factor [2]	Soil Erosion Rate [3] (tons/ acre/year)	Acres of Cropland on Each Soil in the Watershed of...		Total Cropland Soil Erosion (tons/year)	Percent of Total Cropland Soil Erosion	Total Soil Erosion With All Cropland In Conservation Tillage
						Back Creek	Unnamed Stream			
Aa	Alluvial land	1%	0.16	0.37	0.65	4.6		3	0	0.98
BlA	Beltsville silt loam	1%	0.16	0.43	0.75		10.4	7.8	0.7	2.58
BlB2	Beltsville silt loam	3.5%	0.58	0.43	2.74	57.3	39.0	263.3	25.8	86.64
BlB3	Beltsville silt loam	3.5%	0.58	0.43	2.74	3.9		10.6	1.0	3.51
BlC2	Beltsville silt loam	7.5%	1.40	0.43	6.60	6.5	2.6	60.0	5.9	19.76
BlC3	Beltsville silt loam	7.5%	1.40	0.43	6.60	2.2	3.9	40.2	3.9	13.25
ChA	Chillum loam	1%	0.16	0.43	0.75	11.7	1.0	9.5	0.9	3.15
ChB2	Chillum loam	4%	0.67	0.43	3.16	44.2	3.9	151.9	14.9	49.99
ChC3	Chillum loam	9%	1.72	0.43	8.11	1.6	2.2	30.8	3.0	10.14
CrC2	Croom gravelly sandy loam	9%	1.72	0.43	8.11	2		16.2	1.5	5.34
CrD3	Croom gravelly sandy loam	12.5%	2.77	0.43	13.06		5.9	77.0	7.5	25.35
EvC	Evesboro loamy sand	11.5%	2.45	0.17	4.57		9.1	41.5	4.0	13.67
EwC2	Evesboro-Westphalia	9%	1.72	0.49	9.24		4.6	42.5	4.1	13.99
KrA	Keyport silt loam	1%	0.16	0.43	0.75	2.1		1.5	0.1	0.52
MnB2	Matapeake silt loam	3.5%	0.58	0.49	3.12	22.1	16.9	121.5	11.9	39.98
MuB2	Mattapex silt loam	1%	0.16	0.43	0.75			0.0	0.0	0.00
SaB2	Sassafras sandy loam	3.5%	0.58	0.28	1.78	3.0	44.1	83.8	8.2	27.59
SaC2	Sassafras sandy loam	7.5%	1.40	0.28	4.30		2.0	8.6	0.8	2.83
SaC3	Sassafras sandy loam	7.5%	1.40	0.28	4.30	10.8		46.4	4.5	15.27
SfA	Sassafras loam	1%	0.16	0.28	0.49		2.6	1.2	0.1	0.42
					Total	172	148.2	1018.3	100.0	334.97

1. The Length/Slope Factor was determined from the table headed "Cropland: Moderate Ratio of Rill to Interrill Erosion", presented on page 2, Section I-D, Erosion Prediction, in the *Revised Universal Soil Loss Equation - Maryland Technical Guide*, March 1995, published by the USDA Natural Resources Conservation Service.
2. The erodibility factor for each soil was obtained from a table headed "Physical and Chemical Properties of the Soils - St. Mary's County, MD Survey Area", dated 3/15/95.
3. A Cover (C) Factor of 0.152 was used and assumed all cropfields are in a five-year rotation consisting of 2 years corn, 1 year small grains, and 2 years soybeans. It was also assumed that 40% of the cropland is in no-till and 60% in clean tillage. A Practice (P) Factor of 0.37 was used assuming all cropfields are in field strip-cropping.

attempted to examine all areas where gullying was most likely to occur. These areas include cropland and developed land abutting steep, highly-erodible slopes.

The Cuckold Creek watershed contains two soils which are uniquely susceptible to erosion - Matapeake and the Evesboro/Westphalia complex. Both soils tend to occur on steep slopes below flatter hilltops and ridges. Converting forest on the hilltops and ridges to cropland increases the amount of runoff flowing onto the steep, highly-erodible soils. This causes gullying. Converting the cropland to intensively developed lands causes a further increase runoff and, therefore, increased gullying. Gullying can also be caused by collecting runoff from a large area and concentrating the flow onto highly-erodible soils.

During the survey of the two watersheds, CEDS identified ten active gullies. An *active* gully is defined as an area in which erosion is occurring at a rapid pace and is evidenced by exposed soils, recent slumping of trees into the gully, along with other indicators. An *inactive* gully tends to be covered with leaves, moss, or other vegetation and may have trees growing from within its relatively gently sloping sides.

Of the 10 gullies, four drain cropfields, five drain developed lands or roadways, and one drains a gravel pit. The length, width, and depth of the gullies average about 60 feet by 6 feet by 4 feet. The volume of soil eroded from the ten gullies totals 22,510 cubic feet or about 1,100 tons. If this volume of soil were all delivered to and deposited within the two branches of Cuckold Creek adjoining Joy Chapel Road, then it would reduce the water depth by about a tenth of an inch.

The largest and most active gully is located below the stormwater management pond serving the new Hollywood Elementary School located on Joy Chapel Road. On April 18, 1996, CEDS met with school officials and the District Conservationist for the USDA Natural Resources Conservation Service to identify options for correcting the gullying. The school is now considering modifications to the pond which will halt the gullying. These modifications will reduce the rate at which stormwater runoff is released from the pond. This action should drop the rate of runoff release below that which will cause erosion. The District Conservationist has observed that gullies tend to stabilize once erosive velocities are eliminated. The school will also begin monitoring two other gullies located on the campus to determine just how rapidly they are eroding.

Once the pond modifications are completed the third largest single source of mud pollution in the Back Creek watershed will be eliminated.

Mining

CEDS identified five mining sites within the two watersheds. Only one of the five sites is being actively mined. Four of the five gravel pits are clearly self-contained. In other words, water can only exit the pits by soaking into the very sandy and gravelly soils on the pit bottom. Furthermore, two of the four self-contained pits have completely reverted to forest with no soil exposed to erosive forces.

The one pit which may be a problem is located to the northeast of Joy Chapel. There are about two acres of exposed soil at this site. Although one can trace the path that surface runoff would follow to transport eroded soil from the site, there is very little evidence that significant quantities of sediment have washed from the site. There are at least two explanations for this. First, that the sandy-gravelly soils of the area are so permeable that it is rare for surface runoff to occur. Without surface runoff, erosion and sediment transport cannot take place. The second possible

explanation is that when a rare, severe storm occurs runoff leaves the site so rapidly that most of the eroded soil is transported far downstream and, thus, leaving little evidence that material is washing from the site.

Regardless of which explanation is correct, it is in the best interest of Cuckold Creek to stabilize the exposed soil located on the mining site. The Association should contact the owner of the site, which is the MIMA Partnership, and explore their interest in voluntarily stabilizing the site. I believe the District Conservationist and/or the Maryland Department of the Environment (MDE) would provide technical assistance. If the owner refuses to take the necessary action, then I believe MDE also has the authority to force corrective action.

Other Mud Pollution Sources

There are several other potential sources of mud pollution which were not listed in Table 1a and 1b. These sources include timber harvesting sites and the numerous trails located throughout the two watersheds.

During the survey of the watersheds CEDS did encounter several recent timber harvesting sites. Erosion was not a problem at any of these logging sites.

Much of the 20 miles covered during the survey was on horse/hiker/ORV trails. Erosion was significant on perhaps 400 feet of three trails.

The first trail is located on the campus of Hollywood Elementary School and is near the stormwater management pond. I understand the school is exploring options for stabilizing the trail.

The other two eroded trails are located along the east side of Back Creek, opposite Hollywood Elementary School. Both of these trails appear to have been made by off road vehicles (ORVs). The Association should contact those who own the property on which these two trails are located and explore their interest in stabilizing the trails. I believe simply discontinuing ORV use of the trails is all that is needed to achieve stabilization.

FUTURE SOURCES OF MUD POLLUTION

Land development poses the greatest potential for causing additional mud pollution in the Cuckold Creek watershed. But future development also offers an opportunity to shift current sources of mud pollution, such as cropland located on highly erodible soils, to more benign land uses.

CEDS requested a listing from the Saint Mary's County Department of Planning & Zoning of proposed development projects located in the Cuckold Creek watershed. Table 3, provides a summary of the 14 projects identified by the Department. On April 15, 1996, CEDS visited the offices of the Department of Planning & Zoning to review the file compiled for most of the 14 projects.

Table 3: Proposed Development Projects Located in the Cuckold Creek Watershed

Project Name	Project Description	Location on Tax Maps		
		Page	Block	Parcel
Markle/Smith Subdivision	Two lots	27	21	171
P.H. Scriber Subdivision	One lot	27	13	476
The Neck Subdivision	Resubdivision of one lot	27	13	877
Bowling Subdivision	Six lots	27	4	29
Nicholas J. Smith Subdivision	Two farmsteads	27	16	139
Resurrection Manor	Three lots	27	22	523
Breezy Acres Estates	Three lots	27	22	346
Shanti II Medical Facility	29 acre commercial project	27	19	421
Phillip E. Clarke Estate	Five lots	27	12	159
Angela D. Jones Subdivision	Two lots	27	12	369
Hollywood Business Center	34 acre commercial project	27	19	431
Page Subdivision	Three lots	27	23	884/885
Carter Manor	Four lots	27	3	879/473
MIMA Partnership	153 acres	27	14	435

Table 4: Soil Erosion on the 153-Acre Proposed Development Site

Soil Name	Map Symbol	Acres On Site Presently in...		Average Slope	Length/ Slope Factor	Erodibility Factor	Soil Erosion Rate (tons/acre/year)			Subtotal for Current Soil Erosion (tons/year)		Total Current Soil Erosion (tons/year)
		Forest	Cropland				Forest	Cropland	Construction	Forest	Cropland	
Bibb silt loam	Bm	15.1		0%	0.05	0.28	0.0014	0.1	2.7	0.02	0	0.02
Evesboro-Westphalia complex	EwE2	57.3	1.3	32.5%	6.83	0.49	0.3263	36.7	652.6	18.69	47.71	66.41
Matapeake fine sandy loam	MmB2		2.9	3.5%	0.58	0.37	0.0209	2.3	41.8	0.00	6.82	6.82
Matapeake silt loam	MnB2		15.9	3.5%	0.58	0.49	0.0277	3.1	55.4	0.00	49.55	49.55
Matapeake silt loam	MnC3	1.0	0.7	7.5%	1.40	0.49	0.0669	7.5	133.7	0.06	5.26	5.33
Mattapex silt loam	MuB2		30.2	3.5%	0.58	0.43	0.0243	2.7	48.6	0.00	82.60	82.60
Sassafras sandy loam	SaB2		2.6	3.5%	0.58	0.28	0.0158	1.7	31.6	0.00	4.63	4.63
Sassafras sandy loam	SaC2	23.7		7.5%	1.40	0.28	0.0382	4.2	76.4	0.90	0	0.90
Sassafras sandy loam	SaC3		2.6	7.5%	1.40	0.28	0.0382	4.2	76.4	0.00	11.17	11.17
		97.1	56.2							19.7	207.8	227.5

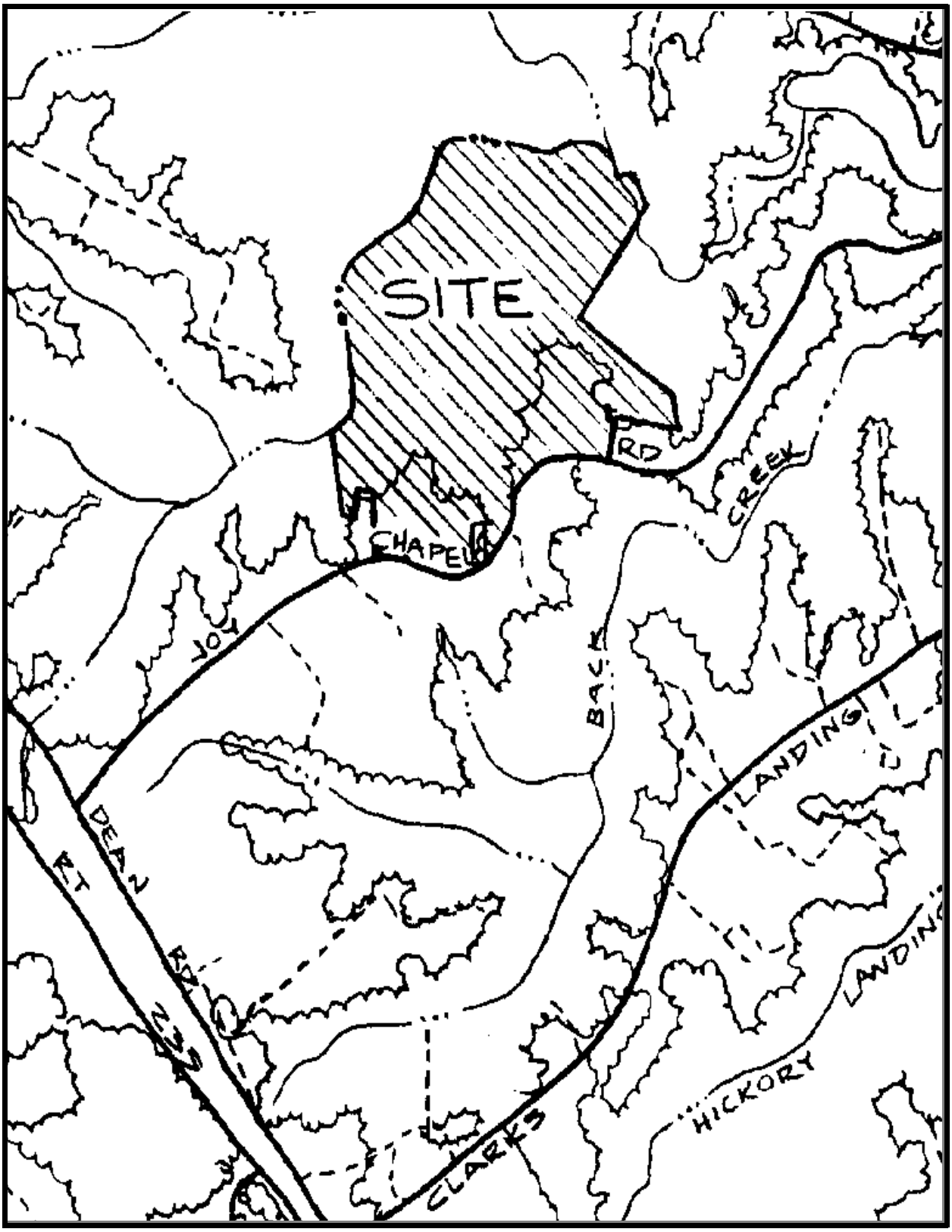


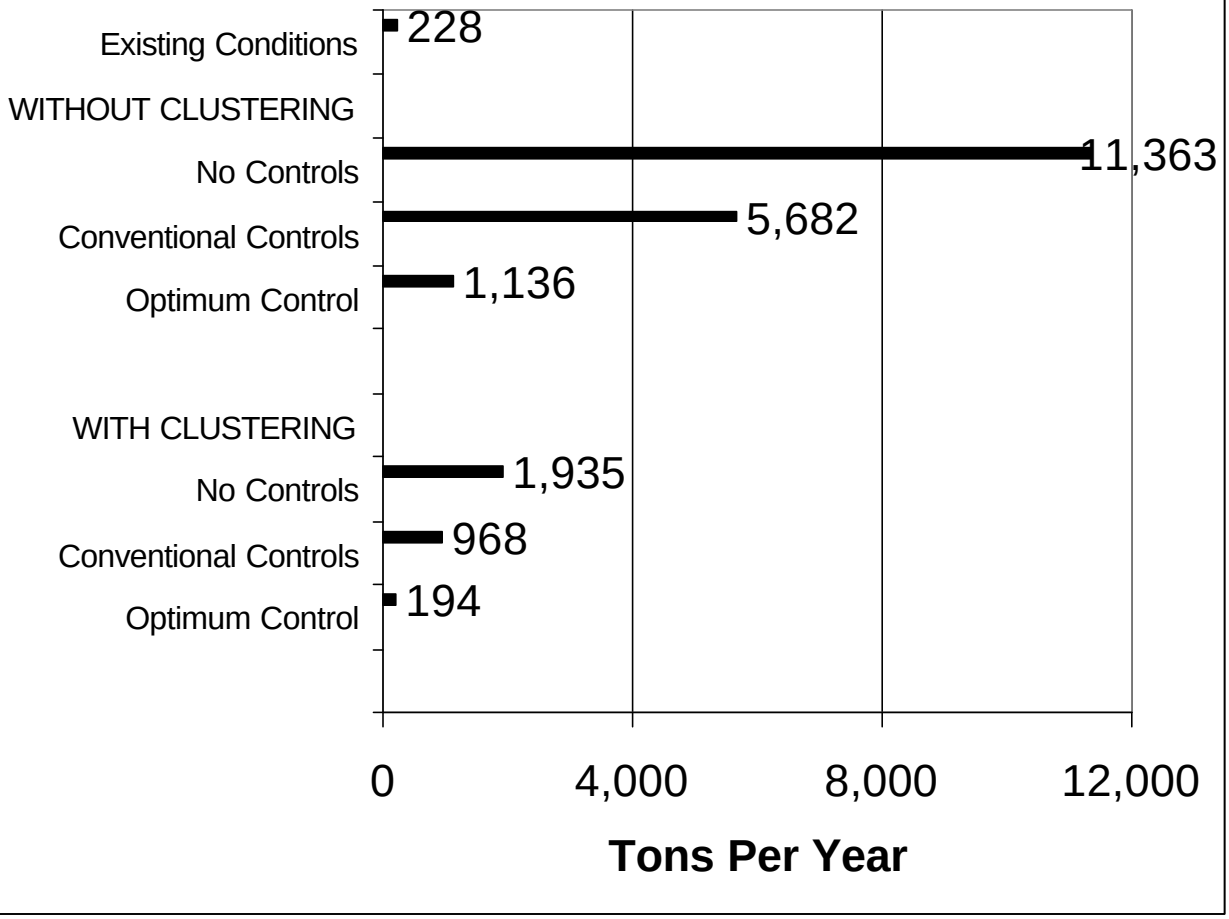
Figure 2: Location of the 153-Acre Site

Table 5: Soil Erosion Resulting From Various Options for Developing the 153-Acre Site

Option	Total Soil Erosion (tons/year)
Present conditions	227.5
Conventional Development of Site: 51 2.1-acre lots; 50% of forest removed; all existing cropfields developed; no stormwater management.	
Construction Phase with No Control	11,363.0
With Conventional Control [1]	5,681.5
With Optimum Control [2]	1,136.3
Post-Construction	40.0
Cluster Development of Site: 51 half-acre lots clustered on 29 acres located on least erodible soils; 23.7 acres of forest removed during construction phase, but then 48-acres of cropland allowed to revert to forest once development is completed for a net increase in woodland of 31 acres when compared to current conditions; stormwater management would be required.	
Construction Phase with No Control	1,935.4
With Conventional Control [1]	967.7
With Optimum Control [2]	193.5
Post-Construction	25.4

1. Conventional control measures include silt fence and sediment traps which retain an average of 50% of the eroded soil on the construction site.
2. Optimum control measures include protecting exposed soil with a thick layer of straw mulch and or seeding with grass. These measures reduce soil erosion by 90% to 95%.

Figue 3: Soil Erosion Resulting from Various Options for Developing the 153-Acre Site



These 14 projects range from a single residential lot to a 34-acre office complex to a 153-acre residential subdivision. All of these projects could create a substantial amount of mud pollution. After all, the 3-acre construction site presented in Table 1a, is a single residential lot. This one lot accounted for more than half the potential mud pollution in the watershed. If a single, 3-acre site could pose such a massive threat to the creek, then the potential impact of 14 projects of equal or far greater size is staggering.

153-Acre Site

The project which poses the greatest potential mud pollution impact is the 153-acre site owned by the MIMA Partnership. This site is located on Joy Chapel Road opposite Joy Chapel and Hollywood Elementary School *(see Figure 2)*.

The only document contained in the County's file for this site was a tentative assessment of environmental constraints on the development of the site. The owner may be seeking an opinion on these constraints so a determination can be made of the development potential. There was no indication of the type of development MIMA Partnership is considering. The proposed Hollywood Business Center is also located on property owned by MIMA Partnership. The Business Center site is located about a half-mile away at Joy Chapel Road and Old Three Notches Road.

The 153-acre site will be used to illustrate the options open to the Association in their effort to minimize the mud pollution caused by future development in the Cuckold Creek watershed. For the purposes of this illustration it will be assumed MIMA Partnership hopes to develop the site as a residential subdivision. The site is zoned Rural Preservation District (RPD) and may be subdivided into one lot for every three acres. Thus the maximum number of lots permitted on the 153-acre site would be 51.

Table 4, lists the nine soils which occur on the site. About two-thirds of the soils are in forest and most of the remainder is in cropland, with the exception of the two-acre mining site described above. The table shows that the soil erosion rate on the 153-acre site is presently 227.5 tons per year, 91% of which comes from the third of the site that is in crop production.

Table 5, provides a comparison of the effects of two options for developing the site - a conventional option versus a clustered subdivision. The effect of these options are graphically depicted in Figure 3.

Conventional Development Option: Forest conservation requirements would likely prevent the removal of more than 50% of the 97 acres of forest located on the site. The forest retained would likely be that located in the wetland soils (Bibb) and on the steeper slopes (Evesboro-Westphalia soils). If the 51 lots each had an area of more than two-acres the project would likely be exempt from stormwater management requirements.

Table 5 and Figure 3, shows four different scenarios under the conventional development option. The first scenario presumes that erosion and sediment control measures would not be applied to the site during the construction phase. Though this happened on the three-acre construction site on Clarks Landing Road, it is unlikely that control would be totally lacking on the 153-acre site. It is far more probable that conventional sediment trapping measures would be applied. Yet even with these conventional measures the annual erosion rate would rise from the

current level of 227.5 tons per year to 5,681.5 tons per year - an increase of 25 times. The use of straw mulching, seeding with grass, and other optimum control measures would reduce the soil loss to 1,136.3 tons per year; a rather dramatic decrease. Once the site is fully developed and the cropfields are taken out of production, the erosion rate would drop to 40 tons per year versus the current 227.5 tons per year - a decrease of 82%!

Clustered Development Option: This option would confine the 51 lots to just 29 acres. The clustered lots would be located on soils with a low erosion potential. These soils (Sassafras) are also located about 700 feet from Joy Chapel Road. Thus it may be possible to screen the lots from the view of those traveling Joy Chapel Road. Instead of removing nearly 50 acres of forest only 24 acres would be felled. But once development is completed and the cropfields are allowed to revert to woodland, the area of forest on the site would increase by 31 acres when compared to current conditions.

With optimum control measures construction phase mud pollution would be about one-tenth of that occurring during conventional development of the site. Once development is completed the erosion rate would be just 25 tons per year, or 37% lower than in the conventional scenario and 89% lower than the current erosion rate on the 153-acre tract.

One caveat must be noted with regard to erosion on the site if it is developed. If the developed areas are served by a stormwater management facility, then it is vitally important that the designer and County review officials take into consideration the potential for gullying. The stormwater facilities must be designed to release runoff at non-erosive velocities. Normal design practice would only dictate releasing runoff at the rate it presently flows from the site. It is likely that the rate of release from the existing cropfields on the site is erosive. To effectively control erosion runoff should be released at the rate associated with forest, not cropland. The Association should urge the Saint Mary's County Department of Public Works and the Department of Planning & Zoning to adopt this design criteria for all future stormwater facilities discharging to highly erodible soils.

There are a number of other options available to the Association for reducing mud pollution from the 153-acre site. The clustering approach presented above is just one of the options. Following are some of the other alternatives the Association may wish to consider.

A. Preserve the 153-acre site in its current condition and seek to reduce mud pollution by converting cropland to more benign land uses. Preservation may be achieved through acquisition as parkland, the County's transferrable development rights program, or other mechanisms.

B. Seek to reduce the number of lots that may be created on the site. This may be achieved by working voluntarily with the applicant or by convincing the County Planning Commission or the County Commissioner's to limit the number of lots.

C. Attempt to block any development of the site by opposing the approvals the owner needs from the County.

Of these three options B is the most viable. If the owner believes that a reduction in the number of lots would eliminate opposition, then they may be willing to agree to this. If they do not agree, then the Association must convince the Planning Commission or the County Commissioners to impose a restriction on the number of lots. This approach will likely cost a minimum of $5,000 in legal fees and other expenses. Ultimately the cost could run as high as $20,000 to $50,000. These

same costs would apply to option C. Option A is the least likely. Preservation funds are extremely limited and are directed to those tracts with values far more significant than those of the 153-acre site.

CEDS views the clustering option as the most likely path for minimizing mud pollution from the 153-acre site. We urge the Association to meet with MIMA Partnership to explore their interest in pursuing this option. If they refuse to consider this very reasonable option, then I believe the Association stands a good chance of convincing County officials to impose clustering.

Hollywood Business Center

Next to the 153-acre site, the largest proposed development project in the Cuckold Creek watershed is the Hollywood Business Center. This 34-acre site is also owned by the MIMA Partnership. This site is located on highly erodible soils, though the erosion hazard is a bit less severe when compared to the 153-acre site. Initial plans for the project show a stormwater management pond. It is imperative that the pond be designed to prevent erosive velocities. If the MIMA Partnership is open to working with the Association on the 153-acre site, then the Association should request an opportunity to review a complete set of plans for the Hollywood Business Center. Recommendations may then emerge for minimizing the impact of developing the site.

Other Proposed Development Projects

In addition to the 153-acre site and the Hollywood Business Center, Table 3 lists 12 other proposed development projects. The Association should contact the owners of each of these projects and request an opportunity to work with them in minimizing mud pollution. The Association should begin with the largest sites and those located on the most erodible soils. In general, the following recommendations will minimize mud pollution.

A. Direct growth to the least erodible soils on the site.

B. Allow the most erodible soils on the site to remain in or revert to forest.

C. Design stormwater management facilities to release runoff at non-erosive velocities.

D. To the maximum extent possible, minimize the amount of time that soil is exposed to erosive forces during the construction phase. Plan site development so initial clearance and rough grading is quickly completed, then stabilize all areas of exposed soil with straw mulch or mulch and grass seed.

E. Avoid initial clearance of the site between October and March when runoff is greatest and it is most difficult to apply mulch and seed.

Public Notice & Public Participation In The Development Review Process

When compared to other Maryland jurisdictions, the development review process in Saint Mary's County is not very citizen friendly. It is difficult for citizens to learn of proposed development projects. And even if citizens do hear about a project they lack sufficient time to consider the proposal and a reasonable means for influencing decision-making on the proposal.

In Saint Mary's County public notice for routine subdivision proposals is limited to a newspaper announcement one week prior to the date on which the Planning Commission will consider the project. It is unlikely that those living near the site and other affected parties will

catch the notice in the newspaper. One week is a ridiculously short period of time for citizens to review project plans, research impacts, then prepare logical arguments for presentation to the Planning Commission. If the Planning Commission approves the project over citizen objections, then the only recourse is to file an appeal to the County Commissioners.

Public notice for other (non-routine) projects is far better. If a subdivision requires a Conditional Use Permit, a variance, or some similar action, then the Planning Commission must hold a hearing on the project. A sign is posted on the site announcing the date, time, place, and purpose of the hearing and all adjoining property owners receive a letter of notification. Plus an advertisement appears twice in the newspaper. These notifications begin at least three weeks before the date of the hearing. Though this is still a rather short amount of time for preparation, it is better than just one week.

In contrast to the process in Saint Mary's County, the Baltimore County government holds a Community Input Meeting (CIM) well in advance of the hearing on a development project. A sign giving the date, time, and location of the CIM is posted on the proposed development site at least 21 days in advance. Copies of the applicant's Concept Plan are available at, and frequently before, the CIM. The applicant must attend the CIM. Citizens may request that a representative of any County agency attend the CIM to answer questions. The CIM is informational, not a public hearing, so there is a lot more opportunity to brain-storming along with give and take negotiating. At the Development Plan stage a public hearing is held by a County Hearing Officer. The hearing is advertised solely with a sign posted on the proposed development site. The Hearing Officer's decision on the Development Plan may be appealed to the County Board of Appeals.

Though the process in Baltimore County is not perfect, it provides citizens with a far better opportunity to learn of and consider how a proposed development project may impact their interests. The extensive feed-back provided through the process allows citizens to prepare more constructive input to decision-makers. But it is important to remember that the Baltimore County CIM process does require a fair amount of staff time. It is unlikely Saint Mary's County could adopt a similar process without a budget increase or by taking funds from some other function.

We urge the Association to meet with the Director of the Department of Planning & Zoning to explore options for improving public notice and public participation in decisions regarding routine subdivision proposals.

RECOMMENDATIONS

Following is a summary of all the recommendations set forth in the preceding report.

1. The Association should contact the owners of all lands on which active gullies are located. The Association should assist the owners in halting further erosion at each active gully. The experience gained through the Hollywood Elementary School gullies provides an excellent model of how to constructively work with the owners.

2. The Association should contact the MIMA Partnership, which owns the mining site located near Joy Chapel, and explore their interest in voluntarily stabilizing the site. This should be done in concert with recommendation #6, below.

3. Two eroding Off Road Vehicle trails are located on the east side of Back Creek. The Association should contact those who own the property on which these two trails are located and

explore their interest in stabilizing the trails. I believe simply discontinuing ORV use of the trails is all that is needed to achieve stabilization.

4. The Association should meet with the District Conservationist for the Saint Mary's Natural Resources Conservation District to explore options for shifting more cropland to conservation tillage and taking highly-erodible soils out of crop production.

5. The Association should urge the Saint Mary's County Department of Public Works and the Department of Planning & Zoning to adopt special design criteria for stormwater management facilities discharging to highly erodible soils. The criteria must ensure that runoff released from the facilities does not expose the soils to an erosive velocity.

6. The Association should meet with the MIMA Partnership to explore options for minimizing the impact of developing the 153-acre site. If they are considering development of the site as a residential subdivision, then the Association should urge MIMA Partnership to consider the clustering option presented in this report.

7. If the MIMA Partnership is open to working with the Association on the 153-acre site, then the Association should request an opportunity to review a complete set of plans for the Hollywood Business Center. Recommendations may then emerge for minimizing the impact of developing the site.

8. The Association should contact the owners of the 12 other proposed development projects and request an opportunity to work them in minimizing mud pollution. The Association should begin with the largest sites and those located on the most erodible soils. In general, the following recommendations will minimize mud pollution.

A. Direct growth to the least erodible soils on the site.

B. Allow the most erodible soils on the site to remain in or revert to forest.

C. Design stormwater management facilities to release runoff at non-erosive velocities.

D. To the maximum extent possible, minimize the amount of time that soil is exposed to erosive forces during the construction phase. Plan site development so initial clearance and rough grading is quickly completed, then stabilize all areas of exposed soil with straw mulch or mulch and grass seed.

E. Avoid initial clearance of the site between October and March when runoff is greatest and it is most difficult to apply mulch and seed.

9. We urge the Association to meet with the Director of the Department of Planning & Zoning to explore options for improving public notice and public participation in decisions concerning routine subdivision proposals.

AN EXAMPLE OF WHAT CUCKOLD CREEK RESIDENTS COULD ACCOMPLISH

The preceding nine recommendations may appear rather intimidating. One might think that an awful lot of work is involved and that the tremendous forces of the development industry would

frustrate our efforts at each step. Yes, there is a fair amount of work involved and we will face opposition, but the task is far from insurmountable. In fact, there are many examples of how citizens, such as the residents of the Cuckold Creek watershed, have organized into an effective and highly successful force for preserving quality of life. Following is one of these many examples.

In late 1983, a series of storms occurred in Anne Arundel County which turned many of the tidal creeks muddy. Two activists, Peg Burroughs and Lina Vlavianos, became deeply concerned by the increasing muddiness of their creeks. They believed the mud was coming from the hundreds of construction sites active throughout the County. At that time Anne Arundel was the most rapidly developing County in the United States.

Peg and Lina met with Richard Klein, the author of this report, who was then the director of Save Our Streams (SOS). Together they mapped out a strategy for learning if mud pollution control measures were being effectively applied to construction sites.

In January, 1984, Peg and Lina recruited about 50 other volunteers to attend a four hour SOS training session on the evaluation of mud pollution control quality. Like Peg and Lina, few of the volunteers had prior experience in the control technology or advocacy. They all simply shared Peg and Lina's concerns for the health of the County's waters.

After the training session the volunteers formed into two person teams and each team agreed to evaluate the quality of mud pollution control on two construction sites. By February, 1984, the volunteers completed their survey and met to share the results. They found that only 23% of the 50 construction sites had effective control measures in place. Many of the other sites had little or no mud pollution preventative measures.

Peg and Lina released the results to the newspapers and TV stations. The press had a field day with this novel citizen investigation. Reporters made life rather miserable for the County Executive. They wanted to know why his inspectors were not keeping more sites in compliance with County laws requiring full and effective use of mud pollution control measures. The Executive responded by announcing that he would double the number of inspectors and that would surely correct the problem. This was Peg and Lina's first victory.

Eight months later, in October, 1984, Peg and Lina did something the County Executive never anticipated. They got the 50 volunteers together again, did a refresher training session, and went our to inventory 50 different construction sites. They found that after the County had doubled the number of inspectors *(and the amount of tax-dollars going to mud pollution inspection)* the percentage of construction sites with good control went from 23% ***down*** to 17%! That's right. Control got worse.

You can imagine what the press did with these findings. At one point it looked like the County Executive might be impeached. But the Executive brought a very skilled bureaucrat on board to fix the mud pollution control program. For the next six months the bureaucrat worked with the inspectors, their supervisors, other County officials, the development industry, and many others. In April, 1985, the bureaucrat got wind that Peg and Lina were going to get the 50 volunteers together again for a third survey. He met with both activists to ask that they hold off for another month or two. He said that he knew they'd find that control quality had improved and that the favorable publicity might prompt the County to slacken the support he needed to make some final and crucial improvements. Peg and Lina agreed to postpone the survey.

In June, 1985, they got the volunteers together again for another refresher training session. The 25 teams went out to inspect 50 new construction sites. They found that the percentage of sites with good mud pollution control had risen from 17% to 61%! This tremendous success was achieved without spending any more tax-dollars or passing any new laws. The County simply took what it had in October 1984 and improved it for six months. And this victory could not have happened without the support provided by Peg, Lina, and their 50 volunteers.

Peg and Lina did it. We can do it. But only if we call upon all those who treasure Cuckold Creek to join with us in supporting more responsible land use management in the watershed.