

## SPECIAL PROTECTION AREA PROGRAM ANNUAL REPORT FOR 2002

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## 1.0 Executive Summary

**Purpose of the Report:** The Special Protection Area (SPA) Program was established by Montgomery County Code Chapter 19, Article V (Water Quality Review-Special Protection Areas, Section 19-67). This Section of the County Code was implemented by Executive Regulation 29-95, "Water Quality Review for Development in Designated Special Protection Areas". The regulations require an Annual Report be prepared. The report summarizes and analyzes available monitoring results of stream and best management practices (BMP) collected within SPA's. The report is to be submitted to the County Executive and County Council with a copy to the Planning Board. This is the eighth report on the program. The first report covered the period 1994 through 1995. This report covers stream monitoring results from 2002 and status of development is updated through June of 2003.

**Existing SPA's:** The County Council has designated three areas within Montgomery County as Special Protection Areas (Figure 1). These areas have high quality stream systems in need of protection measures beyond current standards. These protection measures are necessary to ensure that the stream systems are protected to the greatest extent possible from the impact of master planned development activities. The designated areas are: the Clarksburg Master Plan SPA, the Upper Paint Branch Watershed SPA, and the Piney Branch Watershed SPA. There have been no new areas designated as a SPA over the past several years.

**Program Accomplishments** Monitoring results continue to produce a broad range of trend data that will help assess how effective careful water quality review, performance goal setting, improved site planning and intensive best management practices (BMP) are in mitigating development impacts in SPA's. Although the current program seems to be working well overall, data from some SPA monitoring sites have shown temperature and sedimentation impacts accompanying new development projects. While the sediment pulses may be transitory and short term, the temperature impacts may not be. Effectiveness in mitigating impacts cannot be fully judged until more development projects have been completed and their long term effects on streams evaluated. Currently, the program is continuing to generate a comprehensive set of information on baseline conditions in the SPAs. Good information is also being generated on the effects of construction and the efficacy of BMPs produced under SPA guidelines. In the meantime, practices and procedures continue to be refined and improved in order to enhance the overall effectiveness of the program.

**SPA Development Review Process:** The SPA program requires the Montgomery County Department of Permitting Services (DPS), the Department of Environmental Protection (DEP) and the Maryland-National Capital Park and Planning Commission (M-NCPPC) to work closely with project developers from the outset of the regulatory review process to minimize impacts to SPA stream conditions. SPA permitting requirements guide the development of related concept plans for site layout, environmental buffers, forest conservation, site imperviousness, stormwater management and sediment control. Applicant's monitoring of project best management practices (BMPs) are also defined through this process. A pre-application meeting presents the project developer with the critical natural resource

parameters that need to be maintained in order to protect existing high quality stream conditions. Protection of these natural resource parameters is guided by performance goals developed for each development project. Successful incorporation of the performance goals into the site design process requires innovation and close coordination between the project's design team and environmental, regulatory and planning agencies.

**Status of the Stream Monitoring Program:** DEP has been monitoring stream conditions in all three existing SPA's since 1995. During 2002, stream monitoring data was collected from thirty eight (38) stations. Of these, sixteen (16) are in the Clarksburg SPA, twelve (12) are in the Upper Paint Branch SPA, and ten (10) are in the Piney Branch SPA. The purpose of stream monitoring is to track stream health over time as development proceeds. Changes in the structure and function of biological communities (fish and benthic macroinvertebrates) are assessed and compared to alterations of physical habitat, water quality and changing land-use in the watersheds. Drought conditions experienced throughout the region during 2002 did have an impact on biological communities. The overall number of individuals collected in samples was lower than previous years but the number of species has remained intact.

**Paint Branch Biological Community:** The health of the biological community, as measured by the index of biotic integrity (IBI), is within the range of variability seen over previous years. This indicates water quality is unchanged. However, the drought of 2002 did impact the brown trout population. Numbers of trout are at the lowest point since monitoring began in 1994. It is hoped that with improved weather conditions and completed restoration projects the numbers of brown trout will rebound. Monitoring data from 2002 show that adverse change to the biological community in the Right Fork, reported in last years report, has improved slightly. It is suspected that impairment to the biological community, which began in 1999 and persists to the present, may be related to ongoing development activity in this watershed. Further monitoring will establish whether this impact persists after the projects have been completed.

**Piney Branch Biological Community:** In Piney Branch the benthic macroinvertebrate community exhibits a high degree of variability from year to year. The fish community has remained relatively stable over the same period of 1995 – 2002. DEP suspects that variability observed with the benthic macroinvertebrates is related to water quality problems in Piney Branch where dissolved oxygen levels have been observed to reach low levels. Heavy algal growth has been observed throughout the mainstem of Piney Branch and is believed to be the cause of low dissolved oxygen. Because excess algal growth can be caused by overabundant nutrients, DEP conducted nutrient sampling throughout Piney Branch during 2002 in an attempt to identify and address source(s) of high nutrients. Results did not identify significant sources and nutrient concentrations were found to be relatively low throughout the watershed. DEP still believes the excessive algal growth may be the cause of high variability observed with the benthic macroinvertebrates. However, the cause of increased algal growth is not well understood.

**Clarksburg SPA Biological Community:** Land development activities during 2002 were confined, primarily, to the new Clarksburg town center and the Clarksburg Detention Center. 2002 Monitoring results downstream of the Clarksburg town center indicate that condition of the biological community is unchanged but that increased fine sediments are present in the stream. Increased sediment input to the stream is very much a concern, especially in light of the amount of land disturbance that will occur in the near future. DEP is working closely with sediment inspectors to monitor, detect and correct problems with sediment control before large scale impacts occur in the streams. Monitoring results from the rest of Clarksburg SPA indicate stream condition is generally unchanged from previous years.

**Status of BMP Monitoring Plans:**

Best management practices (BMPs) are steps taken to minimize the impact a project has on the environment. BMPs can include structures such as sediment ponds, design elements such as minimize imperviousness and even management practices such as limiting fertilizer applications. SPA development projects are required to monitor their BMPs to evaluate their effectiveness. Developers usually contract with consulting firms to do this work. BMP monitoring is intended to complement the county's separate stream monitoring program. Currently a total of ninety-seven (97) development projects are either in the review process, have been approved under SPA regulations or are under construction in the SPAs. A summary of all 97 projects is presented in table 1. Fifty six (56) of these projects are not required to monitor BMP's, because they are small projects or pre-date SPA regulations. Projects in Clarksburg and Piney Branch may also be exempted from SPA requirements because of low imperviousness (< 8 %) proposed for the site.

**Table 1. SPA Development Projects**

	Projects in pre-application or plan review phase		Projects with approved BMP monitoring plans		Projects with approved plans not required to monitor BMP's	
	# of projects	Acreage	# of projects	Acreage	# of projects	Acreage
Clarksburg SPA	1	8	16	2084	9	218
Paint Br. SPA	1	14	11	426	28	90
Piney Br. SPA	4	25	8	355	19	599
<b>TOTAL</b>	<b>6</b>	<b>47</b>	<b>35</b>	<b>2865</b>	<b>56</b>	<b>907</b>

Of the thirty-five (35) projects required to do BMP monitoring, twenty seven (27) are currently submitting monitoring reports and data. The other eight (8) projects are either not going to begin construction in the near future or they are not required to do pre-construction monitoring because of the type of data being collected. Table 2 provides a summary of where all thirty-five (35) projects are, and at what stage of BMP monitoring they are in.



**Table 2. Status of Monitoring for Projects with Approved BMP Monitoring Plans**

<b>Project Status</b>	<b>Clarksburg</b>	<b>Paint Branch</b>	<b>Piney Branch</b>	<b>Total</b>
<b>BMP Monitoring Required But Not Yet Begun</b>	0	0	0	<b>0</b>
<b>Pre-Construction Monitoring Underway</b>	3	0	0	<b>3</b>
<b>Construction Monitoring Underway</b>	11	5 *	3	<b>19</b>
<b>Post Construction Monitoring Underway</b>	2	6	5	<b>13</b>
<b>TOTAL</b>	<b>16</b>	<b>11</b>	<b>8</b>	<b>35</b>

\* one project was halted due to SHA purchase of the property

SPA BMP monitoring has begun to produce information on the impacts of development on streams and the effectiveness of SPA BMPs. So far BMP monitoring has not identified large water quality impacts resulting from SPA development projects. Monitored groundwater levels have generally been impacted more by climatic variability than development. Stream temperatures have also been more impacted by weather trends than development impacts. At no site have we identified large spikes in stream temperatures associated with storm runoff from SPA development. Cross sections have generally been stable indicating little stream bank erosion resulting from SPA development. The most significant impacts observed have been on stream turbidity and embeddedness. The increased size of SPA sediment control structures appears to have significant benefits as these structures work very effectively for most storms. Sediment control efficiency is reduced for larger storms and sediment traps have been overwhelmed which eliminates their effectiveness. Some failures have also been seen where accidents or lack of adherence to project requirements have caused the release of large amounts of sediment. Aggressive enforcement actions have limited damage to streams and minimized additional sediment discharges. Streams in the vicinity of some projects have shown increased embeddedness values that may be related to construction. Increases tend to be seen early in the construction process and diminish as projects move toward completion. However, some sites have shown no change or even decreased in embeddedness during construction. Future monitoring will attempt to gain a better understanding of the behavior of this parameter and determine factors that might account for these differing outcomes. Flow monitoring of the Clarksburg Town Center has identified an increase in stream discharge during construction. The monitoring consultant has suggested the increase may be linked to increased

imperviousness due to soil compaction. Flow monitoring at other locations is still generating baseline data for evaluation of future development projects. Overall BMP monitoring indicates that construction in the SPAs is having a relatively benign impact on water quality. Construction phase BMPs seem to be working effectively under most conditions. Future monitoring will provide more information on long term effects and post-construction impacts.

**Supplemental Habitat Restoration and Stormwater Retrofit Measures:** DEP is pursuing separate capital project initiatives in the Upper Paint Branch and the Piney Branch SPA's to improve the management of runoff from previously developed areas and mitigate habitat damage that had occurred before the SPA program was established. These projects are intended to supplement improvements in watershed management achieved through the SPA permit process. In the Upper Paint Branch watershed, DEP, the M-NCPPC and other agencies have worked closely to inventory some 75 potential stream habitat restoration, wetlands creation, and stormwater retrofit project opportunities. Some of these are capital projects. Others involve small habitat restoration and wetlands and tree plantings that can be partially implemented by volunteers. DEP has actively involved the public in reviewing these projects. Presently 9 projects have been completed and 7 more are under design. In the Piney Branch SPA, DEP has inventoried a limited number of proactive capital project opportunities for small wetlands creation, habitat restoration and stormwater retrofit projects located on the site of the Life Sciences Center in the uppermost portion of the watershed. DEP is also pursuing a Watts Branch watershed study that may include improvements in Piney Branch.

**Next Steps:** Since 1995, Montgomery County's regulatory and planning agencies have worked cooperatively, to fully implement the different provisions of the Special Protection Area Program. Now that thirteen (13) projects have completed construction, some conclusions can be made with regard to effectiveness of sediment control during construction and how well site designs are working to minimize impacts to streams. BMPs to hold sediment on-site during construction are generally preventing sediment from reaching streams. The SPA program does not monitor non SPA sites, but DPS suspects that SPA sediment control structures are performing better than structures on non SPA sites. Sediment control structures on SPA sites are twenty-five percent larger than structures on comparable sites in other areas of the county. BMP monitoring data has shown some high sediment removal efficiencies at SPA development projects. Nonetheless, some impact from construction site sediment loadings in streams is inevitable and has occurred in the SPAs. Future monitoring will help determine if these impacts are transient or permanent in nature. Regarding performance of stormwater management BMP's, it is too early to reach conclusions. Post-construction BMP monitoring has occurred for only a brief period. Post-construction monitoring at several projects has been done long enough to make preliminary conclusions on how well sites met performance goals.

SPA regulations specify that a BMP monitoring program is to be implemented as part of a preliminary and final water quality plan. The BMP monitoring program has two main objectives: 1) determine if performance goals for a specific development project have been achieved or not and 2) determine if BMP designs being required are working adequately or in need of improvement. The BMP monitoring

program is central to the SPA Program in that it provides essential information to determine the effectiveness of site design and BMP designs in meeting performance goals and in protecting existing high quality stream conditions. Some sites are not required to do BMP monitoring because of their small size. Staff have encountered numerous problems ensuring consistency and quality in BMP monitoring data submitted by consultants involved in BMP monitoring. DEP and DPS are evaluating whether BMP monitoring could be improved by having it managed by a county agency rather than individual developers to better ensure consistency and quality of data. DEP and DPS plan to review the SPA regulations during the upcoming year to consider changes in monitoring responsibilities and the related monitoring fee structure now in place.

**Other Observations:** Some other informal observations by DEP, DPS and M-NCPPC staffs indicate some preliminary benefits of the SPA program:

- o Expanded stream buffers, as required in SPA's, does provide additional protection to the stream eco-system and exclusion of development from expanded buffers has generally been achieved. However, design constraints, particularly in Clarksburg, have made it difficult to provide this additional protection in every case.
- o In several approved project proposals, applicants are reforesting areas in earlier stages of development than would normally occur in developments not located in SPA's.
- o Minimizing impervious surfaces has become an important design objective in development projects, especially in the Upper Paint Branch SPA, where a specific imperviousness cap is required as part of an overlay zone.
- o Progress is being made in addressing unauthorized encroachments on stream buffers located on parkland or conservation easements which affect water quality in some portions of Paint Branch. Actions taken by M-NCPPC to halt encroachment into these areas has been effective. Stream buffers, which had been kept cleared by adjacent property owners, are now left to grow and provide shading and food to the stream eco-system.
- o Temperature Studies in Paint Branch SPA indicate that in areas where curb and gutter are used to convey stormwater runoff, the receiving stream experiences higher temperature spikes during short intense summer thunderstorms than do areas using open section roadways.

## **2.0 Synopsis of the Special Protection Area Program**

The Montgomery County Council established the Special Protection Area (SPA) program in 1994. The program was intended to minimize impacts to designated high quality streams that would be threatened by proposed land uses without special protection measures coordinated with land use controls. To date, the County Council has designated three regions as Special Protection Areas (Figure 1). These are the Clarksburg Master Plan SPA; the Upper Paint Branch Watershed SPA; and the Piney Branch Watershed SPA. There are special requirements for developing land in an SPA. Applicants proposing land development projects in both the private and public sectors are required to work closely with county environmental agencies throughout the development process. Particularly significant is the requirement that developers consult with the county early in the process of generating a development plan. This approach seeks to ensure that protection of critical natural resources is incorporated into site design before significant time and fiscal resources are invested in proposing any particular development scheme.

The SPA program also requires a monitoring component to document stream conditions, stormwater management best management practices (BMP) effectiveness and allow environmental quality goals to be set and performance evaluated for development projects in SPAs.

Readers desiring more detailed information on the fundamentals of the SPA program should look to Appendix 1 of this document, "Explanation of the Special Protection Area Program."

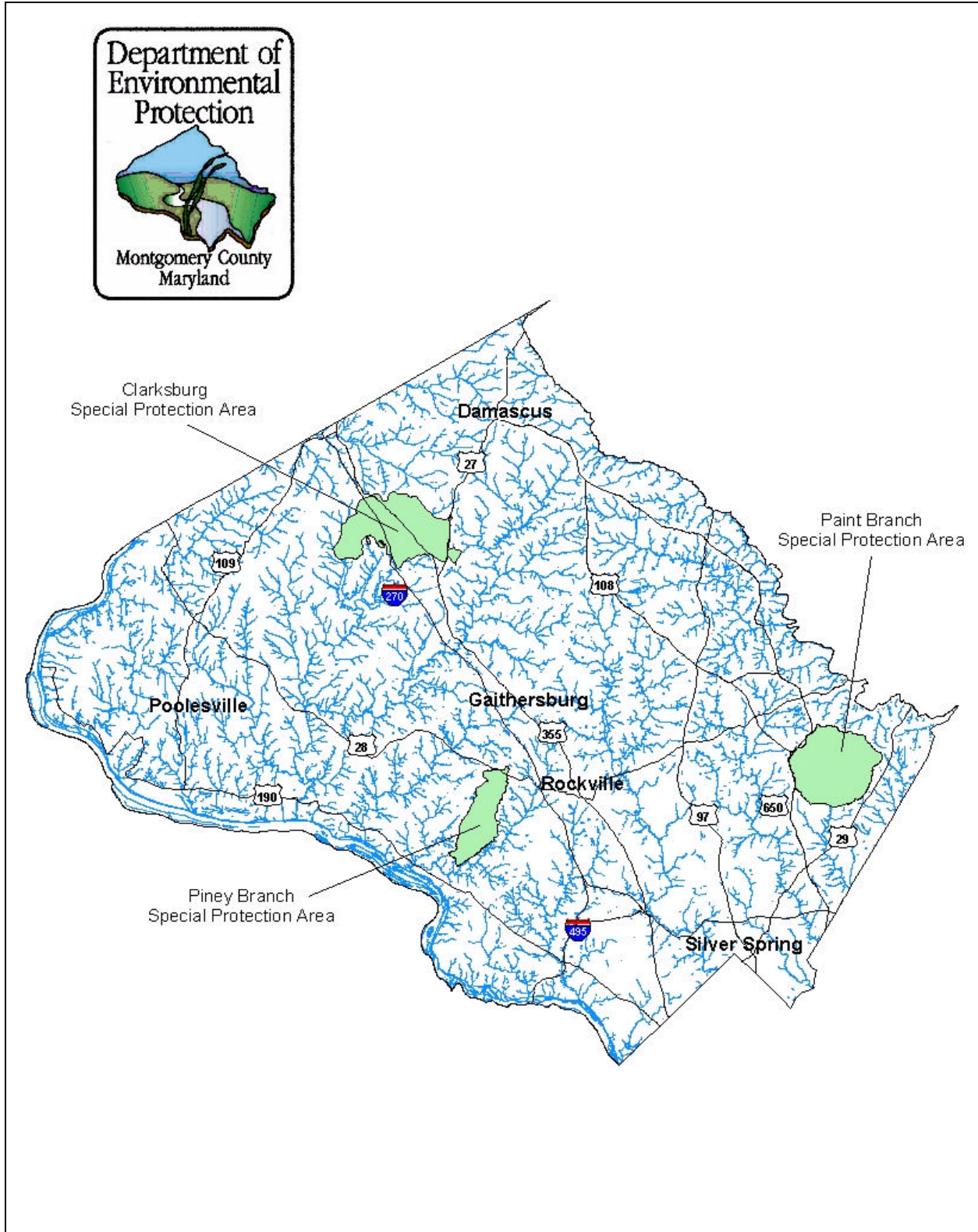


Figure 1 Special Protection Area Locator Map

### **3.0 Implementation of the SPA Program**

#### **3.1 Review of Process to Date**

The SPA program requires that water quality concerns be identified and addressed early in the planning process. When protection of identified critical natural resources is not considered in the early stages of preparing a development plan, opportunities for protection are not fully achieved and resources may not be fully protected. Consequently, an integral component of the program is the requirement that developers meet with county environmental and planning staff before significant resources have been invested in planning the development of a site. This allows identification of sensitive areas that must be protected. Guidance on what should be included in a water quality plan for development of the particular site is also provided early on. Ideally, the goals and objectives presented in these early meetings are incorporated into the development site design plans. At some SPA sites however, the complexity and intensity of conflicting development activities makes water quality goals difficult to achieve. In areas of intense master planned land uses, there is a tendency by those involved in the planning process to focus on advance site planning without considering stormwater management needs and inherent siting conflicts. When these needs are not considered concurrently with other interests, opportunities to provide adequate water quality protection may be lost. Advance site planning makes subsequent achievement of a constructive balance between development and water quality a daunting challenge. DEP and DPS will continue to work closely with the MNCPPC to input environmental protection considerations earlier into the land development planning process.

#### **3.2 Public Involvement in the SPA Program**

As part of the SPA regulations, provisions are included that allow the public to participate in the process of planning development. The Department of Permitting Services (DPS) provides written public notice in the M-NCPPC Planning Board Agenda that preliminary water quality plans for a project have been submitted for review and approval. Public information meetings may be requested in writing within fifteen days of the notice being issued. At these meetings members of the public or interested organizations are briefed on submitted plans and can contribute comments if desired. The public can also become involved when water quality plans are reviewed and acted on by the Planning Board in conjunction with review and action on preliminary plans, site plans, mandatory referrals, development plans and certain types of zoning cases.

The Montgomery County Council enacted legislation on October 3, 2000 to help ensure that purchasers of property in an SPA are aware of the program and its implications. The intent of the legislation is to promote awareness and comprehension of the goals and objectives of the SPA program, and of the effect the program may have on the use of a particular property for sale within an SPA. Council Bill 24-00 requires certain disclosures be made to all buyers of real property located in the special protection areas. A brochure explaining SPA requirements is now distributed with materials

issued at settlement for all real property sales contracts.

Buyers seeking further information are directed to the web sites of the three agencies responsible for SPA implementation for answers to the most often asked questions. These sites will include telephone numbers to call for additional information. Buyers also are directed to check their particular record plat and other land records and regulatory approval conditions to determine the existence of any regulatory restrictions such as conservation easements on their property.

### **3.3 Status of SPA Conservation Plans**

Conservation plans for all three SPA's are available. These conservation plans detail findings from several years of monitoring in the SPA's and identify critical natural resources that need to be protected if a high quality stream ecosystem is to be maintained. Performance goals for the protection of critical natural resources are established for each SPA. The conservation plans are intended to provide guidance for County plan reviewers and developers in setting performance goals for individual projects as required in the water quality plan. These conservation plans are 'living documents' intended to present the best available data on critical natural resource parameters. As new cost effective and proven technology becomes available to better describe these natural resource parameters, the conservation plans will be updated as needed.

The conservation plans can be downloaded from the Montgomery County Department of Environmental Protection's web site, <http://www.askdep.com>. On the DEP homepage, click on Special Protection Areas listed under Programs. Previous SPA Annual Reports can be downloaded here as well.

### **3.4 Status of BMP Monitoring**

BMP monitoring has been required on a total of thirty-five (35) projects in the three SPA's. Three (3) of these projects are currently submitting pre-construction baseline monitoring data, nineteen (19) are currently in the construction phase and thirteen (13) projects have been completed. A summary of all required BMP monitoring to date is provided in Table 2.

Thirteen (13) of the completed projects continue to submit BMP monitoring data. Seven (7) of the completed projects have submitted enough post-construction data to begin making preliminary conclusions on BMP and site design performance. Five of these projects are located in the Piney Branch, one in Paint Branch and one is in Clarksburg. Sections 4.1.3, 4.2.4 and 4.3.4 discuss the BMP monitoring information obtained to date in the three SPA's.

#### **3.4.1 Anticipated Effects of BMP's**

Best management practices are intended to minimize development impacts on streams. While the ideal goal is for development to cause no impact to SPA streams, realistically some impacts will occur. Impacts are most likely to be seen while construction activities are underway. After construction is completed, it is anticipated that carefully planned BMP's will allow streams to gradually recover from temporary construction impacts not fully controllable through construction site sediment controls. It is believed that this recovery will require several years to take place. For this reason, water quality plans for SPA development projects usually require three to five years of BMP monitoring after construction of a project has been completed. Until more data is available, the degree to which stream systems will be able to regain preconstruction conditions after development is uncertain. Hopefully, SPA streams will be able to fully recover from any decline in conditions that might occur during construction. However, when other land use goals take precedence over water quality goals in the development of a site, the prospect of complete stream recovery becomes less clear. This is because stormwater controls cannot fully mitigate impacts on stream water quality or hydrology caused by significant reductions in watershed forest cover and increases in developed land in urban or suburban uses.

### **3.4.2 Outlook for Future**

A number of SPA development projects have been completed and some post-construction monitoring data has been submitted. Cavanaugh, Peters, Shady Grove Rd., Boverman and Bruck projects in Piney Branch and Fairland Community Center in the Paint Branch SPA have turned in some post-construction data. However, we do not as yet have extensive data on post-construction conditions. We anticipate that more projects will be completed in 2003 and begin turning in post-construction data in 2004. Running Brook, the detention center, and Gateway 270 should be completed in Clarksburg. In Paint Branch, Briarcliff and the Cloverly Safeway are collecting post-construction data in 2003. As consultants begin to submit data covering multiple years, BMP monitoring reports will evaluate post-construction conditions, overall development impacts, and effectiveness of the different types of BMP's. Information continues to come in on the effectiveness of sediment control during construction. Over time, BMP monitoring efforts will begin to provide a better understanding of how well the SPA program and associated BMP requirements are doing in minimizing development impacts. The degree to which impacted streams are able to recover from development activities and the time required for recovery will also be better understood. Ultimately, the intent of the SPA program is to offset changes to stream hydrology and quality caused by watershed development, mimicking pre-development hydrology and maintaining environmental quality to the extent feasible. In the next several years DEP will be better able to gauge the success of the program in that regard.

### **3.4.3 BMP Monitoring Methods and Procedures**

To insure consistency and accuracy of monitoring techniques, DEP and DPS established the BMP Monitoring Work Group. This group, which consists of water quality professionals from the public sector and private industry, has established protocols for most types of monitoring being used to



determine the effectiveness of BMP's. This document, *Montgomery County Department of Environmental Protection Best Management Practice Monitoring Protocols* (June 1998) is available on the web at: <http://www.askdep.com>. The BMP monitoring workgroup will meet periodically to review effectiveness of the BMP monitoring protocols.

### **3.5 Status of Stream Monitoring Program**

In the fall of 1994, DEP began SPA baseline stream monitoring in Little Seneca Creek and Ten Mile Creek within the Clarksburg Master Plan SPA. In the spring of 1995, in anticipation of SPA designation, DEP initiated further SPA baseline stream monitoring in the Upper Paint Branch and Piney Branch Special Protection Areas. Presently, DEP is collecting monitoring data from fifty one (51) stations, twenty seven (27) in the Clarksburg SPA, fourteen (14) in the Upper Paint Branch SPA, and ten (10) are in the Piney Branch SPA.

Monitoring at most stations consists of biological sampling (benthic macroinvertebrates and fish), stream habitat assessment, stream channel measurements, and physiochemical water quality data (dissolved oxygen, temperature, pH, and conductivity). Due to small stream size at several monitoring stations, biological sampling includes only the benthic macroinvertebrate monitoring. Limited field staff and variable field and weather conditions prevent sampling all fifty one (51) stations each year. Sampling was completed at thirty eight (38) stations during 2002.

#### **3.5.1 Stream Monitoring Methods and Procedures**

The Department of Environmental Protection established a Biological Monitoring Work (BMW) Group consisting of local and state environmental agency personnel, consultants, environmental organizations and citizens. One of the BMW Group's initial functions was to peer review and evaluate County stream monitoring protocols developed by DEP (Van Ness et al, 1997). These stream monitoring protocols are used for all County stream monitoring efforts, including SPA baseline monitoring.

Biological monitoring (fish and benthic macroinvertebrates) is the principal means by which stream condition is tracked over time as development proceeds in the SPA's. Monitoring results from each year are used to calculate an Index of Biological Integrity or IBI (see glossary for definition). Reported in this document are all IBI scores from various locations within each SPA.

Measurements of stream habitat, water temperature and channel morphology assess the quality and stability of stream habitat. Long-term monitoring of these parameters will allow DEP to determine if changes to channel morphology are a result of natural variability or development induced stressors. Understanding where changes in channel morphology have led to degraded stream channels will also help in terms of knowing where stream restoration is needed.