

1.0 Executive Summary

Purpose of the Report: The Special Protection Area 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 seventh report on the program. The first report covered the period 1994 through 1995. This report covers stream monitoring results from 2001 and status of development is updated through June of 2002.

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 BMP controls 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 2001, stream monitoring data was collected from thirty eight (38) stations. Of these, seventeen (17) are in the Clarksburg SPA, eleven (11) 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.

Analysis of monitoring data has revealed changes in the biological community residing in portions of Paint Branch and Piney Branch.

Paint Branch Biological Community: The biological community, as measured by index of biotic integrity (IBI), residing in most of the Paint Branch SPA has remained unchanged over the period of 1994 – 2001. The only sub-watershed that has experienced any significant adverse change to the biological community is the Right Fork. It is suspected that this may be related to ongoing development activity in this watershed. Further monitoring will establish whether this impact persists after the projects have been completed. Improved condition of the entire biological community has occurred in the Gum Springs Tributary. DEP attributes this to the completion of the Oak Springs Bypass stream restoration project completed by the county and its partners in July of 2000.

Piney Branch Biological Community: In Piney Branch both the fish and benthic macroinvertebrate communities have exhibited signs of declining condition along the mainstem. DEP feels this is the result of water quality problems in Piney Branch where dissolved oxygen levels were observed to reach low levels. There may be enough biochemical oxygen demand to produce low dissolved oxygen levels which impair stream biology. Heavy algae growth has been observed throughout the mainstem of Piney Branch. Over productive algal communities can lead to excess biological oxygen demand. Excess algal growth can be caused by overabundant nutrients. DEP is currently investigating potential sources of nutrients in an attempt to identify and address the problem(s).

Clarksburg SPA Biological Community: Results from Clarksburg SPA indicate stream condition is generally unchanged. Biological monitoring results rate most of the area in the good/excellent range. However a very small amount of the land proposed for disturbance is under construction.

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 a separate effort that complements the county's stream monitoring program. To date a total of ninety eight (98) development projects are either in the review process or have been approved under SPA regulations. A summary of all 98 projects is presented in table 1. Fifty three (53) of these projects are not required to monitor BMP's, primarily because of a projects small size. 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	4	202	14	1868	9	218
Paint Br. SPA	1	14	11	426	28	90
Piney Br. SPA	4	25	11	355	16	583
TOTAL	9	241	36	2649	53	891

Of the thirty six (36) projects required to do BMP monitoring, twenty seven (27) are currently submitting monitoring reports and data. The other nine (9) projects are either not going to break ground in the near future or they are not required to do pre-construction monitoring. Table 2 provides a summary of where all thirty six (36) projects are, and at what stage of BMP monitoring they are in.

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

Project Status	Clarksburg	Paint Branch	Piney Branch	Total
BMP Monitoring Required But Not Yet Begun	4	3	2	9
Pre-Construction Monitoring Underway	2	1	0	3
Construction Monitoring Underway	7	3	3	13
Post Construction Monitoring Underway	0	4	7	11
TOTAL	13	11	12	36

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 8 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.

Watershed Restoration/Retrofit Case Study: Oak Springs By-pass Pipe Temperature Study:

In 1999, temperature studies found that water temperature in the Oak Springs tributary was 4⁰ (F) warmer, on average, than the Gum Springs tributary (1999 SPA annual report). Warm water discharge from Oak Springs pond caused these higher temperatures and resulted in an average increase of water temperature in lower Gum Springs of 1.5⁰ (F). These warm temperatures were extremely stressful to the naturally reproducing brown trout population that uses the Gum Springs Tributary as one of two primary spawning/nursery areas. The Oak Springs by-pass pipe, completed in July of 2000, diverts warm water discharged from the Oak Springs storm water management pond 1,900 feet around the sensitive Gum Springs tributary to the larger Paint Branch mainstem. Data from temperature loggers placed in the outfall from the pond and the

outfall from the by-pass pipe during late summer 2000 showed that water conveyed through the by-pass pipe was cooled by 2.6^o (F) on average (2000 SPA annual report). Results from 2001 show an average decrease of 4.2^o (F)

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 eleven (11) projects have completed construction, some conclusions can be made with regard to effectiveness of sediment control during construction. 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. Nonetheless, some impact from sediment in streams has occurred in the SPAs. Future monitoring will help determine if this is a short term impact or permanent. 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. As the post-construction period of BMP monitoring increases more conclusions will be made in future annual reports.

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. Monitoring would be managed by DEP staff to better ensure consistency and quality of data. DEP and DPS plan to review the SPA regulations during the upcoming year.

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

- o In development project proposals going through the SPA process, the exclusion of development from expanded buffers has generally been consistently achieved.
- o In several approved project proposals, applicants are reforesting areas in earlier stages of development than would normally occur outside an SPA.
- 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 a regulation.

- o Encroachment on publicly owned stream buffers has been identified as a problem affecting water quality in some portions of Paint Branch. This encroachment results in disturbed environmental buffer areas. Increased enforcement of public rights and civil statutes will be targeted at these areas to correct this problem. Restoration and reforestation projects will also be examined as potential aids in remedying the situation.

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 established to protect streams with existing high quality. It also was established to protect sensitive environmental resources related to water quality. The program focuses on protecting those streams and environmental resources where they are potentially threatened by proposed land uses. To date, the County Council has designated three regions as Special Protection Areas (Figure 1). They are the Clarksburg Master Plan SPA; the Upper Paint Branch Watershed SPA; and the Piney Branch Watershed SPA. Protection of existing high quality stream conditions is to be accomplished by closely coordinating water quality protection measures with land use controls. 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 any particular development scheme. 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. The process also provides opportunities for public involvement throughout the review process. Finally, the SPA program involves a monitoring component. Monitoring is intended 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."

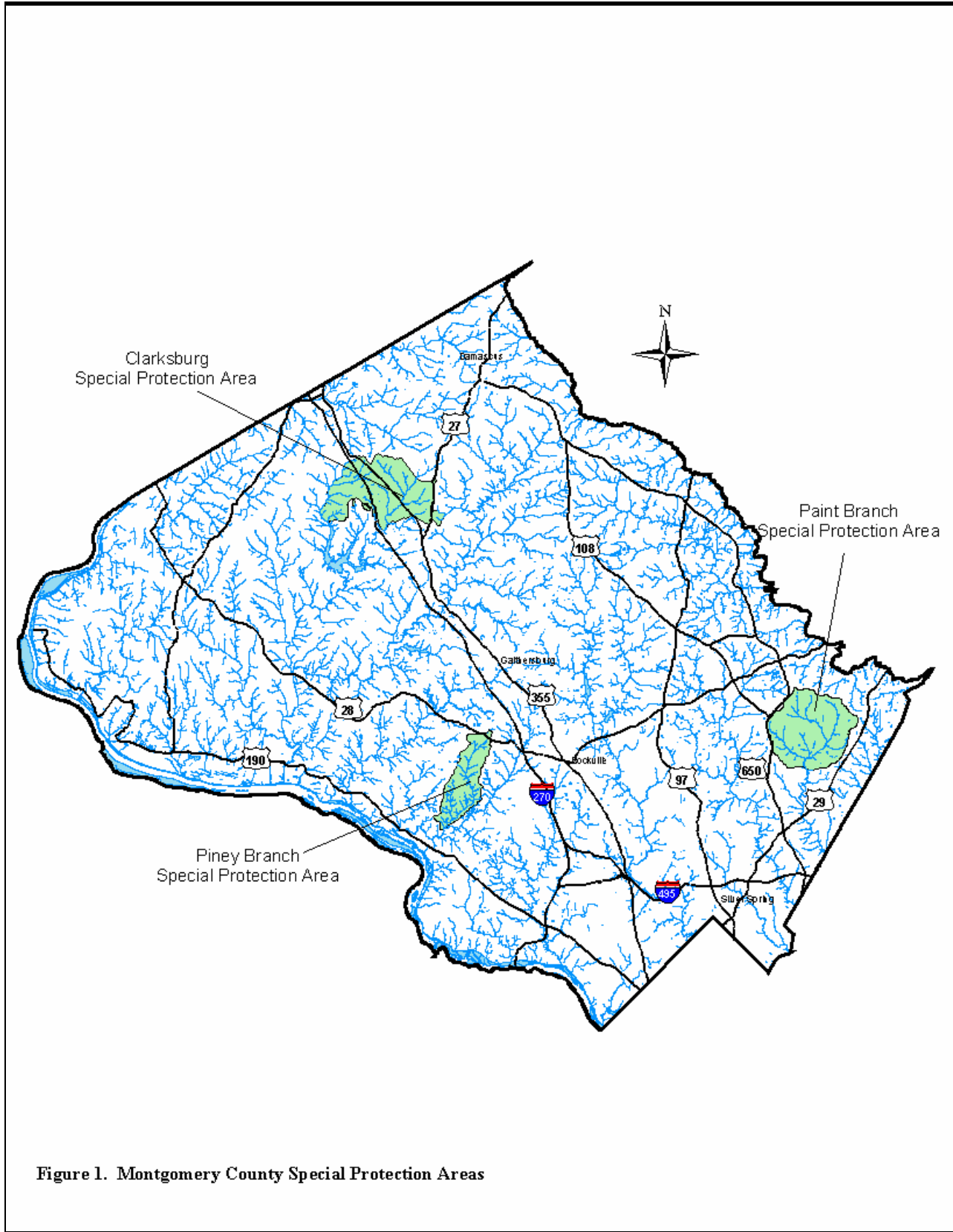


Figure 1. Montgomery County Special Protection Areas

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. 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 site design process to focus on advance site planning. This advance site planning makes achievement of a constructive balance between development and water quality a daunting challenge. Complex advance site planning before County review may preempt implementation of some of the more desirable options for water quality protection. In these situations, intensive site planning may inhibit full attainment of water quality performance goals. 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 which will 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. The requirement is currently in effect for all real property sales contracts

Buyers seeking further information will be 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 will also be 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 parameters 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 six (36) projects in the three SPA's. Three (3) of these projects are currently submitting pre-construction baseline monitoring data, thirteen (13) are currently in the construction phase and eleven (11) projects have been completed. The remaining nine (9) projects have not yet initiated BMP monitoring because they are either not ready to begin construction or not required to do pre- or during-construction monitoring. A summary of where BMP monitoring has been required to date is provided in Table 2.

Seven (7) of the completed projects are currently submitting BMP monitoring data. Four (4) of the completed projects have not yet submitted data. Five (5) of the completed projects have submitted enough post-construction data to begin making preliminary conclusions on BMP performance. All five of these projects are located in the Piney Branch SPA. 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 are likely to 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 may take place over a period of several years. 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 development projects were completed during 2001 and post-construction monitoring data has been submitted. Cavanaugh, Peters, Boverman and Bruck projects in Piney Branch and Fairland Community Center in the Paint Branch SPA have been completed. It is too early to reach conclusions on effectiveness of BMP's on these sites. However, conclusions are presented in this report on effectiveness of sediment control during construction. As additional post-construction data is submitted, we will begin to gain a better understanding of how well the SPA program and associated BMP requirements are doing in minimizing development impacts. We will also be able to gage the degree to which impacted streams are able to recover from development activities in the SPA's. The time required for recovery from development impacts should also be better understood. Ultimately, the intent of the SPA program is to offset changes to stream hydrology and quality caused by watershed development to mimic pre-development hydrology and maintain environmental quality to the extent feasible. In the next several years we will be better able to gage 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 at a total of thirty one (31) baseline SPA stations plus sixteen (16) development related stations. Of these forty seven (47) stations, twenty three (23) are in the Clarksburg SPA, fourteen (14) are in the Upper Paint Branch SPA, and ten (10) are in the Piney Branch SPA.

Monitoring at most stations consists of the collection and identification of benthic macroinvertebrates, the collection and identification of stream fish, the collection of channel measurements, the assessment of stream habitat and the collection of physiochemical water quality data in conjunction with the macroinvertebrate and fish collections. Water quality parameters measured include dissolved oxygen, temperature, pH, and conductivity. Six (6) stations are located on streams too small for fish sampling. Sampling benthic macroinvertebrates is the only biological sampling at these stations. Limited field staff prevents sampling all forty seven (47) stations each year. Sampling was completed at 38 stations during 2001.

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.