4.2 Upper Paint Branch Special Protection Area

4.2.1 SPA Designation History for the Upper Paint Branch SPA

The Paint Branch watershed, upstream of I-495, is designated as a Use III naturally reproducing trout stream. Previous long term biological and habitat monitoring results had indicated that certain portions of the watershed experienced considerable stress from prior land development activities. In order to protect this watershed and its unique urban cold water natural resource, the County Council designated the Upper Paint Branch watershed above Fairland Road a Special Protection Area on July 11, 1995. Complementing this designation, as part of an environmental overlay zone, is a requirement for a ten percent impervious area cap on all new development in the SPA portion of the watershed (originally recommended by the 1981 Eastern Montgomery County Master Plan). To clarify, the ten percent limit applies to new development; lawfully existing impervious surface is the limit on reconstruction development. Upper Paint Branch is currently the only SPA which has specific limits on site imperviousness for land development throughout the SPA.

The SPA requirements, criteria, and guidelines are applied to all proposed land-disturbing activities. Unlike the other SPA's, there are no exemptions from SPA provisions related to plan review because of a proposed project's small size or land use. However, if an applicant requests a waiver, and a hardship condition is determined, the Planning Board or DPS, as applicable, may waive any or all of the SPA requirements, criteria, and guidelines for a project as a part of the water quality plan review and approval. Although not exempted from all SPA requirements, some projects are not required to conduct BMP monitoring if their small size or distance from a stream makes monitoring impractical. These specific requirements in the Upper Paint Branch SPA are strictly applied to land development projects within the SPA.

To provide additional environmental protection, the County Council approved an environmental overlay zone for the Upper Paint Branch SPA in July, 1997. The overlay establishes the ten percent site cap on the allowable imperviousness area for new development projects, prohibits certain land uses, requires special land management practices for certain special exceptions, and establishes very limited provisions for grandfathering, exempting, and waiving specific, existing uses from the site imperviousness cap.

M–NCPPC, through the purchase of large land areas, has allocated a lot of available resources to the Upper Paint Branch SPA. Additional land has been acquired through dedication as part of subdivision plans for new land development projects. Large forested parklands are functioning well to protect stream habitat and water quality in the Good Hope sub-watershed.

DEP is also pursuing capital project initiatives in the Upper Paint Branch SPA to improve the management of runoff from previously developed areas and mitigate areas of 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. DEP, with 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.

As of June 2002, seven (7) projects have been completed in the Good Hope subwatershed and there is one (1) completed project in the Gum Springs subwatershed. Another seven (7) projects are in the design phase, two (2) are in the Gum Springs subwatershed, two (2) are in the Right Fork subwatershed and one (1) is in the Left Fork subwatershed. Two (2) projects under design in the Good Hope subwatershed are nearly ready for construction and should be completed during 2002. DEP has also recently completed 2.25 miles of stream restoration on the Paint Branch mainstem. This project is located just south of Fairland Road, immediately downstream of the Paint Branch SPA boundry. It is expected to significantly improve habitat support for brown trout and other species. There were also two sites within the SPA that were reforested through M-NCPPC's volunteer forest planting program.

4.2.2 Description of the Watershed Within the Upper Paint Branch SPA

Paint Branch is recognized as a unique County resource due to its ability to support a naturally reproducing trout population in a suburban setting. The Upper Paint Branch SPA encompasses the entire watershed above Fairland Road (Figure 14). For management purposes the watershed is divided into five (5) subwatersheds; the Left Fork, the Right Fork, Gum Springs tributary, Good Hope tributary, and the Paint Branch mainstem.

Numerous studies have generally found that the Good Hope tributary is the primary trout spawning and nursery area for the Paint Branch system. This tributary consistently produces the highest percentage of young-of-year trout within the entire Paint Branch watershed. Gum Springs and the Right Fork subwatersheds supply water of excellent quality and also provide trout spawning habitat. Similarly, the Left Fork provides high water quality and acceptable habitat for trout, but is not consistently used as a spawning and nursery area. Each of these subwatersheds is important in maintaining the water quality, in-stream habitat and overall ecological health within the Paint Branch mainstem.

4.2.3 Status of Development in the Upper Paint Branch SPA as of June 2002

During the last year, the proposed development projects within the Upper Paint Branch SPA have been for small (1 to 8 acre) residential subdivisions. This trend has been generally consistent since the SPA was implemented. Since there are no exemptions for smaller subdivisions in this SPA, each development must comply with the SPA regulations. The exceptions are two larger residential subdivisions, Hunt Property-Lions Den (78.7 acres, under construction) and Hunt Property-Miles Tract (48.2 acres, expected to start construction during the fall of 2002), that will be closely monitored to determine their effect on the watershed. Both of these subdivisions are located within the drainage area for the Right Fork of the Upper Paint Branch watershed.

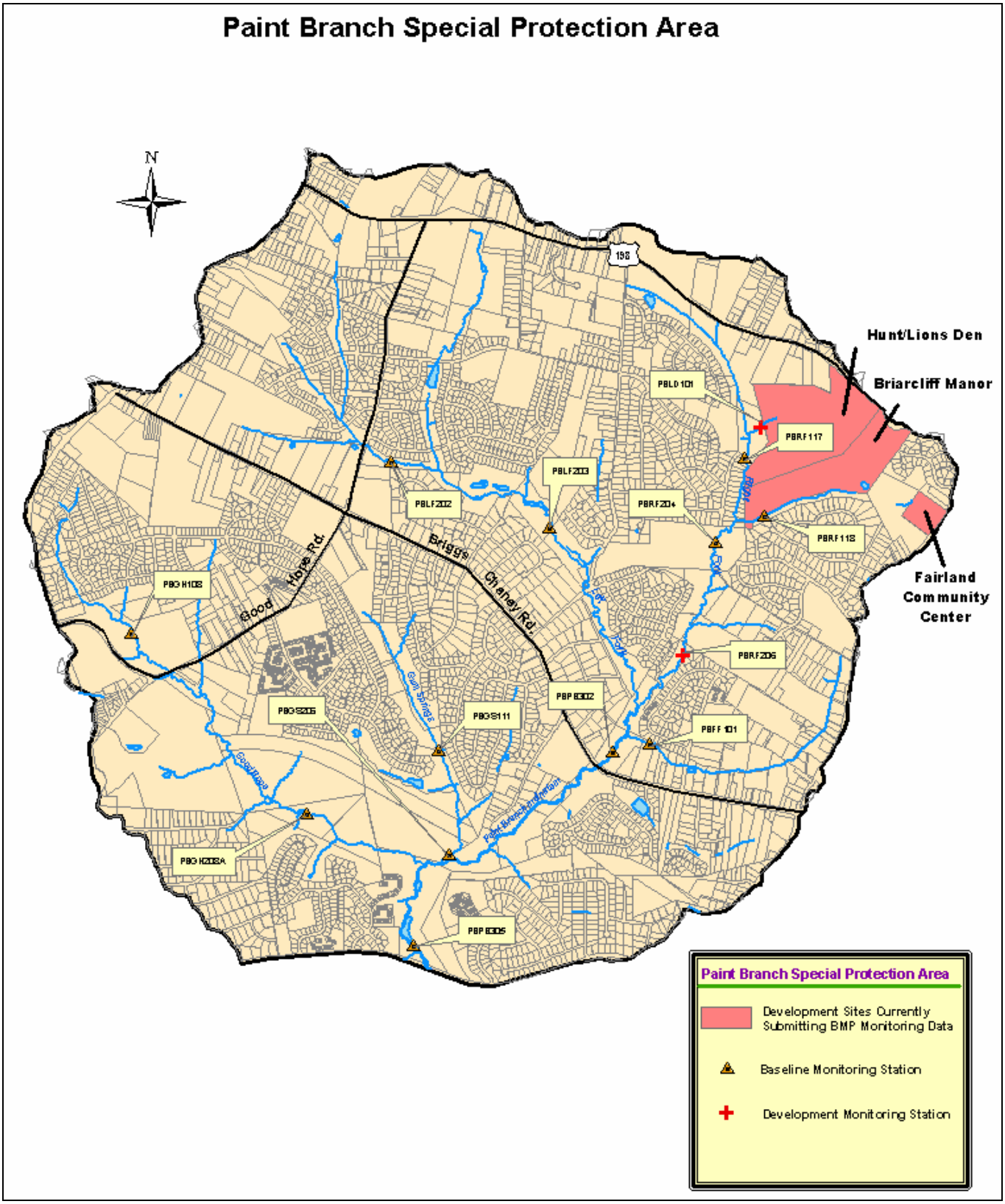

Figure 14. Upper Paint Branch Special Protection Area

Again this year, many of the building permits that have been issued were for individual houses on existing recorded lots. Development of lots that were recorded before October 31, 1994 are not subject to the SPA regulations. These developments however, are reviewed for conformance to the ten percent imperviousness cap that is mandated by the environmental overlay zone and encompasses the entire SPA portion of the Paint Branch watershed. To comply with the overlay zone requirements, DPS requires proof that each application for a building permit that is not required to get Planning Board approval will not exceed the impervious cap.

The ten percent site imperviousness cap is also an important part of development projects that require Planning Board approval. Imperviousness limits set as part of a Planning Board approval of a project are enforced through a written agreement between the Board and the applicant. Of the non-residential projects that have obtained Planning Board approval (and Planning Board and DPS approval of the water quality plans), there were no impervious cap waivers granted in 2001. For information on projects that were previously granted waivers of the 10 percent impervious cap by the Planning Board, please see last years annual report which is available on line at http://www.askdep.com

Development projects that have been approved by the Planning Board incorporate forest preservation, aforestation/reforestation areas and protection of environmental stream buffers. Some of these projects involve the dedication of parkland to provide additional protection for environmentally-sensitive areas. These new areas of parkland dedication are consistent with the park recommendations of the Cloverly Master Plan, Fairland Master Plan, and the 1995 Limited Amendment to the 1981 Eastern Montgomery County Master Plan. Specifics on parkland acquisition and conservation easements obtained to protect environmentally sensitive areas will be reported in future annual reports.

Of the 41 projects listed in Table 12, a total of 35 final water quality plans have been approved as of June 2002. Several of the projects are in the path of alternatives to the master planned Inter-County Connector and have been put in reservation (on hold) pending decisions on the Inter-County Connector (ICC) alignment alternatives.

Table 12. Upper Paint Branch SPA Development Projects (1995 to June 2002)

PROJECT NAME	SPA LOCATION	DEVELOPMENT SIZE, TYPE	STATUS
Allnutt/Peach Orchard Estates	Right Fork Tributary	141 acres, 130 lots, RE-1 cluster option adjoining 2 subdivisions were concurrently reviewed. Includes parkland dedication.	Preliminary and final water quality plans approved. Sediment control permit issued. Project construction started; however, site is now owned by SHA due to its location in an alternative ICC route.
Bailey Thompson Property	Left Fork Tributary	9.8 acres, RE-1 cluster option, proposed 5 lots includes parkland dedication and acquisition.	Sediment control permit issued. Construction nearing completion.
Briarcliff Manor West (Baldi Property)	Right Fork Tributary	58.15 acres, 56 lots proposed	In the last phase of construction.
Briggs Chaney Road/Old Columbia Pike Intersection improvements	Right Fork Tributary	1 acre	Preliminary and final water quality plans approved.
Calvin Williams Subdivision	Good Hope Tributary	1 lot	No plan of subdivision. Sediment control permit issued. Overlay zone requirements conditionally waived due to long driveway created by flag lot. Onsite stormwater management to be provided.
Camp Property	Good Hope Tributary	5.7 acres, RE-2C, 2 lots.	Preliminary/Final water quality plan approved. Sediment Control permit pending.
Carlton Subdivision (Rose Property)	Right Fork Tributary	2.9 acres, R-200	Preliminary/Final water quality plan approved.

Table 12. (continued)

Cedar Ridge Community Church (Spencer Farm)	Right Fork Tributary	12.3 acres, Proposed church	Preliminary and final water quality plans approved. Sediment control permit issued. Under construction.
Cloverly Safeway	Good Hope Tributary	2.6 acres, C-1 Renovation	Construction complete. As-Builts pending.
Cloverly Town Center	Good Hope Tributary	3.13 acres, C-1 (0.57 acres in SPA)	Sediment control permit pending.
Colesville Heights	Left Fork Tributary	0.5 acres, RE-1, 1 lot	Preliminary and final water quality plans approved. Sediment control permit issued.
Davila Residence, Ethel Lee Pell property	Left Fork Tributary	2.0 acres, RE-1 1 lot	No plan of subdivision. Meets overlay zone requirements. Construction complete.
Drayton Farms (Parr's Ridge)	Left Fork Tributary	63.5 acres, RE-1 cluster option	Preliminary and final water quality plans approved. Permit issued. Under construction.
Fairland Acres	Upper Paint Branch Mainstem	3.7 acres, R-200	Preliminary / final water quality plans approved. Under construction.
Fairland - County Community Center	Right Fork Tributary	9.8 acres	Construction complete. As-built approved.
Fairland Gardens	Right Fork Tributary	1.0 acre, one lot.	Preliminary / final water quality plans approved.
Fairland Gardens	Right Fork Tributary	5.9 acres, R-200, 5 lots previously approved, with 3 new lots proposed)	Construction is substantially complete. Awaiting as-built.
Fairland Gardens Pond Retrofit	Right Fork Tributary	1.6 acres	Sediment control permit pending.
Fairland, Freedmans Addition to	Upper Paint Branch, Mainstem	1 lot	No plan of subdivision. Sediment control permit issued. Overlay zone requirements met.
Good Hope Community Center	Good Hope Tributary	0.2 acres, spray park (modification to existing community center)	Preliminary / final water quality plans approved. Construction complete.

Table 12. (continued)

Good Hope Estates	Left Fork Tributary	3.9 acres, RE-1 3 lots	One lot complete, second new lot has not yet started construction.
Good Hope Union United Methodist Church	Good Hope Tributary	7.7 acres, new church	Construction complete, As-Built pending.
Great Hope Homes	Good Hope Tributary	11.5 acre, new community center	Preliminary / final water quality plans approved.
Gum Springs Stream Restoration	Gum Springs Tributary	1.0 acres	Sediment control permit pending.
Han Property	Right Fork Tributary	4.9 acres, R-200	Preliminary / final water quality plans approved. Sediment control permit pending.
Harding Subdivision	Upper Paint Branch, Mainstem	2.6 acres, R-200	Preliminary/Final water quality plans approved.
Hardings Subdivision – Parcel 135	Upper Paint Branch Mainstem	1.0 acres, R-200	Preliminary / final water quality plans approved.
Harding's Subdivision, Lot 16	Upper Paint Branch, Mainstem	0.7 acre	Not a plan of subdivision. Sediment control permit issued. Overlay zone requirements waived with conditions due to lot setback requirements in an established neighborhood.
Hunt Property - Lions Den	Right Fork Tributary	78.7 acres, RE-1	Preliminary/ final water quality plans approved. Under Construction.
Hunt Property - Miles Tract	Right Fork Tributary	48.2 acres, PD-2	Preliminary/final water quality plan approved.
Kaplan Property	Right Fork Tributary	2.17 acres, R-200, 2 lots	Preliminary and final water quality plans approved
LaRoe Property	Left Fork Tributary	14.4 acres, RE-1 (9.4 acres in SPA)	Preliminary water quality plan withdrawn. Property sold to SHA due to ICC alternative.
Lord Subdivision	Right Fork Tributary	1.16 acres, R-200, 3 lots proposed	Preliminary / final water quality plans approved.
Old Columbia Pike Pedestrian Improvements	Upper Paint Branch mainstem	0.75 acres, DPWT Roadway / Sidewalk improvements	Revised preliminary / final water quality plans approved.

Table 12. (continued)

Sines Property	Left Fork Tributary	2.5 acres, RE-1, 2 lots	Preliminary / final water quality plans approved.
Snowdens Manor, Enlarged P572	Good Hope Tributary	1.0 acre	No plan of subdivision. Sediment control permit issued. Overlay zone requirements met.
Spencer Farm	Right Fork Tributary	7.9acres in the SPA Church / School	Preliminary and final water quality plans approved.
Spencerville Post Office	Right Fork Tributary	3.9 acres, RE-1 Proposed U.S. Post Office	Preliminary and final water quality plans approved. Construction completed.
Thompson Road Sidewalk	Left Fork Tributary	0.5 acres	Preliminary / final water quality plans approved. Construction completed.
Tofigh Property	Mainstem	1.8 acres, R-200	Preliminary / final water quality plans approved.
Snider's Estates	Left Fork Tributary	8.1 acres, RE-1	Preliminary / final water quality plans approved.

4.2.4 Summary of BMP Monitoring in the Upper Paint Branch SPA

All development projects required to do BMP monitoring in the Upper Paint Branch SPA are

listed in Table 13. Four (4) of the eight (8) projects listed have completed construction. Three (3) projects are currently under construction and one (1) project has not yet begun.

Table 13. Paint Branch BMP Monitoring

PROJECT NAME & CONSULTANT CONDUCTING THE MONITORING	REQUIRED BMP MONITORING	REQUIRED TIME FRAME FOR BMP MONITORING	DATA SUBMITTED THUS FAR
Fairland Community Center / *Environmental Quality Resources, Inc.* *(Construction completed)*	**3 continuous temperature loggers** **2 groundwater wells** **photo documentation of bioretention area and annual survey of plant species**	**pre-development monitoring:** 1 year **during-construction monitoring:** until site is stabilized and sediment pond is converted to SWM pond **post-construction monitoring:** 3 years	**temperature data:** 3/98 - 9/98 6/99 - 9/99 6/00 - 9/00 6/01 - 9/01 **groundwater data:** 3/98 - 3/02
Briarcliff Manor West (formerly Baldi Property) / *Environmental Systems Analysis, Inc.* ***(construction began 8/99)***	**1 groundwater observation well** **2 surface water quality stations:** *pH, Conductivity, Dissolved Oxygen, Turbidity* **3 continuous water temperature loggers** **1 continuous air temperature logger** **2 embeddedness stations** **channel cross section** **1 stream flow logger**	**pre-development monitoring :** 1 year **during-construction monitoring:** until site is stabilized with functioning stormwater management facilities **post-construction monitoring:** 1 year	**groundwater data:** 9/98 - 12/01 **surface water quality data:** 9/98 - 12/01 **temperature data:** 9/98 - 9/01 **embeddedness data:** 9/98 - 11/01 **channel cross section data:** 9/98, 10/99, 4/00, 3/01, **stream flow data:** 11/98 - 12/99, 1/01-12/01
Cloverly Safeway / *Rodgers Assoc*. *(construction complete)*	**1 continuous water temperature logger** **water quality:** Cadmium, Copper, Lead, Zinc, Hydrocarbons	**Pre_Construction:** 3 storms, Temperature. **During construction:** No monitoring **Post_Construction:** 3 storms per year for 5 years, Temperature.	**temperature data:** 9/98 **water quality data:** 5 storms 9/98-11/99

Table 13 (continued)

PROJECT NAME & CONSULTANT CONDUCTING THE MONITORING	REQUIRED BMP MONITORING	REQUIRED TIME FRAME FOR BMP MONITORING	DATA SUBMITTED THUS FAR
Hunt Lions Den / *Environmental Systems Analysis, Inc.* *(Construction began 1/02)*	**2 groundwater wells** **2 continuous water temperature loggers** **2 surface water quality stations:** *pH, Conductivity, Dissolved Oxygen, Turbidity* **5 stream channel cross sections**	**pre-development monitoring:** 1 year **during-construction monitoring:** until site is stabilized and sediment pond is converted to SWM pond **post-construction monitoring:** 3 years	**groundwater data:** 8/00 - 1/01 **temperature data:** 8/00 - 9/01 **water quality data:** 8/00 - 10/01 **stream channel cross sections:** 9/00, 9/01
Parr's Ridge (Formerly Drayton Farms) / *Macris, Hendricks and Glascock* *(construction began 5/01)*	**1 groundwater well**	**pre-development monitoring:** 1 year **during-construction monitoring:** until site is stabilized and sediment pond is converted to SWM pond **post-construction monitoring:** 3 years	**Groundwater data:** 5/1/97 – 10/1/98 (pre-construction) 5/1/01 – 5/2/02 (during construction)
Fairland Gardens *(construction complete)*	**1 continuous flow logger**	**Logger provided to DEP for long term monitoring of stream flow in the Right Fork of Paint Branch.**	**Flow data:** **4/00 – 4/02**
Good Hope Union United Methodist Church *(construction complete)*	**1 groundwater well**	**pre-development monitoring:** 1 year **during-construction monitoring:** until site is stabilized and sediment pond is converted to SWM pond **post-construction monitoring:** 3 years	**Groundwater data:** None received
Snider's Estates *(not yet under construction)*	**TSS sampling** – during construction **Nutrient and chemical sampling** – post construction	**pre-development monitoring:** none **during-construction monitoring:** until site is stabilized and sediment pond is converted to SWM pond **post-construction monitoring:** 3 years	**No data submitted to date**

Fairland Community Center (post-construction)

The Fairland Community Center was completed during the spring of 2002. This site was required to provide information on stream temperatures and groundwater levels. Photo documentation of plantings in a bioretention area was also required. Unfortunately, the planned bioretention area did not drain properly. Water collected and did not move to the underdrains as it was designed to and the BMP was reconfigured to act as a large grassy swale rather than a bioretention area. Consequently, there is no need for photos of the plantings. Information on groundwater levels and water temperature at the site were submitted this past year. Unfortunately, the data we received was not usable. Calibration of the temperature loggers after monitoring indicated that they were not reading accurately. Additionally, DEP still has not received adequate information on elevation of groundwater wells on the site. The contract with the firm doing the monitoring of the site has ended. Because this is a County project, DEP will be taking over BMP monitoring for the post-construction period. The BMP's at the site were converted over from sediment control to act as water quality structures in early summer 2001. Data on post construction conditions at the site will be collected during 2002. It is hoped that comparisons with pre-construction conditions can be made in next year's annual report.

DEP is considering the Fairland Community Center as a possible site for a Low Impact Development (LID) demonstration project. This would include installation and monitoring of bioretention areas on the site.

Braircliff Manor (during-construction)

The Briarcliff Manor West site (figure 15) is essentially complete but the sediment control ponds have not yet been converted to stormwater management facilities. The ponds should be converted soon and the first year of post-construction data should be submitted during 2002. BMP monitoring began in September of 1998 and construction began in August of 1999. This past year DEP received information on stream temperatures, groundwater levels, stream flows and a channel cross section survey. Reliability of groundwater data from the site is questionable as it is not compatible with data submitted during 1999 - 2000. The data shows large fluctuations in well levels at the site this past year. Some of these values are very difficult to explain and may be suspect. Furthermore, similar fluctuations were not observed in prior years at the site. Consequently groundwater data is not presented here. The channel cross section surveys from the site are plotted in figure 16. The surveys show that the channel is somewhat dynamic but generally stable. Some deposition of woody debris and other material has occurred on the right bank (facing upstream). This woody debris may account for some of the movement seen in this channel. Temperature plots from summer of 2001 (figure 17) indicate that sediment pond #1 has a slight warming effect on Greencastle Tributary. This effect is only seen periodically throughout the summer during dry hot periods. The effect was strongest during early August when the stream was warmest and the impact would have been most detrimental. Stream monitoring results indicate a decline in health of the benthic macroinvertebrate community in Greencastle Tributary during the spring of 2001. Temperature data from 2000 is unreliable because the logger was exposed to air and recorded air temperatures. Assuming thermal impacts discovered during the summer of 2001 existed during 2000, this warming effect may have played a role in declining condition of the benthic macroinvertebrate community observed in spring of 2001.

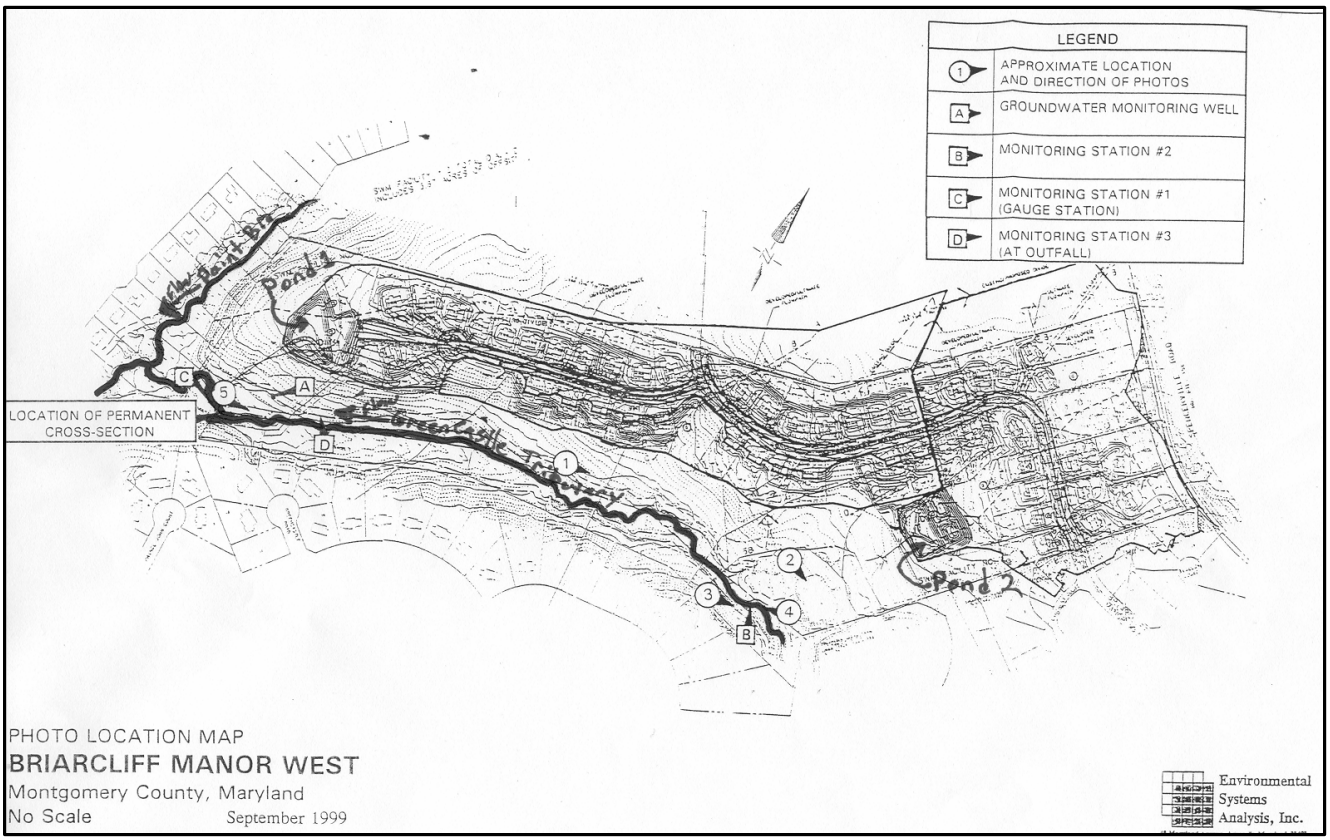

Figure 15. Map of Briarcliff Manor West and Associated Sediment / Stormwater Management Ponds.

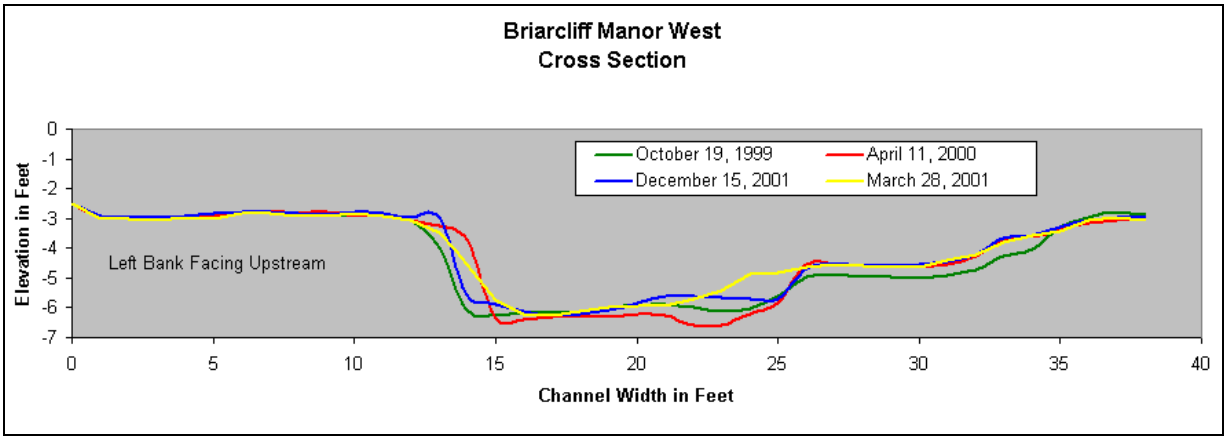

Figure 16. Stream channel cross sections from the Greencastle Tributary which receives run-off from Briarcliff Manor.

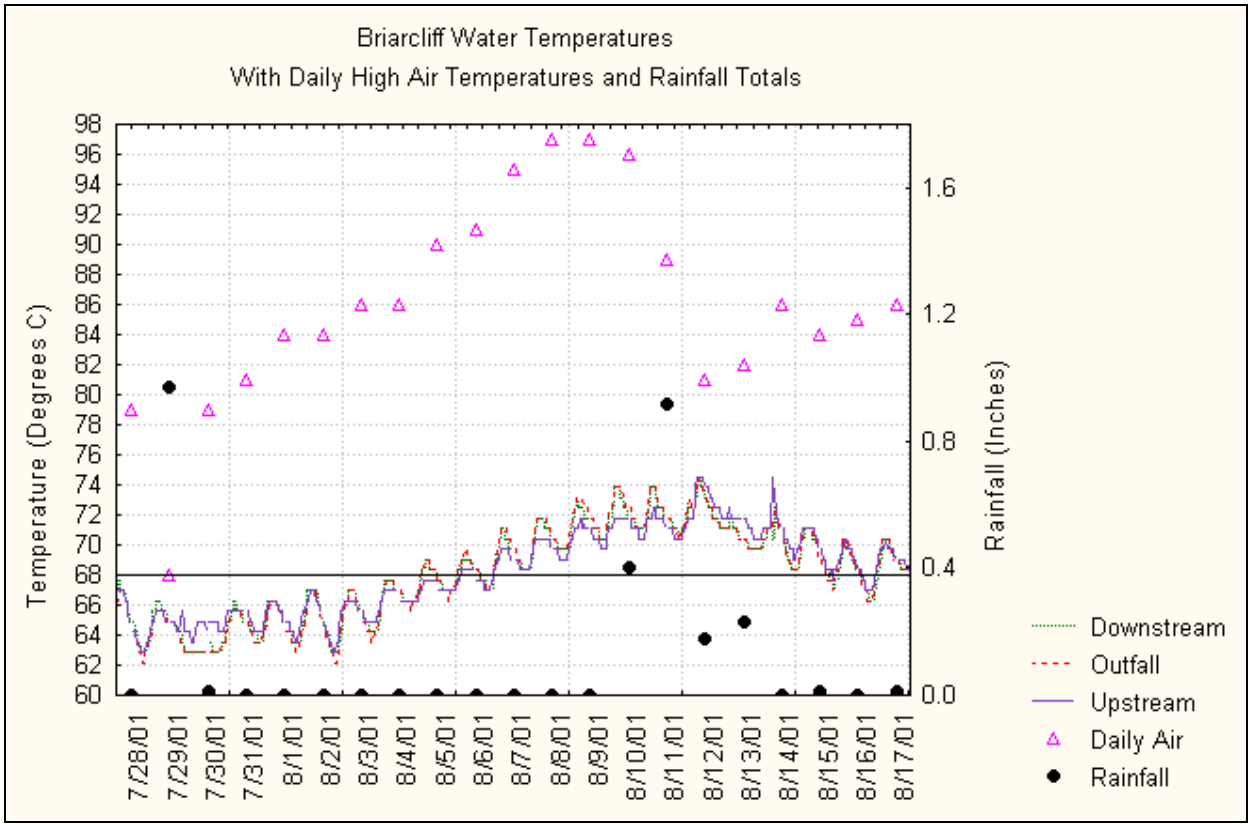

Figure 17. Stream water temperatures in Greencastle Tributary.

Cloverly Safeway (post-construction)

Pre-construction monitoring of the Cloverly Safeway project included water chemistry analysis of storm events. This work measured the concentration of metals and petroleum hydrocarbons in parking lot runoff. It found elevated levels of copper and zinc in stormwater runoff. When we get post-construction data we can compare it to the pre-construction data to evaluate the effect of the project and BMPs on these pollutants. The project was essentially completed and the store reopened in early 2001. Unfortunately, in the past year Safeway has made little progress in getting their required BMP final inspections. Their sediment control permit expired in November of 2001 and as of February 2002 they do not have a sediment control permit for the project. DPS has received complaints and sediment control inspectors have issued notices of violation for problems at the site. Safeway has also failed to respond to county requests to sign a contract with the consultant that completed their pre-construction monitoring to do the required post-construction monitoring of the site in a timely manner. If they had, this would be one of the first SPA development projects with pre-construction data to compare with conditions after construction. DPS has notified Safeway that the bond on the project will be held until this issue has been resolved.

Hunt / Lions Den (during-construction)

BMP monitoring at Hunt/Lions Den includes two groundwater wells, water quality readings from two locations (upstream and downstream of SWM outfall), stream channel cross section surveys at five locations. Pre-construction monitoring began in August of 2000. Construction on the site began in January of 2002. All data submitted to date will be used to establish pre-construction baseline conditions against which future data will be compared.

Parr's Ridge (during-construction)

This site (formerly called Drayton Farm) is a 63.5 acre parcel of land located northwest of Spencerville Road (Rt. 198) and Oak Hill Road. The property straddles the ridgeline between the Paint Branch and Patuxent watersheds. The only portion of the development draining to Paint Branch are rooftops and backyards of six lots. Stormwater management for this small area includes a 200 foot wide, vegetated buffer behind the lots. The buffer area is required to promote infiltration of stormwater and groundwater recharge.

BMP monitoring of the site includes one groundwater well in the vicinity of the vegetated buffer to evaluate how effective this feature is at groundwater recharge. Pre-construction monitoring data for 1997 – 1998 has been submitted to DEP. Construction on the site began in May of 2001. Results from 2001 show groundwater levels are lower then the pre-construction years 1997 and 1998. This is believed to be due to extended drought, rather then construction activities on the site.

4.2.5 Summary of Stream Monitoring in the Paint Branch SPA

Baseline stream monitoring began in 1994 and is done on an annual basis at most stations throughout the Paint Branch SPA. Monitoring in 2001 was completed at 11 stations. In general, the fish community showed little change from previous years. The benthic macroinvertebrate community declined in the Right Fork and improved in the Gum Springs tributary.

Temperature studies were conducted during summer of 2001 in two areas of the Upper Paint Branch, Good Hope (Forester Pond) and Gum Springs (Oak Springs by-pass pipe). The purpose was to assess effectiveness in mitigating thermal impact from these areas.

4.2.5.a Biological Monitoring Results

Fish sampling was completed at nine (9) stations during 2001. Index of Biological Integrity scores calculated from monitoring results indicate little change from previous years (Figure 18). However, numbers of brown trout adults and young-of-year continue to be low for a second year

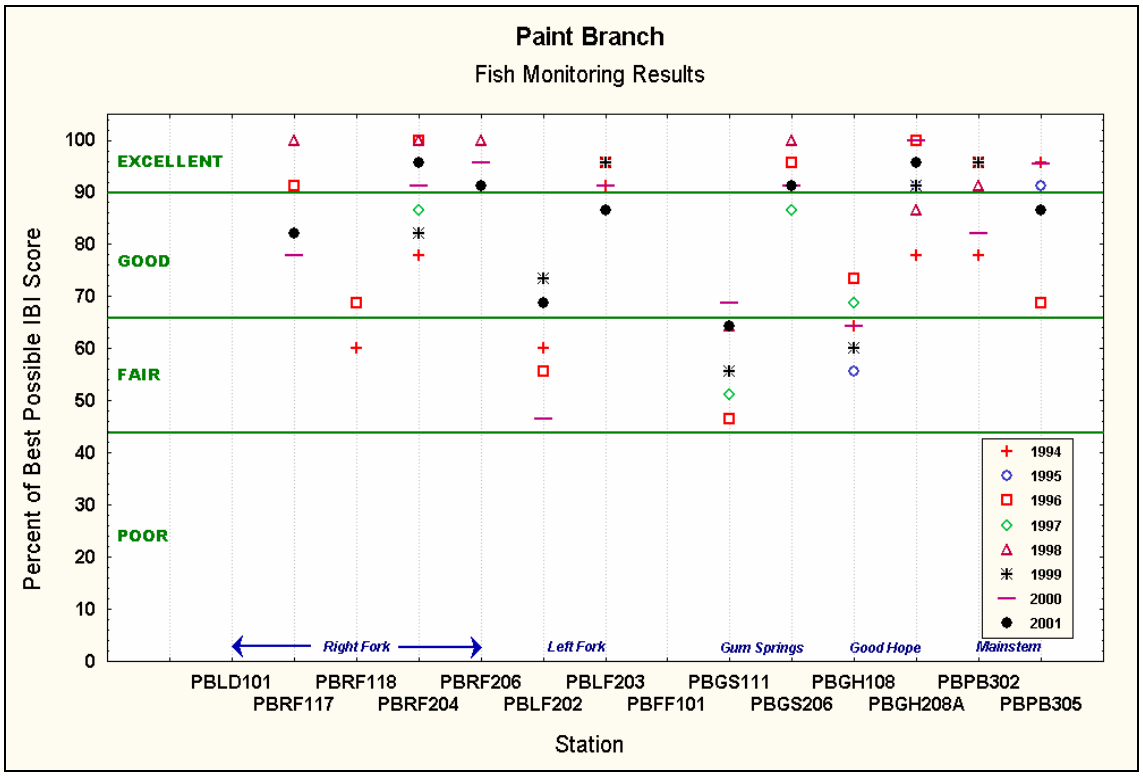

Figure 18. Results of Fish Monitoring for All Years

throughout most of the watershed. Numbers of brown trout dropped off in 2000 throughout the watershed in response to the 1999 drought. Little recovery occurred during 2001 except in lower Good Hope (PBGH208A) and Gum Springs (PBGS111, PBGS206) where numbers of young-of-year trout were up (Table 14). These results are consistent with results reported by the Maryland Department of Natural Resources (DNR). DNR's estimate of the brown trout population show numbers of young-of-year had increased in 2001 at both areas.

Table 14. Brown Trout data from Upper Paint Branch

Station		1994	1995	1996	1997	1998	1999	2000	2001
PBRF117 *(Right Fork)*	No. of Adult trout	1	N/S	0	2	6	N/S	0	0
	No. of YOY trout	0	N/S	2	9	5	N/S	0	2
PBRF204 *(Right Fork)*	No. of Adult trout	5	N/S	2	3	8	2	0	0
	No. of YOY trout	5	N/S	2	7	4	1	0	0
PBRF206 *(Right Fork)*	No. of Adult trout	N/S	N/S	N/S	N/S	2	N/S	0	0
	No. of YOY trout	N/S	N/S	N/S	N/S	3	N/S	0	0
PBLF202 *(Left Fork)*	No. of Adult trout	0	N/S	0	0	N/S	0	0	0
	No. of YOY trout	0	N/S	0	0	N/S	0	0	0
PBLF203 *(Left Fork)*	No. of Adult trout	2	N/S	0	0	N/S	0	0	0
	No. of YOY trout	0	N/S	1	0	N/S	0	0	0
PBGS111 *(GumSprings)*	No. of Adult trout	7	N/S	0	0	2	1	1	0
	No. of YOY trout	41	N/S	0	1	0	0	0	8
PBGS206 *(GumSprings)*	No. of Adult trout	10	2	4	0	2	N/S	0	0
	No. of YOY trout	21	0	0	2	1	N/S	0	21
PBGH108 *(Good Hope)*	No. of Adult trout	2	2	1	0	N/S	0	0	N/S
	No. of YOY trout	2	0	2	25	N/S	0	1	N/S
PBGH208A *(Good Hope)*	No. of Adult trout	25	17	16	15	10	14	3	6
	No. of YOY trout	21	0	0	18	10	18	8	12
PBPB302 *(Mainstem)*	No. of Adult trout	2	N/S	1	2	6	1	1	N/S
	No. of YOY trout	0	N/S	0	16	1	3	0	N/S
PBPB305 *(Mainstem)*	No. of Adult trout	19	8	0	3	N/S	N/S	2	0
	No. of YOY trout	6	0	0	5	N/S	N/S	0	8

(N/S = Not Sampled)

Gum Springs By-Pass Pipe

The return of young-of-the-year brown trout in Gum Springs is particularly encouraging because it follows completion of the Gum Springs by-pass pipe in July of 2000 (a joint project between the U.S. Army Corps of Engineers, DEP and M-NCPPC). Benefits from the by-pass pipe which have a direct influence on the brown trout population and the stream ecosystem as a whole include: 1) elimination of thermal barrier as warm water discharge from Oak Springs no longer enters Gum Springs, 2) reduction in peak storm flows in lower Gum Springs as some stormwater is now diverted through the by-pass pipe to the Paint Branch mainstem.

Maydale Fish Barrier Removal

The fish community in the Left Fork is showing signs of improvement at PBLF202 located just downstream of Good Hope Rd. This is due to the return of sculpins (a sensitive, bottom dwelling fish species absent since 1999) and to higher overall number of individuals. It is noteworthy that the downstream fish barrier at Maydale Nature Center was removed in 2000 and may have been a contributing factor to the higher number of fish.

Right Fork Decline

Benthic macroinvertebrate monitoring results from 2001 indicate declining stream condition throughout the Right Fork except at station PBLD101, located in a small tributary draining the Hunt/Lions Den development. Development activity began on Hunt/Lions Den in January of 2002 and therefore any possible impacts would not have been observed in spring of 2001 when sampling was done. Declining conditions between 2000 and 2001 throughout the rest of the Right Fork are greatest at station PBRF118, located in the Greencastle tributary which receives runoff from two new development projects (Briarcliff Manor and Fairland Community Center). BMP monitoring results from Briarcliff Manor indicate some increase in stream water temperature and build-up of sediments in the stream channel (section 4.2.4). These impacts could be contributing to the declining condition of the benthic macroinvertebrate community. If they are, impacts are expected to be short lived because sediment control ponds will soon be converted to dry detention ponds, eliminating thermal impacts, and the site stabilized, eliminating soil erosion.

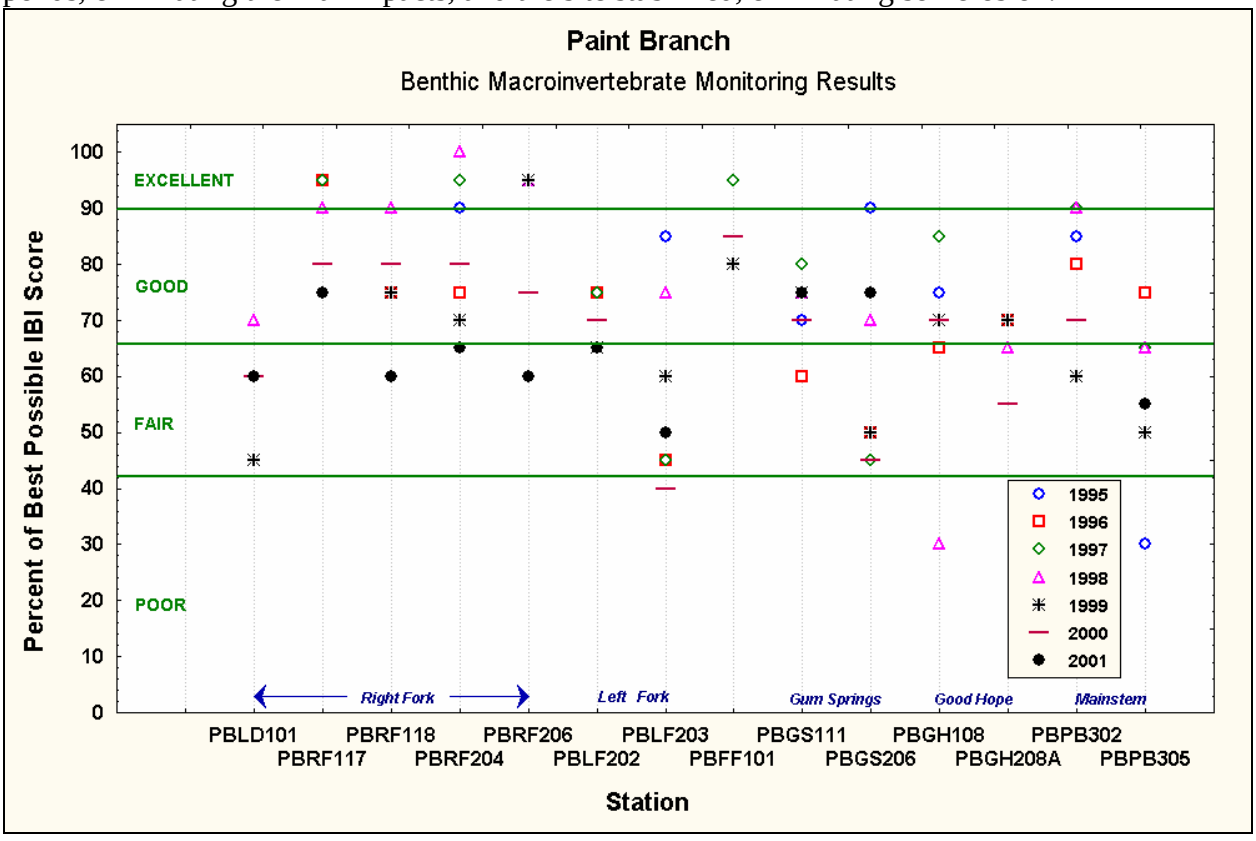

Figure 19. Results of Benthic Macroinvertebrate Monitoring

The 2000 SPA annual report included some discussion on benthic macroinvertebrate results from upper Good Hope (PBGH108) and the apparent short-term impact of unknown origin that occurred between spring of 1997 and 1998. Results from 1999 indicated a recovery and 2000 results were not available. Results from 2000 are now available and confirm that this was a short-term impact as condition here has recovered and is in the good range for a second year. Sampling was not conducted here in 2001 but will be done at both Good Hope monitoring stations in 2002. In

addition, temperature monitoring will be done during 2002 in upper Good Hope to determine if any thermal impacts exist from a recently completed stormwater management pond at Piping Rock Drive.

One of the trends in the benthic macroinvertebrate data from1995 – 2000 shows conditions declining in an upstream to downstream fashion along two tributaries, Left Fork and Gum Springs. In other words, conditions were worse in the lower reaches of these tributaries then the upper. Results from 2001 show this trend no longer holds up in Gum Springs. Both stations in Gum Springs (upper and lower) scored in the good range. Improved condition of the benthic macroinvertebrate community at the lower station in Gum Springs is consistent with results of fish monitoring which show a high number of brown trout young-of-year. Benefits of the Oak Springs by-pass pipe mentioned above may have a direct influence on the stream ecosystem. Preliminary monitoring results indicate a positive response in both the fish and benthic marcoinvertebrate communities to these benefits.

To look for trends over the entire monitoring period of 1994 – 2001, regression analysis was performed on all IBI scores. The data set was broken up into the five sub-watershed units that make-up the Paint Branch SPA (Right Fork, Left Fork, Gum Springs, Good Hope and Mainstem). Regression analysis was performed on data sets containing fish and benthic macroinvertebrate IBI scores independently. Results of the analysis revealed only one statistically significant trend. Benthic macroinvertebrate IBI scores from the Right Fork show a statistically significant negative trend over time (figure 20).

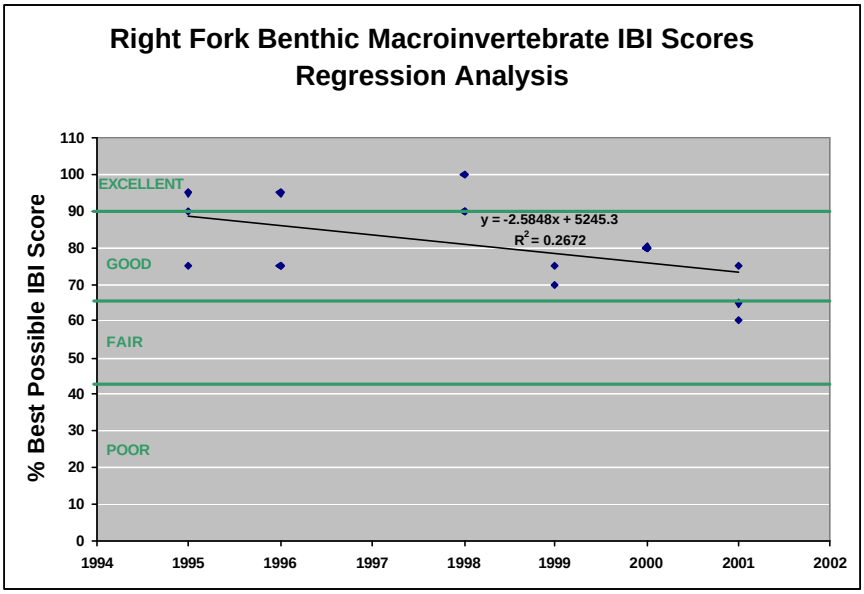

Figure 20. Regression analysis of benthic macroinvertebrate monitoring results (P=0.031). Observations are from sta.'s PBRF117, PBRF118 and PBRF204 (no 1999 data for PBRF117).

Neither the fish nor benthic macroinvertebrate data sets from any of the other sub-watersheds show a statistically significant trend in any direction. This means that the biological community (as measured by 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 change to the biological community is the Right Fork.

4.2.5.b Habitat Monitoring

Rapid Habitat Assessment

Results of all habitat assessments done in Paint Branch are summarized in Figure 21. Habitat scores have generally remained in the sub-optimal range at all stations. This means that overall habitat conditions of the Upper Paint Branch are adequate to support a diverse biological community. However, problems with stream habitat identified in previous SPA annual reports still exist. These include lack of stream-side forest buffer in the upper Left Fork and middle portions of Gum Springs and sediment deposition in the Right Fork.

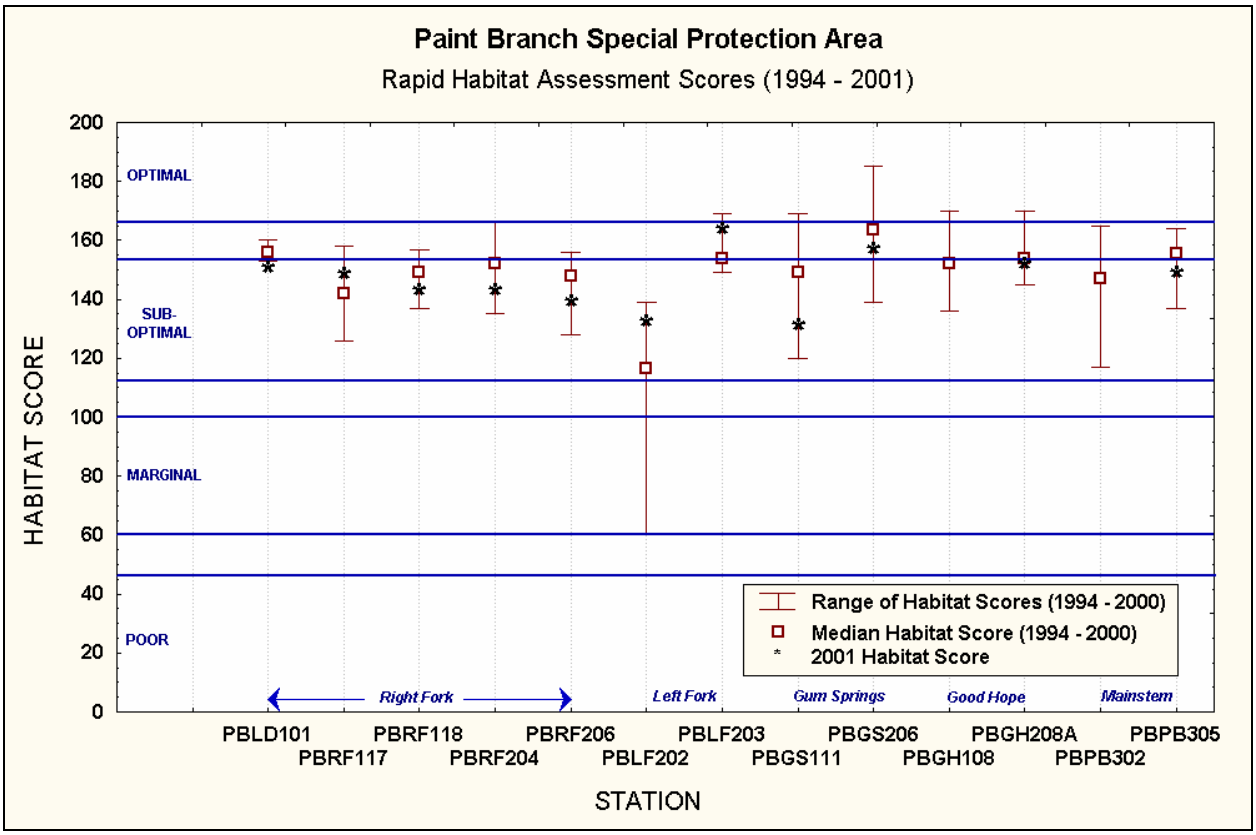

Figure 21. Results of all Rapid Habitat Assessments Completed in Paint Branch

Public Land Encroachment Issues

Last years annual report identified encroachment into public lands as the cause of poor riparian forest buffer. The Montgomery County Water Quality Advisory Group (WQAG) adopted a resolution (No. 04-2001) on September 10, 2001 proposing certian actions to address this matter.

The resolution and the M-NCPPC response can be found in appendix 2.

The status of continuing interagency efforts to enforce encroachment laws will be reported on in future SPA annual reports.

Quantitative Stream Habitat Monitoring

Quantitative habitat monitoring was not completed at any DEP monitoring station in the Paint Branch SPA during 2001. Currently at least three years of quantitative habitat measurements exist for each monitoring station to provide baseline condition. Because observable changes in channel morphology are generally slow, this monitoring will be scaled back in frequency. Stream channel profile measurements were done in areas of the Right Fork as part of required BMP monitoring on the Hunt/Lions Den and Briarcliff Manor development projects. Results from this monitoring are in the BMP section of this report.

4.2.5.c Stream Temperature Monitoring

Continuous temperature loggers were deployed at ten locations in Paint Branch SPA during the summer of 2001. Seven loggers were placed in the vicinity of Oak Springs by-pass pipe (Gum Springs) to study effectiveness in mitigating thermal impact from the Oak Springs storm water management pond. Three loggers were placed in the Colesville Depot tributary to document effectiveness in mitigating thermal impact from the Forester Pond.

Gum Springs Temperature Monitoring Results

Temperature loggers were placed at seven locations in and around the Gum Springs tributary, repeating a temperature study first conducted during the summer of 1999 (figure 22). The 1999 temperature study found that water temperature in the Oak Springs tributary was 4^{0}(F) warmer, on average, then 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 1.5^{0}(F).

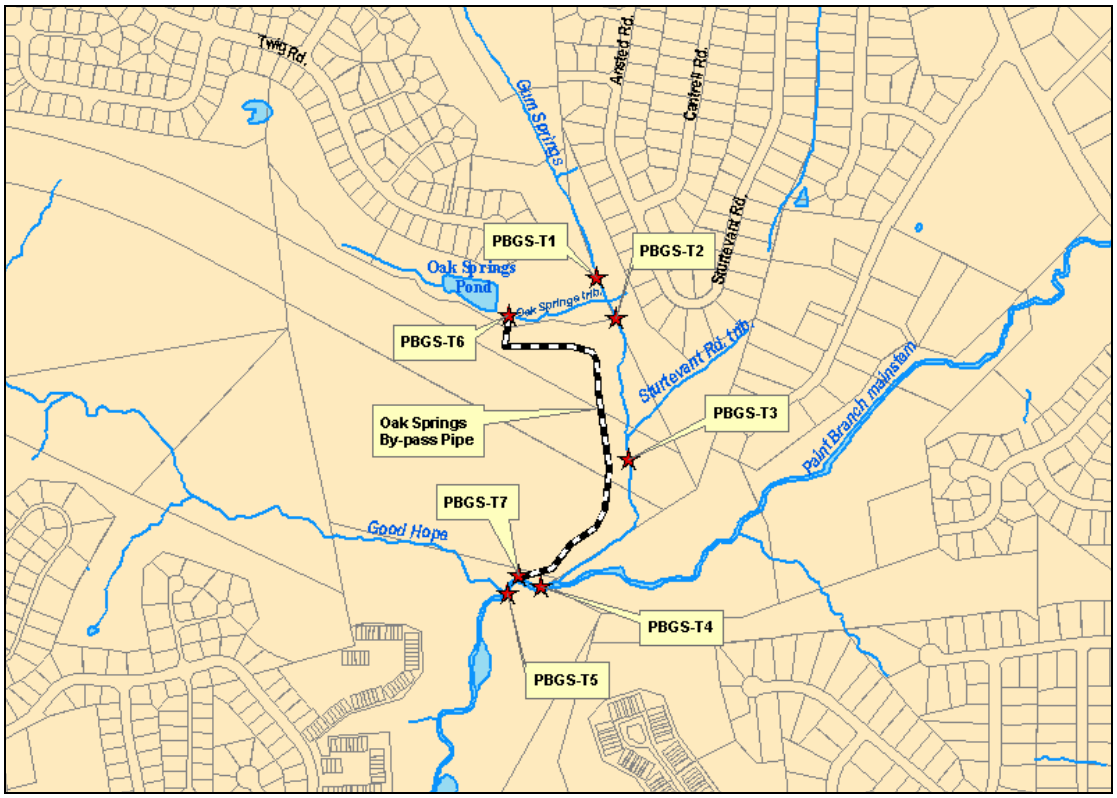

Figure 22. Locations of Temperature Loggers for Oak Springs Temperature Study

Oak Springs By-pass Pipe Temperature Study

The Oak Springs by-pass pipe, completed in July of 2000, conveys warm water discharge from the Oak Springs storm water management pond 1,900 feet to the 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 ^{0} (F) on average (2000 SPA annual report). Results from 2001 show an average decrease of 4.2 ^{0} (F) between PBGS-T6 and PBGS-T7 (figure 23).

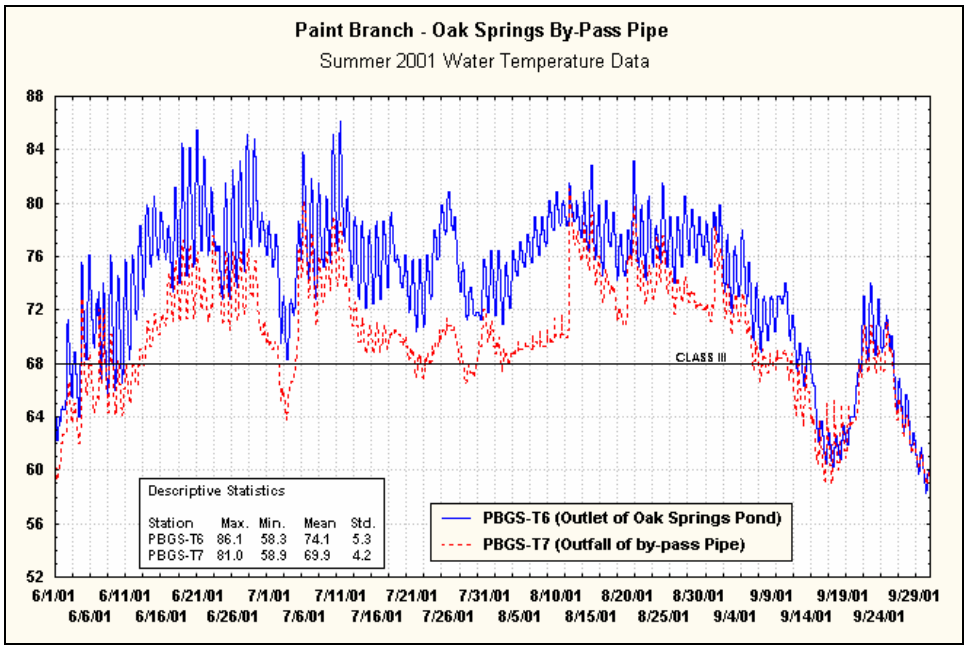

Figure 23. Water Temperature Data From Oak Springs By-Pass Pipe

Data from two loggers placed in Gum Springs, upstream (PBGS-T1) and downstream (PBGS-T2) of the confluence with Oak Springs tributary, show no difference of average water temperature (figure 24). Thermal impacts that had existed prior to installation of the by-pass pipe are no longer present. Data from a logger placed in Gum Springs, just downstream of the confluence with Sturtevant Rd. tributary (PBGS-T3), show temperatures are slightly higher. The increase is due to either normal stream warming or influence from Sturtevant Rd. tributary.

Loggers were placed in the mainstem of Paint Branch at locations upstream (PBGS-T4) and downstream (PBGS-T5) of the pipe outfall to determine if the by-pass pipe is causing thermal impact in the mainstem. Results show slightly cooler water temperature downstream of the outfall by an average of 0.6^{0} (F) (figure 25). This suggests that water conveyed through the by-pass pipe is cooled enough to not cause thermal impact in Paint Branch mainstem.

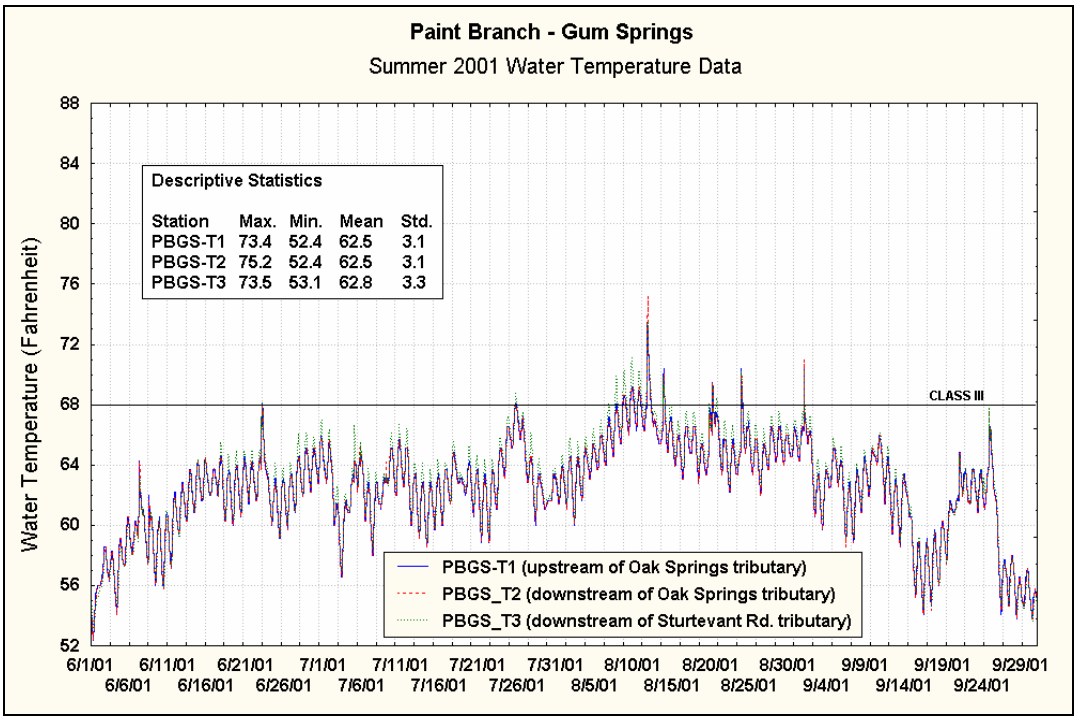

Figure 24. Water Temperature Data From Gum Springs

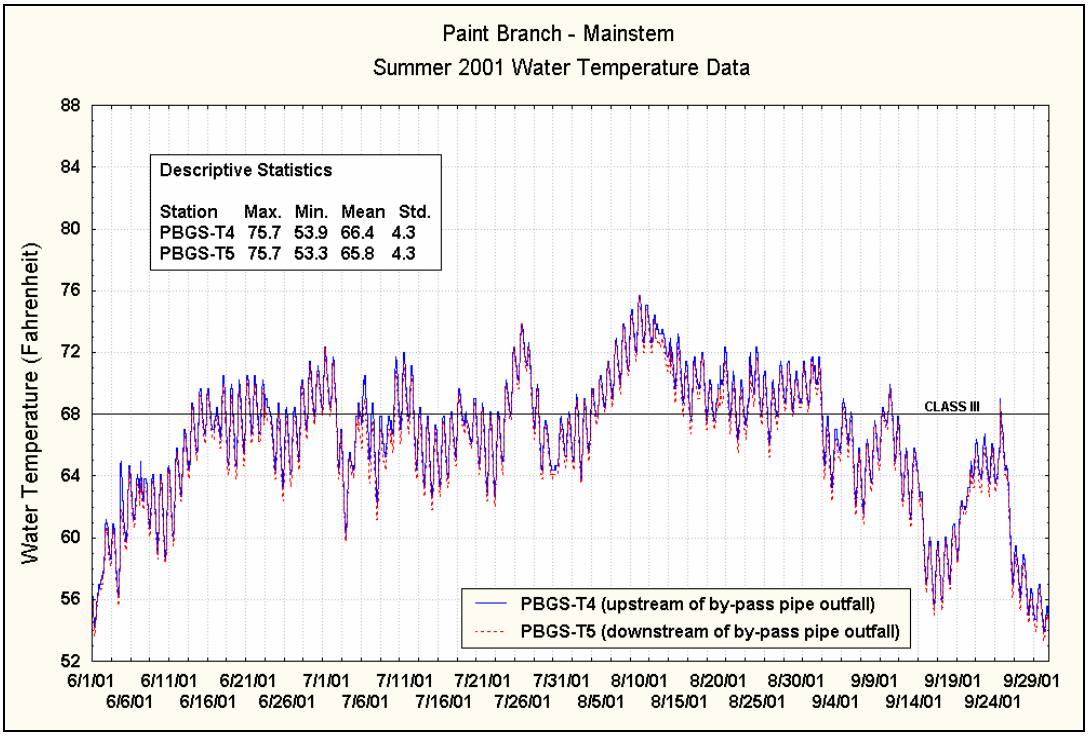

Figure 25. Water Temperature Data From Paint Branch Mainstem

Colesville Depot Tributary Temperature Monitoring Results

A temperature study of the Colesville depot tributary conducted by DEP during the summer of 1995 identified the Forester Pond, an old farm pond, as causing thermal impact. Results from follow-up monitoring showed average water temperature increases by 6.0^0 (F) during summer of 1999 and 3.1^0 (F) in 2000 due to warm water discharge from the Forester pond.

DEP developed plans and installed a project on the Forester Pond to address the thermal impacts. The project involved lowering water elevation in the pond thus decreasing overall volume. In addition, wetland plantings were installed to provide shading over the remaining water surface. The project was completed in September of 2000.

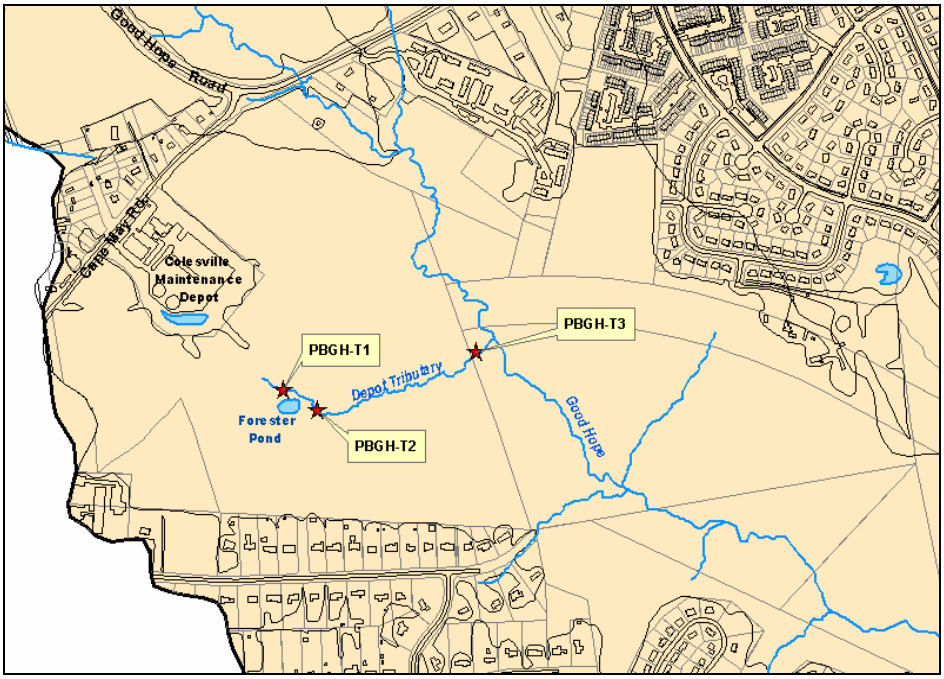

Figure 26. Locations of Temperature Loggers in Colesville Depot Tributary

In 2001 temperature loggers were placed in Colesville Depot tributary (figure 26) at the same three locations as previous years to determine if thermal impacts have been reduced. Results indicate water temperatures are still elevated by 6.1^0 (F) at station PBGH-T2, downstream of the Forester Pond (figure 27).

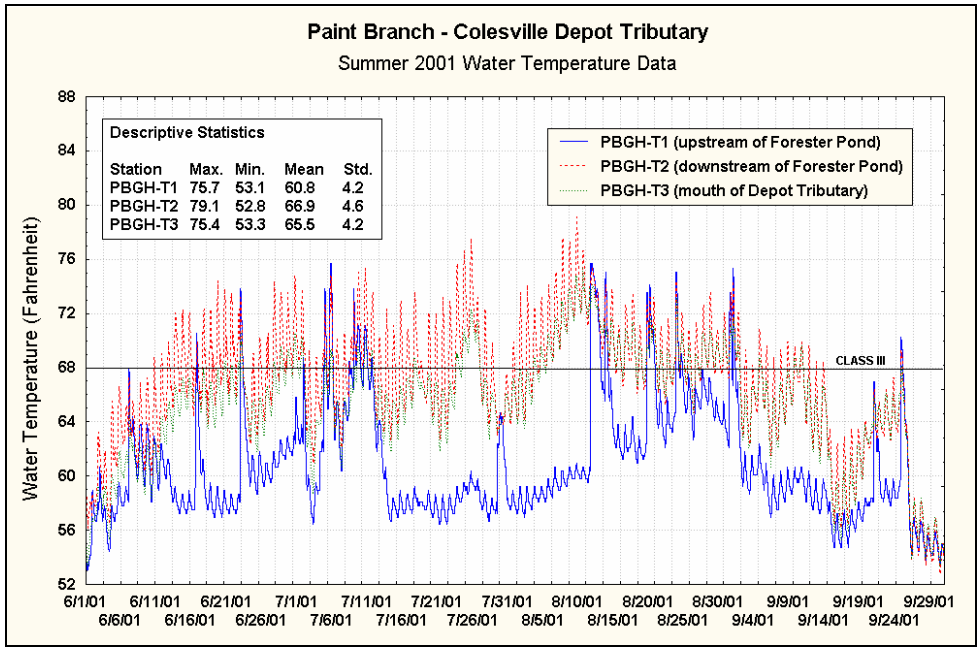

Figure 27. Water Temperature Data From Colesville Depot Tributary

These results suggest that lowering the water surface in the pond has not yet helped in reducing thermal impact on Colesville Tributary. Wetland vegetation planted in the reduced pond area has not had sufficient time to grow and provide shading. It is anticipated that as newly planted vegetation grows and provides more canopy cover to the pond, water temperature will decrease. Monitoring will be done in the future to determine any additional benefit from greater vegetative canopy.