

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. To help better 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). The ten percent limit only applies to new development. Additions to existing homes are exempt. 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.

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 significant amount 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 as stream buffer areas 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 caused by development impacts that 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 August 2003, a total of nine restoration projects have been completed in the Paint Branch SPA. Eight projects are in the Good Hope subwatershed and one is in the Gum Springs subwatershed. Another seven projects are in the design phase, one in the Good Hope subwatershed, three in the Gum Springs subwatershed, two in the Right Fork subwatershed and one in the Left Fork subwatershed.

Additionally, downstream of the Special Protection Area, DEP completed 2.25 miles of stream restoration on the Paint Branch mainstem between Fairland Road and Route 29. Stream restoration along this stretch of Paint Branch included: bank stabilization, tree planting, lunkers and woody debris placement (for fish habitat), grade control, channel relocation to protect historical site. Restoration is expected to significantly improve habitat support for brown trout and other species. One year after project completion, field evaluations of this restoration work were completed in July of 2003 and indicate that much of this restoration has held up well and is functioning as designed. Field evaluations will be made in years three and five after project completion as well. DEP has also initiated a new watershed study, primarily for the Lower Paint Branch, which will also include some further evaluation on additional projects to increase stormwater control within the SPA.

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 24). 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 2003

Most of the proposed development projects within the Upper Paint Branch SPA have been for small (1 to 5 acre) residential subdivisions. Since there are no exemptions for smaller subdivisions within this SPA, each development must fully comply with the SPA regulations. This trend has been generally consistent since the SPA was implemented. However, there are two much larger residential subdivisions, Hunt Property-Lions Den (78.7 acres, under construction) and Hunt Property-Miles Tract

(48.2 acres, under construction), that are being 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.

Again during 2002, 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. Of all of the lots that were not subject to SPA regulations but that were reviewed by DPS for conformance to the impervious cap, only one single-family lot was granted a waiver due to hardship.

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 2002. For information on projects that were previously granted waivers of the 10 percent impervious cap by the Planning Board, please see last years (July 2002) annual report, available on line at <http://www.askdep.com>

Development projects that have been approved by the Planning Board incorporate forest preservation, afforestation/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 42 projects listed in Table 15, a total of 36 final water quality plans have been approved as of June 2003. Several of the projects are in the path of alternatives to the master planned Inter-County Connector and have been put on hold pending final decisions on the Inter-County Connector (ICC) alignment alternatives.

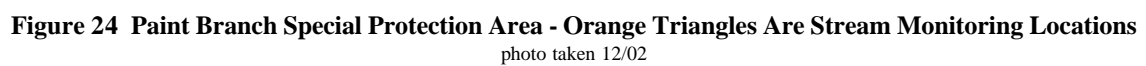


Table 15 Upper Paint Branch SPA Development Projects (1995 to June 2003)

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.	Construction nearing completion.
Briarcliff Manor West (Baldi Property)	Right Fork Tributary	58.15 acres, 56 lots proposed	In the last phase of construction. As-built plans in for review.
Briggs Chaney Road/Old Columbia Pike Intersection improvements	Right Fork Tributary	1 acre	Preliminary and final water quality plans approved. Sediment control approved. Under construction.
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. Under construction.
Carlton Subdivision (Rose Property)	Right Fork Tributary	2.9 acres, R-200	Preliminary/Final water quality plan approved.

Table 15. (continued)

Cedar Ridge Community Church (Spencer Farm)	Right Fork Tributary	12.3 acres, Proposed church	Construction complete. As-built under review.
Cloverly Safeway	Good Hope Tributary	2.6 acres, C-1 Renovation	Construction complete.
Cloverly Town Center	Good Hope Tributary	3.13 acres, C-1 (0.57 acres in SPA)	Under construction.
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	Construction complete. As-built under review.
Fairland Acres	Upper Paint Branch Mainstem	3.7 acres, R-200	Construction complete.
Fairland - County Community Center	Right Fork Tributary	9.8 acres	Construction complete.
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 Heights	Right Fork Tributary	0.56 acres, R-200	Preliminary/final water quality plan approved.
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 15. (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.
Great Hope Homes	Good Hope Tributary	11.5 acre, new community center	Preliminary / final water quality plans approved. Under construction.
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. Under construction.
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.

Table 15. (continued)

Old Columbia Pike Pedestrian Improvements	Upper Paint Branch mainstem	0.75 acres, DPWT Roadway / Sidewalk improvements	Revised preliminary / final water quality plans approved.
Sines Property	Left Fork Tributary	2.5 acres, RE-1, 2 lots	Preliminary / final water quality plans approved. Sediment control plan 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	7.9 acres 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. Under construction.

4.2.4 Summary of BMP Monitoring in the Upper Paint Branch SPA

All development projects collecting BMP monitoring data in the Upper Paint Branch SPA are listed in Table 16. Four (4) of the eight (8) projects listed have completed construction. Four (4) projects are currently under construction.

Table 16 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 / <i>Environmental Quality Resources, Inc.</i> (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 no data in 2002 - drought groundwater data: 3/98 - 7/03
Briarcliff Manor West (formerly Baldi Property) / <i>Environmental Systems Analysis, Inc.</i> (construction began 8/99 and is close to completion)	1 groundwater observation well 2 surface water quality stations: <i>pH, Conductivity, Dissolved Oxygen, Turbidity</i> 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 - 12/02 surface water quality data: 9/98 - 12/02 temperature data: 9/98 - 9/02 embeddedness data: 9/98 - 12/02 channel cross section data: 9/98, 10/99, 4/00, 3/01, 10/01, 10/02 stream flow data: 11/98 - 12/99, 1/01-12/01, 5/02-12/02

Table 16 (continued)

PROJECT NAME & CONSULTANT CONDUCTING THE MONITORING	REQUIRED BMP MONITORING	REQUIRED TIME FRAME FOR BMP MONITORING	DATA SUBMITTED THUS FAR
Cloverly Safeway / <i>Rodgers Assoc.</i> (<i>construction complete</i>)	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 post-construction monitoring began during 2002 but data has not yet been submitted to DEP/DPS
Hunt Lions Den / <i>Environmental Systems Analysis, Inc.</i> (<i>Construction began 1/02</i>)	2 groundwater wells 2 continuous water temperature loggers 2 surface water quality stations: <i>pH, Conductivity, Dissolved Oxygen, Turbidity</i> 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 - 12/02 temperature data: 8/00 - 9/02 water quality data: 8/00 – 12/02 stream channel cross sections: 9/00, 9/01, 9/02
Parr's Ridge (Formerly Drayton Farms) / <i>Macris, Hendricks and Glascock</i> (<i>construction complete October 2002</i>)	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 (<i>construction completed during 2000</i>)	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 – 6-03
Snider's Estates (<i>Construction began 4/03</i>)	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

Table 16 (continued)

PROJECT NAME & CONSULTANT CONDUCTING THE MONITORING	REQUIRED BMP MONITORING	REQUIRED TIME FRAME FOR BMP MONITORING	DATA SUBMITTED THUS FAR
Hunt Property – Miles Tract <i>(Construction began March 2003)</i>	2 temperature loggers air temperature gage rain gage TSS sampling – during construction Photo documentation of outfall area 4 groundwater wells 3 cross sections	pre-development monitoring: 1 year during-construction monitoring: until site is stabilized and sediment pond is converted to SWM post-construction monitoring: 5 years for cross sections, 3 years for all other parameters	Temps – 6/02 - 9/02 Rain data – 6/02-3/03 Wells – 7/02 – 3/03 Cross sections 6/02
Briggs Chaney Rd./Old Columbia Pike Intersection <i>(Construction to begin during late 2003)</i>	TSS	pre-development monitoring: 2 storm samples during-construction monitoring: 3 storm samples post-construction monitoring: 1 storm sample	No data received

Briarcliff Manor (during-construction)

Monitoring of the Briarcliff Manor site began in September of 1998 and construction began in August of 1999. Post-construction monitoring of the Briarcliff Manor West site began in May of 2003. In 2003 DEP received a draft version of a comprehensive report from the consultant on their completed during-construction monitoring program. DEP is providing comments to the consultant for incorporation in their final version of the document.

Figure 25 is a map of the site. In 2002 DEP received information on stream temperatures, groundwater levels, stream flows and a channel cross section survey. DEP was unable to use groundwater data from the site in 2001 because of quality control considerations. Groundwater data from 2002 is plotted in Figure 26. Groundwater levels during 2002 were fairly similar to levels during the six corresponding months in 1999 for which we have pre-construction readings. This indicates that the well maintains very stable levels even during extreme drought periods. Its location low on the site, close to the stream probably explains that. At this point, development of the site does not appear to have impacted the stability of groundwater levels here and indicates that stream baseflows should not have been greatly impacted by development of the site. However, as DEP was only able to directly compare data for two six month periods, this is a very preliminary result. DEP will reassess this conclusion as new data comes

in from the site.

Channel cross section surveys show that the channel is somewhat dynamic but generally stable (Figure 27). At this time, development of the site does not appear to have caused channel instability at the cross section.

Temperature data from the site indicates that the water is warmed as it flows through the site. This condition may have existed prior to construction. Presently DEP is unable to evaluate whether this effect existed prior to construction because the site developer's consultant unfortunately lost most of the preconstruction temperature data. As streamside trees and adjacent reforested areas, grow up this temperature impact may decrease.

Briarcliff embeddedness data is plotted in Figure 28. The data indicate that the stream has seen increased percentages of embeddedness at all three sample sites since pre-construction. This may be due to weather conditions, changes in the watershed upstream from Briarcliff or error in the data set. The data also indicate that embeddedness has increased far more at the outfall (MS#3) than it did at the upstream (MS#2) site. This effect is observed beginning in late 2000 and continuing on into early 2002. This increase was much less pronounced at the downstream MS#1 site. This may reflect the stage of development at the site or BMP maintenance status. The consultant's draft final report on construction conditions examines this in greater detail. The final version of their report is expected in Fall of 2003.

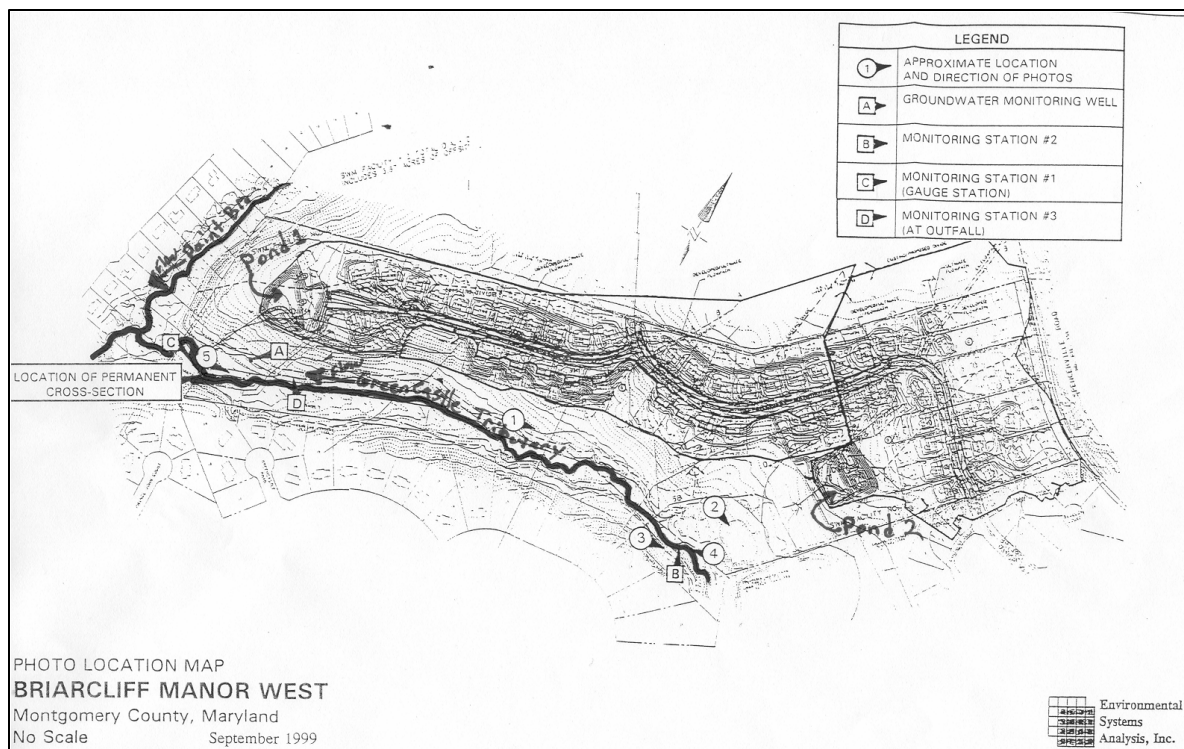


Figure 25 Map of Briarcliff Manor West and Associated Sediment / Stormwater Management Ponds.

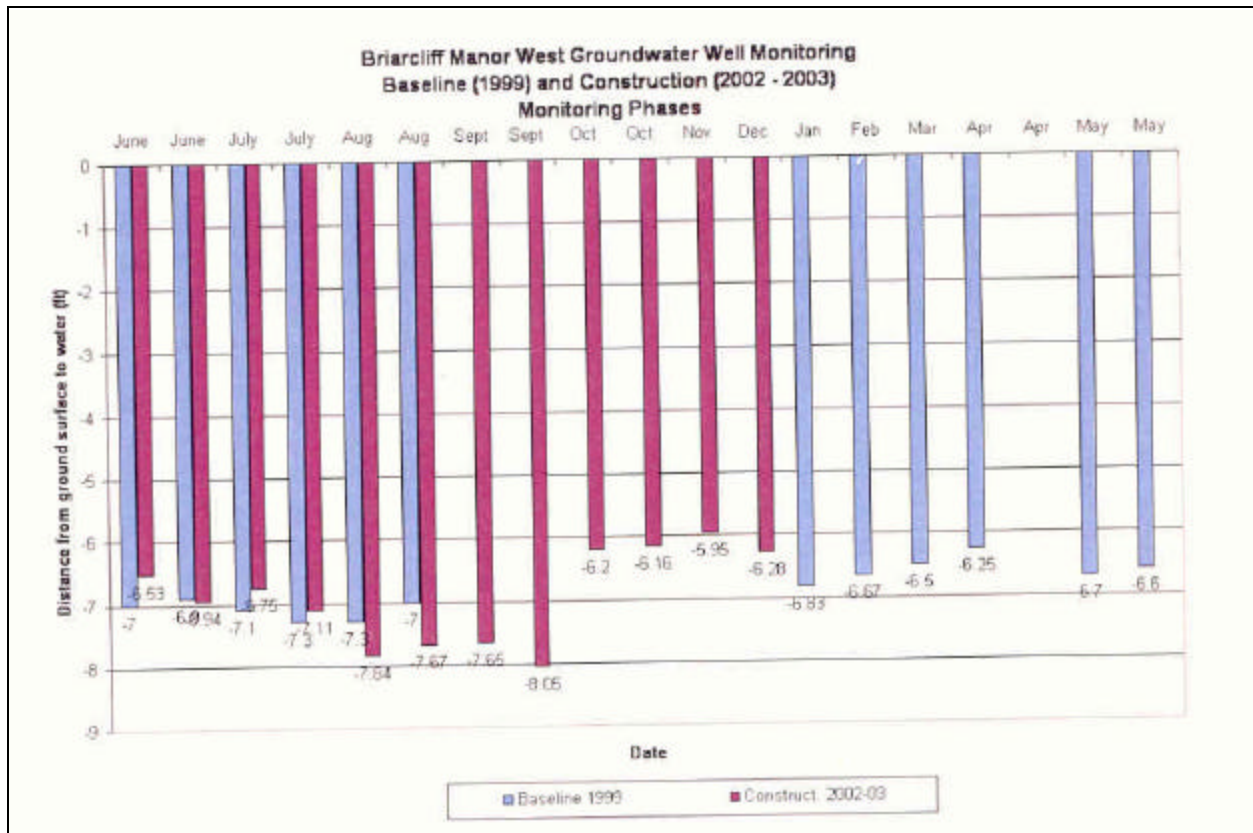


Figure 26 Briarcliff Groundwater Levels

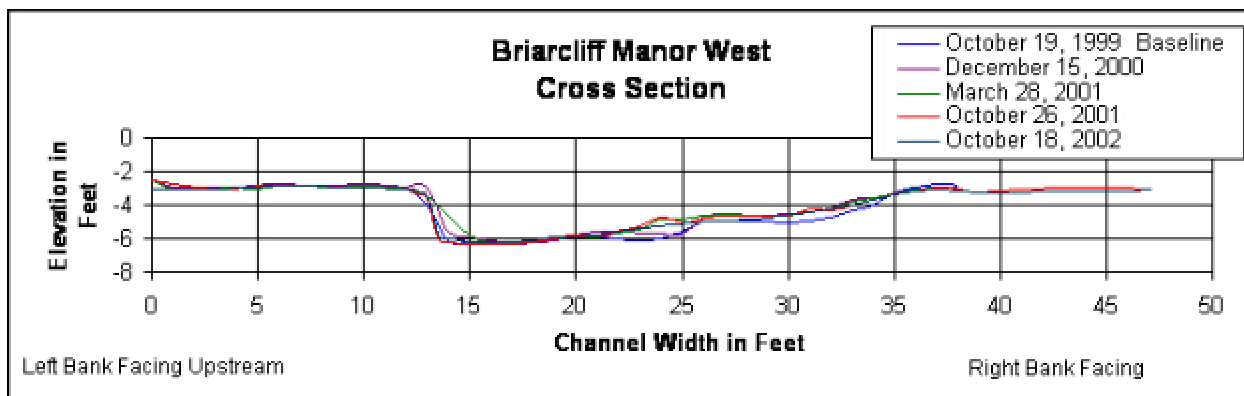


Figure 27 Briarcliff Cross Section

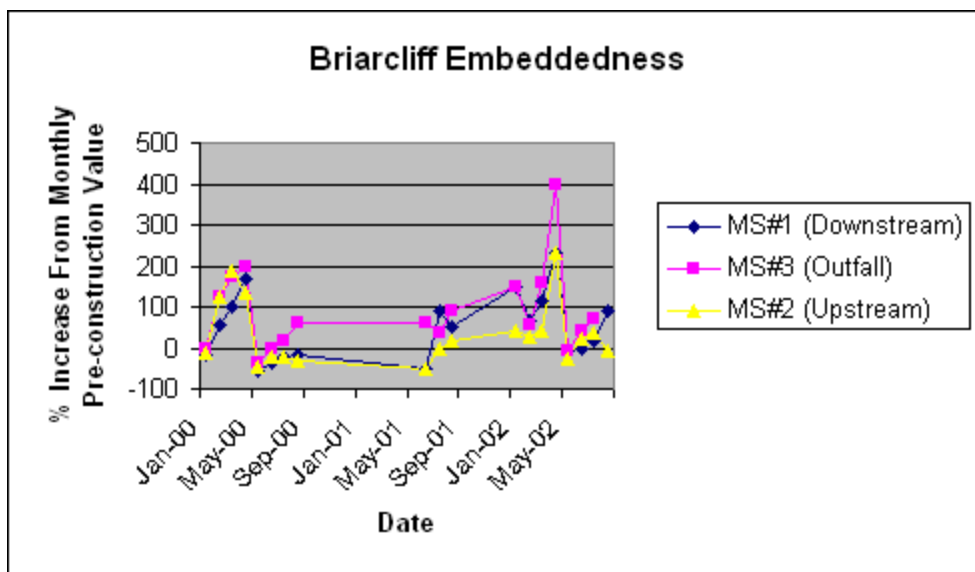


Figure 28 Briarcliff Embeddedness

Parr's Ridge (during-construction)

This is a 63.5 acre site (formerly called Drayton Farm) 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 actually draining to Paint Branch includes rooftops and backyards from 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 of the well spanned the period of 5/97 – 10/98. Construction on the site began in May of 2001.

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 DEP gets post-construction data it will be compared 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. However, it was not until Safeway had finally contracted with a consultant that progress was made to complete their remaining post-construction BMP monitoring requirement. DEP now anticipates receiving a report in the coming year that will provide information on post-construction conditions and the effectiveness of BMPs on the site.

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, groundwater levels and photos of plantings in a bioretention area after construction. Unfortunately, the constructed 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. Because this is a County project, DEP took over BMP monitoring for the post-construction period. The BMPs at the site were converted over from sediment control to act as water quality structures in early summer 2001. This past season DEP was unable to get data on stream temperatures due to drought conditions causing temperature loggers on the site to read air temperatures because the streams were so low. Groundwater readings indicate that groundwater levels dropped during the drought of last summer. Groundwater levels have since increased greatly as large amounts of rainfall have been received in 2003. In next years annual report DEP hopes to be able to evaluate the effect of the completed project on groundwater levels and stream temperatures under more normal conditions.

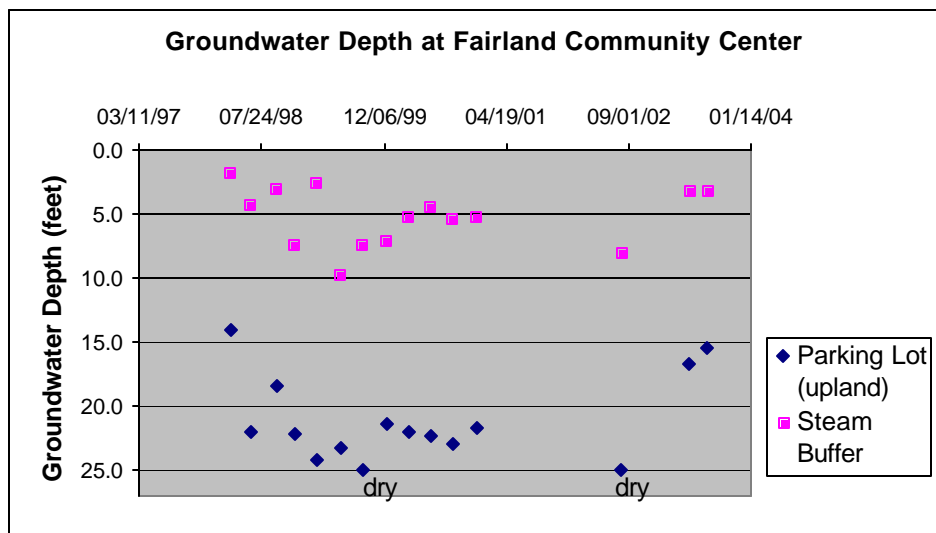


Figure 29 Fairland Community Center Groundwater Levels

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 the SWM outfall), and 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. Temperature data from this site in 2002 show very little difference between upstream and downstream stations. The data is plotted in Figure 30. At this point, development does not appear to have impacted stream temperatures at the site. Cross sections show a minimal amount of movement and are generally very stable. Turbidity data from the site on October 18, 2002 shows turbidity values in the stream increased greatly across the outfall. The turbid water was coming from the sediment trap after a 1.45 inch rainfall on October 16, 2002. The consultant and developer identified damage to the pond dewatering device which was causing the turbid discharge. The damaged device was repaired. Groundwater levels dropped at the site in 2002. The consultant attributed this drop to the drought and not development impacts or BMP effectiveness. We anticipate getting a report with additional data from the consultant in 2003 that will provide a more detailed analysis of their findings.

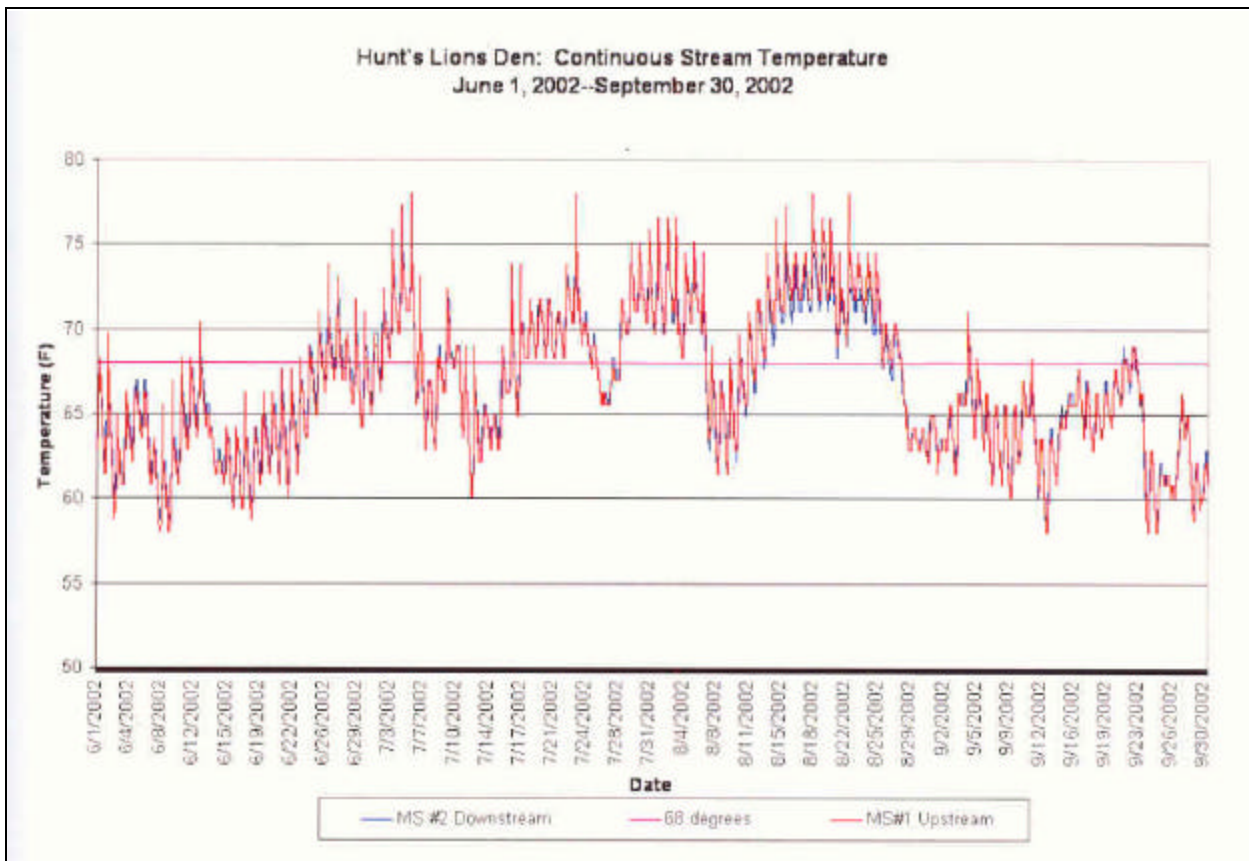


Figure 30 Hunt Lions Den Stream Temperatures 2002

4.2.5 Summary of Stream Monitoring in the Paint Branch SPA

DEP began monitoring Paint Branch in 1994 and has done this annually at most stations throughout the Paint Branch SPA. Monitoring in 2002 was completed at 12 stations. However, because of drought conditions experienced throughout the region causing extremely low flow in Paint Branch, only five stations were sampled for fish during 2002. Benthic macroinvertebrate sampling was completed at twelve (12) stations.

Temperature loggers were deployed during the summer of 2002 in five areas, 1) upper Good Hope 2) lower Gum Springs 3) Right Fork 4) Left Fork and 5) Paint Branch mainstem.

4.2.5.a Biological Monitoring Results

Results of fish sampling show little change in the overall community integrity. Index of Biological Integrity (IBI) scores calculated from sampling results are within the range of scores from previous years (Figure 32). However, the number of brown trout adults and young-of-year continue to be low for a third year (Table 17). 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 number of young-of-year trout were higher. Results from 2002 show the number of young-of-year trout dropped off in both Good Hope and Gum Springs. Presumably, this again reflects the extremely low flow conditions that persisted throughout the watershed during 2002.

Results of benthic macroinvertebrate sampling also indicate little or no change in overall community health at all stations in Paint Branch except PBLF202 located in the upper Left Fork near Good Hope Rd (Figure 31). Sampling results from 2002 indicate a drop in biological integrity from good to poor/fair. A sudden drop in IBI score at one particular monitoring location has been observed in Paint Branch before. At PBGH108 (located in the upper Good Hope tributary) the IBI score dropped from good in 1997 to poor in 1998. Although the cause of impairment was never found it was short in duration. The IBI score in 1999 and 2000 was back in the good range. There are many possible causes of such short term, local impairment to the benthic macroinvertebrate community including: 1) someone pouring or spraying pesticides, insecticides or some other toxic substance in or near the stream 2) some sort of local disturbance to the stream bottom from people or animals walking through the same area of stream from which the sample was collected. Sampling results from 2003 will help determine if this is short term impairment or not.

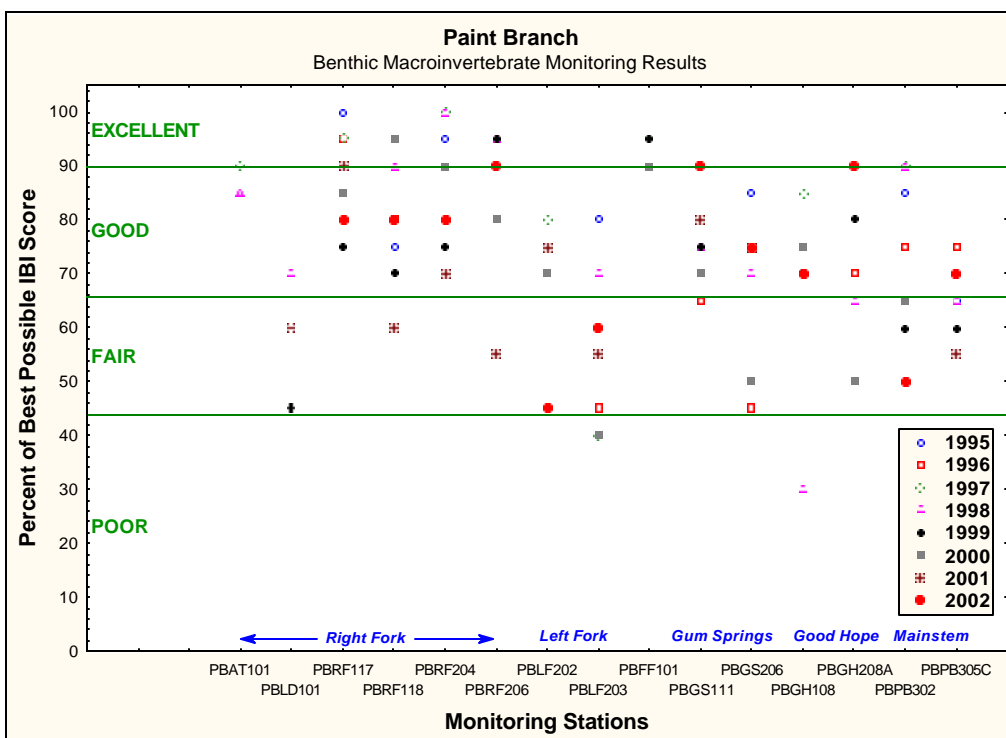


Figure 31 Benthic Macroinvertebrate Monitoring Results

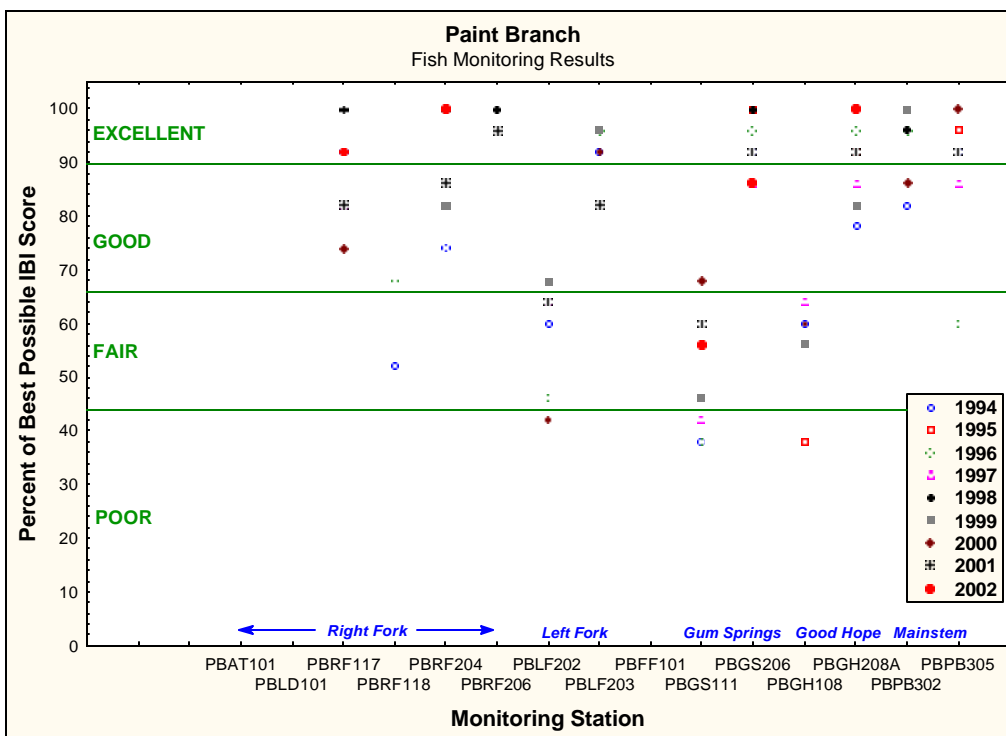


Figure 32 Fish Monitoring Results

Table 17 Brown Trout data from Upper Paint Branch SPA

Station		1994	1995	1996	1997	1998	1999	2000	2001	2002
PBRF117 (Right Fork)	No. of Adult trout	1	N/S	0	2	6	N/S	0	0	0
	No. of YOY trout	0	N/S	2	9	5	N/S	0	2	0
PBRF204 (Right Fork)	No. of Adult trout	5	N/S	2	3	8	2	0	0	2
	No. of YOY trout	5	N/S	2	7	4	1	0	0	0
PBRF206 (Right Fork)	No. of Adult trout	N/S	N/S	N/S	N/S	2	N/S	0	0	N/S
	No. of YOY trout	N/S	N/S	N/S	N/S	3	N/S	0	0	N/S
PBLF202 (Left Fork)	No. of Adult trout	0	N/S	0	0	N/S	0	0	0	N/S
	No. of YOY trout	0	N/S	0	0	N/S	0	0	0	N/S
PBLF203 (Left Fork)	No. of Adult trout	2	N/S	0	0	N/S	0	0	0	N/S
	No. of YOY trout	0	N/S	1	0	N/S	0	0	0	N/S
PBGS111 (GumSprings)	No. of Adult trout	7	N/S	0	0	2	1	1	0	2
	No. of YOY trout	41	N/S	0	1	0	0	0	8	0
PBGS206 (GumSprings)	No. of Adult trout	10	2	4	0	2	N/S	0	0	1
	No. of YOY trout	21	0	0	2	1	N/S	0	21	1
PBGH108 (Good Hope)	No. of Adult trout	2	2	1	0	N/S	0	0	N/S	N/S
	No. of YOY trout	2	0	2	25	N/S	0	1	N/S	N/S
PBGH208A (Good Hope)	No. of Adult trout	25	17	16	15	10	14	3	6	3
	No. of YOY trout	21	0	0	18	10	18	8	12	7
PBPB302 (Mainstem)	No. of Adult trout	2	N/S	1	2	6	1	1	N/S	N/S
	No. of YOY trout	0	N/S	0	16	1	3	0	N/S	N/S
PBPB305 (Mainstem)	No. of Adult trout	19	8	0	3	N/S	N/S	2	0	N/S
	No. of YOY trout	6	0	0	5	N/S	N/S	0	8	N/S

(N/S = Not Sampled)

Gum Springs By-Pass Pipe

The Gum Springs by-pass pipe was completed in July of 2000 (a joint project between the U.S. Army Corps of Engineers, DEP and M-NCPPC). The pipe is designed to convey warm water discharge from an “in-line” stormwater management pond (Oak Springs Pond) 1,900 feet to the Paint Branch mainstem, by-passing the Gum Springs tributary. Benefits of the by-pass pipe include: 1) elimination of the thermal barrier in lower Gum Springs which had previously discouraged trout migration from the mainstem into the Gum Springs tributary, 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.

Biological monitoring in Gum Springs during 2002 indicates ecological health remaining in the good range. However, number of brown trout young-of-the-year found in lower Gum Springs (PBGS206) dropped off sharply from 2001. This suggests little spawning activity occurred in Gum Springs during the fall of 2001, a trend observed throughout the watershed, likely caused by drought conditions.

Right Fork Decline

As reported in last years SPA annual report biological monitoring results from 2001 seemed to suggest a decline in ecological health had occurred in the Right Fork. The decline was observed only with the benthic macroinvertebrate community and not the fish. Monitoring results from 2002 indicate some improvement of the overall benthic macroinvertebrate community health throughout the Right Fork except at station PBRF117.

Two development projects within the Right Fork drainage area were completed during 2001, Fairland Community Center and Briarcliff Manor. Both of these projects have been fully stabilized and the sediment control traps/ponds have been converted to storm water management facilities. Biological monitoring at two stations (PBRF118, PBRF204) located directly downstream of these two development projects indicates slightly improved ecological health between 2001 and 2002. All results of benthic macroinvertebrate monitoring since 1995 from Right Fork stations are plotted in Figure 33.

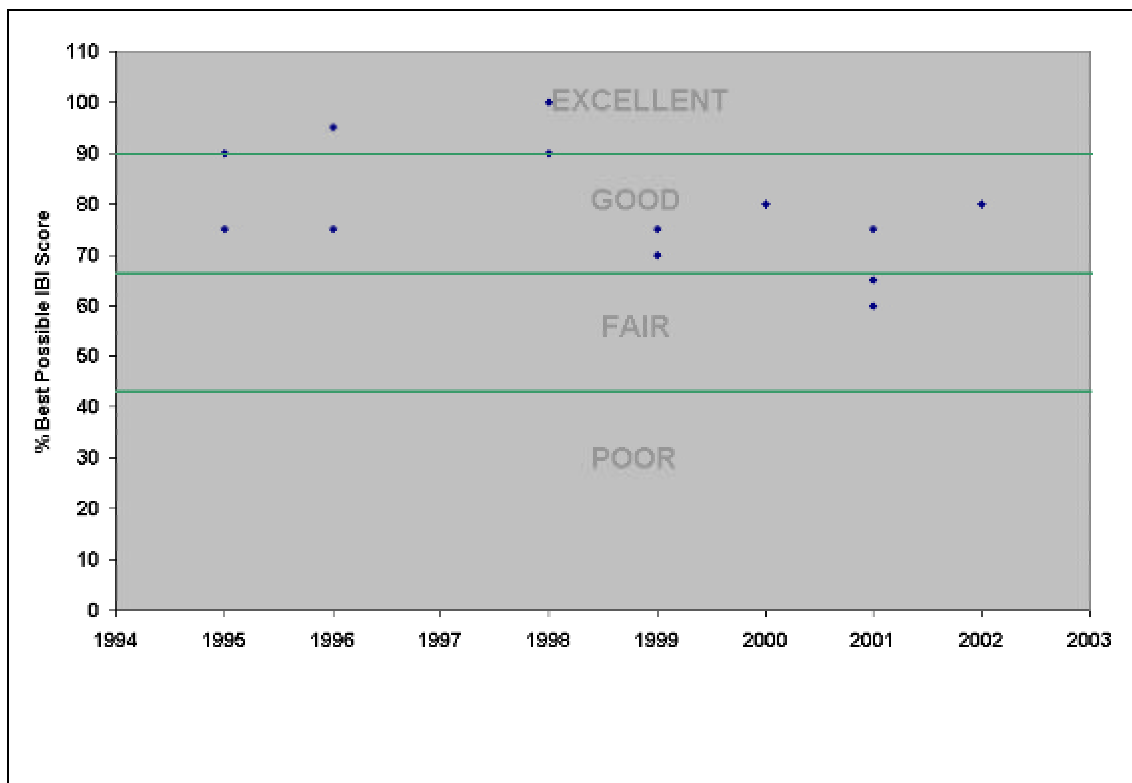


Figure 33 Benthic Macroinvertebrate Monitoring Results From Three Stations In The Right Fork – PBRF117, PBRF118, PBRF204. Two or one point(s) appear on the plot when two or three monitoring stations received the same IBI score

The steady decline in IBI scores reported in last years SPA annual report did not continue into 2002. Last year we included a regression line that illustrated the downward trend in benthic IBI. This year no statistically significant regression line can be drawn through the data. Regression analysis does not

support statements regarding an ongoing linear decline in benthic IBI from 1995 through 2002. Although it appears that the decline has leveled off, benthic IBIs remain low in the right fork of Paint Branch. Benthic IBIs from 1995 through 1998 averaged 87 points. From 1999 through 2002 benthic IBIs averaged 75 points. A t-test (Figure 34) indicates that these means are significantly different ($p=0.004$). Figure 33 shows that no Right Fork sample has scored in the excellent range since 1998.

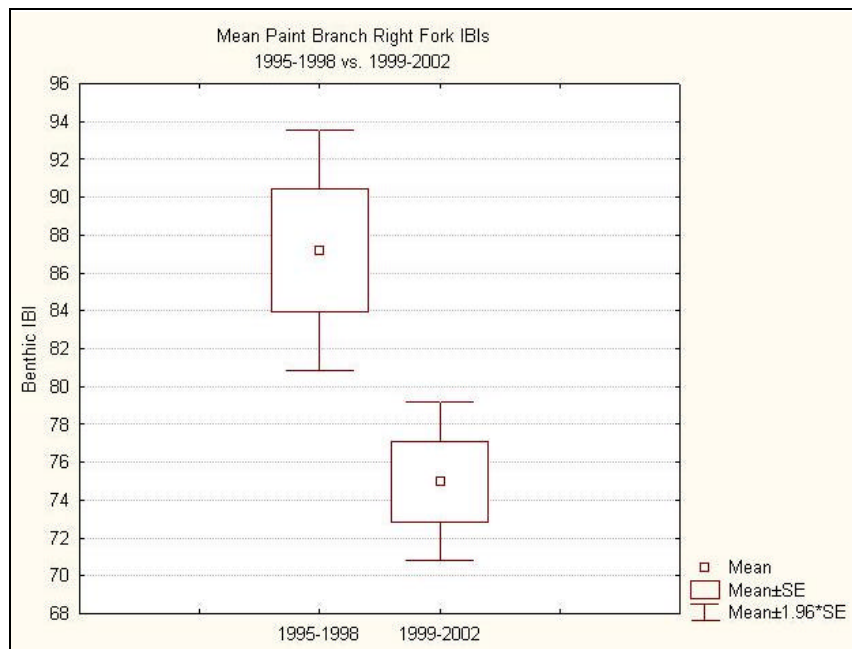


Figure 34 Mean Right Fork Benthic IBIs

DEP suspects that land disturbance on the Peach Orchard/Alnutt development, located in the headwater area of the Right Fork may be a factor in this decline. Development of the site began in May of 1997. Construction was stopped in 1998 because Maryland – DOT purchased the site to hold as an alternative ICC alignment. The sediment control ponds remain on the site and are inspected/maintained by Maryland Department of the Environment. While no sedimentation in the stream has been observed downstream of the MD-DOT property, we have observed turbid water leaving the site after larger storm events. There are extensive ATV trails on the site that are subject to erosion and some bank erosion has been observed where drainage from the site enters the right fork of Paint Branch. The sediment ponds on the site could also be a source of thermal impacts. In the winter of 2002-3 the site was used to store snow cleared from area roads.

DEP, in a memo to MD-SHA, expressed concern that a large amount of top soil was present in the piles of snow and that this posed a threat to Paint Branch as snow melt could carry sediment, road salt and other roadway pollutants to the stream. SHA responded by installing silt fence around the site and leveling out the piles of snow / top soil. Annual weather variation could also be playing a role. The region had a drought in 1999. That drought would have affected benthic samples collected the spring of

2000. Regional groundwater levels remained low in subsequent years. While drought would not explain lower scores observed in 1999, it could have had an impact in subsequent years. We expect to see a continuation or exacerbation of the decline in our 2003 results due to the extreme drought in 2002 and road salts in the snowmelt from the SHA site. 2003 has been a very wet year. We would expect benthic IBI samples collected in 2004 to rebound if drought, groundwater levels and snowmelt from the SHA site are the only stressors of the system.

4.2.5.b Habitat Monitoring

Rapid Habitat Assessment

The range of all habitat assessment scores from Paint Branch are summarized in Figure 35. These assessments are done whenever a site is visited for monitoring in spring, summer or fall. 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 and healthy biological community. However, results obtained during 2002 from two Right Fork stations (PBRF204 and PBRF206) show some decline in stream habitat quality. Stream habitat parameters that account for the decline include: 1) channel flow status 2) epifaunal substrate and 3) embeddedness. These parameters could be showing impact from extreme drought in 2002. Channel flow status is a habitat parameter that rates the proportion of stream channel that is under water. A stream channel that contains water from bank to bank is scored high while a trickle of water through a wide stream channel is scored low. Many streams were rated low for channel flow status during 2002 because of drought conditions. The

epifaunal substrate habitat parameter rates the quantity and variety of natural structure in the stream, such as cobble, large rocks, fallen trees, logs and undercut banks available for refugia, feeding or spawning. A stream rated as optimal contains a variety of different sized stones and woody material. Lower scores for epifaunal substrate in the Right Fork could be related to the lower flows in 2002. Lower embeddedness scores mean a greater amount of sediment has been deposited on and around the

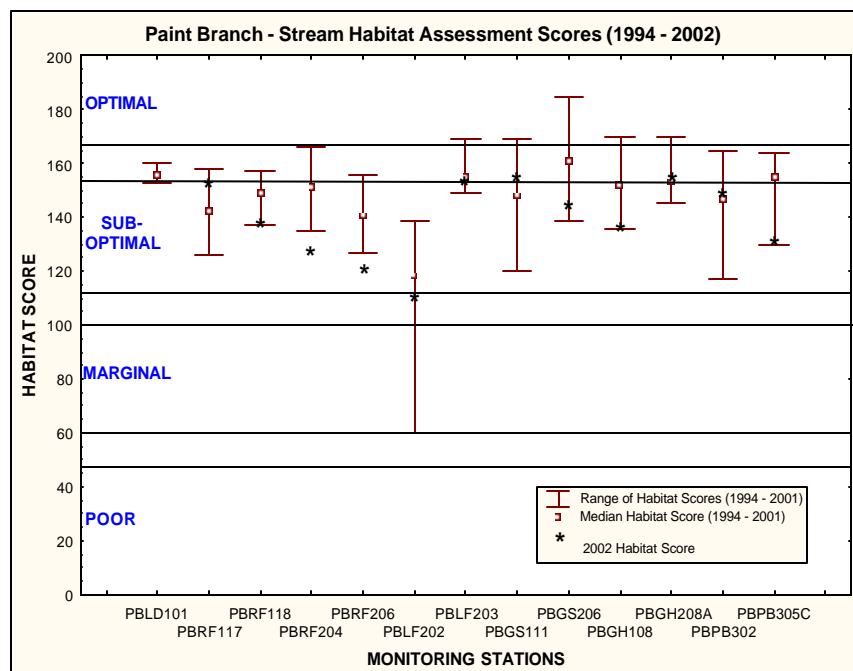


Figure 35 Results Of All Rapid Habitat Assessments Completed In Paint Br.

cobble and gravel in the stream. During drought, there may not be enough water to flush sediment out of the interstices of the stream bed. Alternatively, a greater amount of sediment could have entered the stream, presumably from active construction currently underway within the Right Fork drainage area. The Hunt Lions Den project is currently under construction there.

Public Land Encroachment Issues

Encroachment onto public lands has been identified as a primary cause of poor riparian forest buffer along several Paint Branch tributaries. The Montgomery County Water Quality Advisory Group (WQAG) adopted a resolution (No. 04-2001) on September 10, 2001 proposing certain actions to address this matter (SPA Annual Report For 2001).

During 2002 M-NCPPC notified land owners along portions of the Left Fork that they were illegally clearing and mowing public property. Additionally, new park boundary markers were installed clearly delineating property lines. Since M-NCPPC has taken these actions, adjacent property owners have ceased to clear park land (see before and after comparisons of stream buffer vegetation since parkland boundaries were delineated –Figures 36, 37 and 38). This will significantly widen the stream buffer which can only help to improve overall stream quality by providing additional shading and food to the stream ecosystem.



Figure 35 Before Property Markers Were Installed



Figure 36 After Property Markers Were Installed



Figure 37 July 2003 Park Property No Longer Being Mowed

Quantitative Stream Habitat Monitoring

Quantitative habitat monitoring was not completed at any DEP monitoring station in the Paint Branch SPA during 2002. 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 to occur over time, this monitoring has been scaled back in frequency. Stream channel profile measurements continue on an annual basis within the Right Fork as part of required BMP monitoring on the Hunt/Lions Den and Briarcliff Manor development projects.

4.2.5.c Stream Temperature Monitoring

Continuous temperature loggers were deployed at seven locations in Paint Branch SPA during the summer of 2002. Two loggers in the Right Fork, two in the Left Fork, one in upper Good Hope, one in lower Gum Springs and one in the mainstem at Fairland Road. In general, water temperature was warmer during the summer of 2002 than any other year since 1994, when DEP began monitoring. This is due to the extreme drought conditions that persisted throughout the summer of 2002 and to warmer than normal air temperature. Historically the average air temperature for the period of June 1 – September 30 is 72.1⁰ F (from Dulles National Airport). During 2002 average air temperature was 74.2⁰ F, which is 2.1⁰ F higher than the historic norm. Because of extremely low stream flow and higher than normal air temperature during the summer of 2002, stream water temperature throughout Paint Branch was considerably higher than normal and exceeded the Maryland Use III criteria of 68⁰ F forty two percent of the time between June 1 – September 30 (Table 18).

Table 18 Percent of Paint Branch Temperature Readings Above 68 Degrees

PBPB305C	PBRF204	PBRF117	PBLF202	PBLF203	PBGH108	PBGS206	All Sites
45.86%	45.31%	37.73%	43.58%	51.73%	38.27%	36.48%	42.71%

Right Fork

Temperature loggers were deployed in the Right Fork at two locations, PBRF117 and PBRF204. Results presented in Figure 38 show water temperatures exceeding the Maryland Use III criteria of 68⁰ F throughout much of the summer. Average water temperature for the period of 6/1–9/30 was 2⁰ F warmer than 1998 when summer air temperatures were near normal. Results of fish sampling, completed in late September at two Right Fork stations (PBRF117 and PBRF204) indicate that the warm water temperature had no impact on overall community health. These sites had very high fish IBI scores in 2002. High temperatures may have had an impact on trout here though, as only two adults were collected at PBRF204 and no trout were collected at PBRF117 (Table 17). This could also be a residual impact of the 1999 drought. Since the drought of 1999 all seven samples collected at these two sites had three or fewer trout. Prior to 1999, six samples out of eight collected here had 4 or more trout and the average sample had 7.75 trout. It is possible that overall trout populations are down since

1999 and fewer were found here in 2002 because the remaining fish are exhibiting a preference for other portions of the Paint Branch watershed where more stream flow was available.

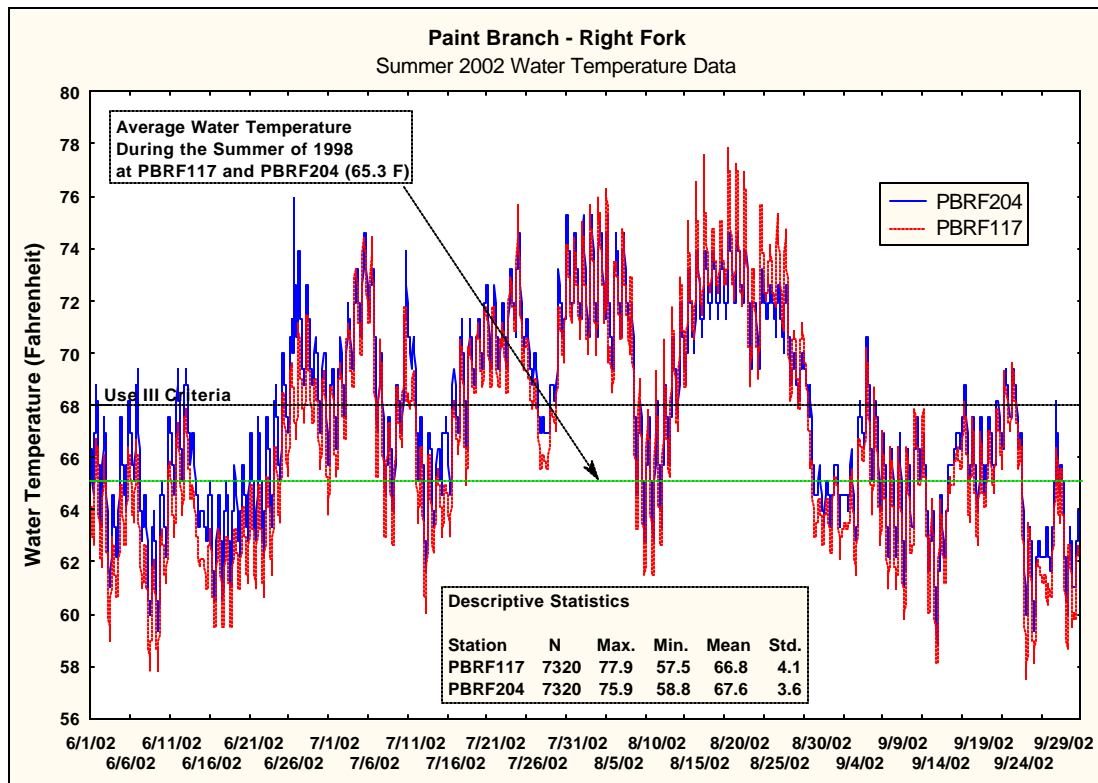


Figure 38 Stream Water Temperature Data From the Right Fork

Left Fork

During summer of 2002 temperature loggers were deployed at two locations within the Left Fork, PBLF202 and PBLF203. Results are presented in Figure 39. Water temperature remained above the 68° F Use III criteria for most of the summer. Several brief temperature spikes occurred during the summer of 2002 on 6/6, 7/9 and 7/23 all of which correlated with brief (15 to 45 minute) storm events.

A temperature study of the Left Fork conducted by DEP during the summer of 1998 found that the Rainbow Drive tributary was the source of elevated temperatures and temperature spikes during storms (SPA Annual Report, June 2000).

Short, intense summer thunderstorms often cause a pulse of warm water runoff from heated street, parking lot and rooftop surfaces in streams. Interestingly, temperature spikes were greater in the lower Left Fork (PBLF202) than any other area of Paint Branch monitored during 2002. Two possible explanations for this include: 1) The in-line stormwater management pond on a tributary to the Left Fork at Rainbow Drive discharging pulses of warm pond water during storm events and 2) curb and gutter being the primary means of stormwater conveyance in residential neighborhoods along the Left Fork between PBLF202 and PBLF203 quickly conveys stormwater from heated road surfaces to streams.

Much of the development throughout the rest of Paint Branch SPA uses open section roadways in residential areas. With open section roadways, grass swales along streets convey stormwater. Runoff from heated road surfaces is cooled somewhat as it flows at slower velocities through the grass swales.

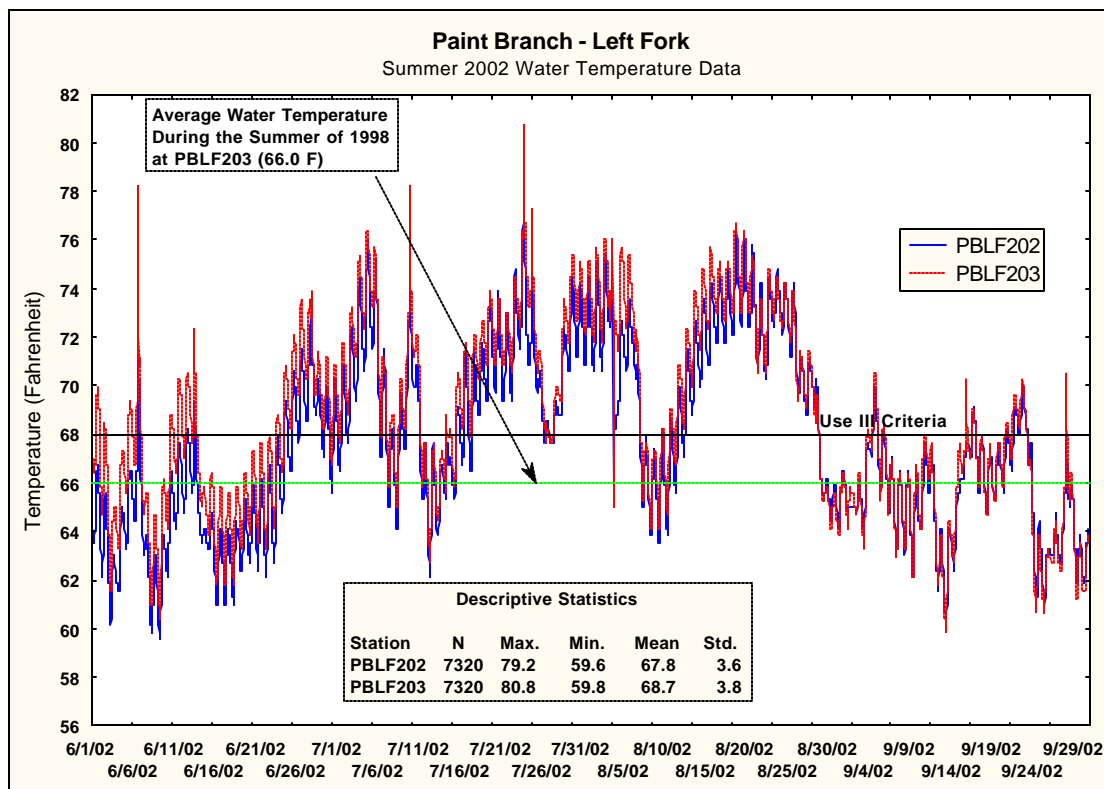


Figure 39 Stream Water Temperature Data From The Left Fork

Gum Springs

One temperature logger was placed in lower Gum Springs tributary at PBGS206. Results show little or no temperature spikes during storm events (Figure 40). It should be noted that much of the development on the east side of Gum Springs tributary uses open section road for stormwater conveyance. Newer development on the west side uses curb and gutter. However, most of the west side development drains to the Oak Springs pond which has recently been retrofitted with a by-pass pipe to convey pond outfall 1,900 feet to the Paint Branch mainstem thus by-passing Gum Springs tributary.

Although water temperatures remained above the Maryland Use III criteria for extended periods during the summer of 2002, average temperature in lower Gum Springs was among the lowest of all areas monitored in Paint Branch. This is further evidence of how the Gum Springs by-pass pipe has lowered stream water temperature creating more favorable conditions for the naturally reproducing Brown trout.

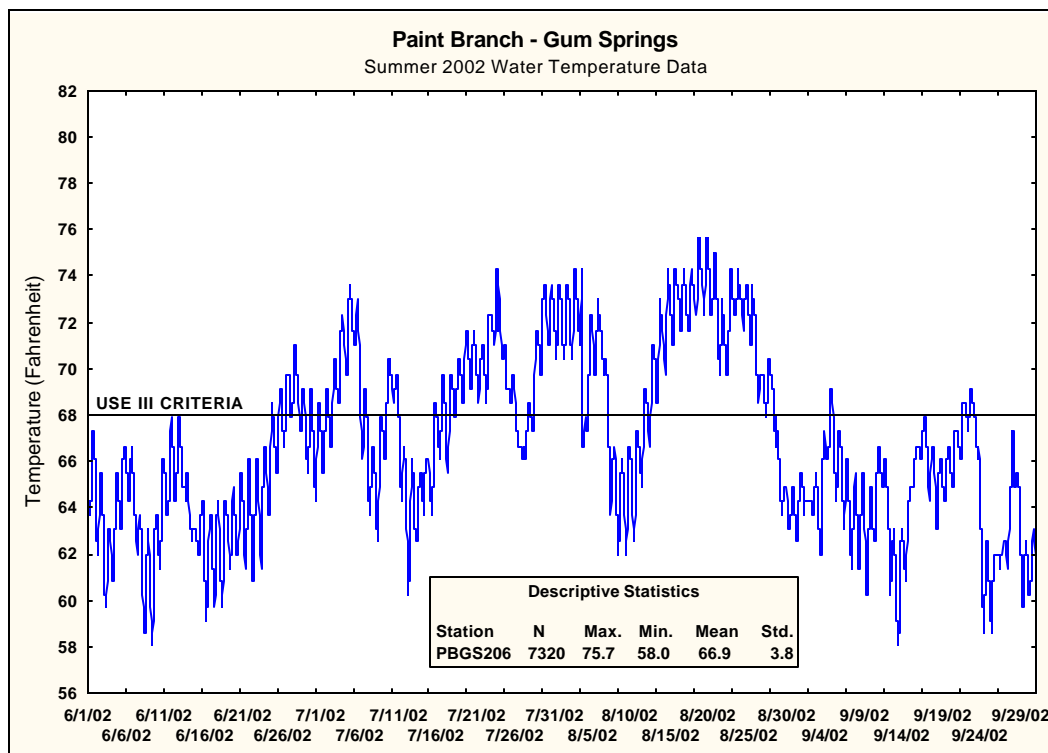


Figure 40 Stream Water Temperature Data From Lower Gum Springs

Good Hope

One temperature logger was deployed in the upper portion of Good Hope tributary at PBGH108. Results show water temperatures remained above the Maryland Use III criteria for extended periods (Figure 41). Average water temperature was 1.9⁰ F higher during the summer of 2002 then the more normal year of 1998. Temperature spikes during summer storms did occur in 2002 but were not as high as in the Left Fork.

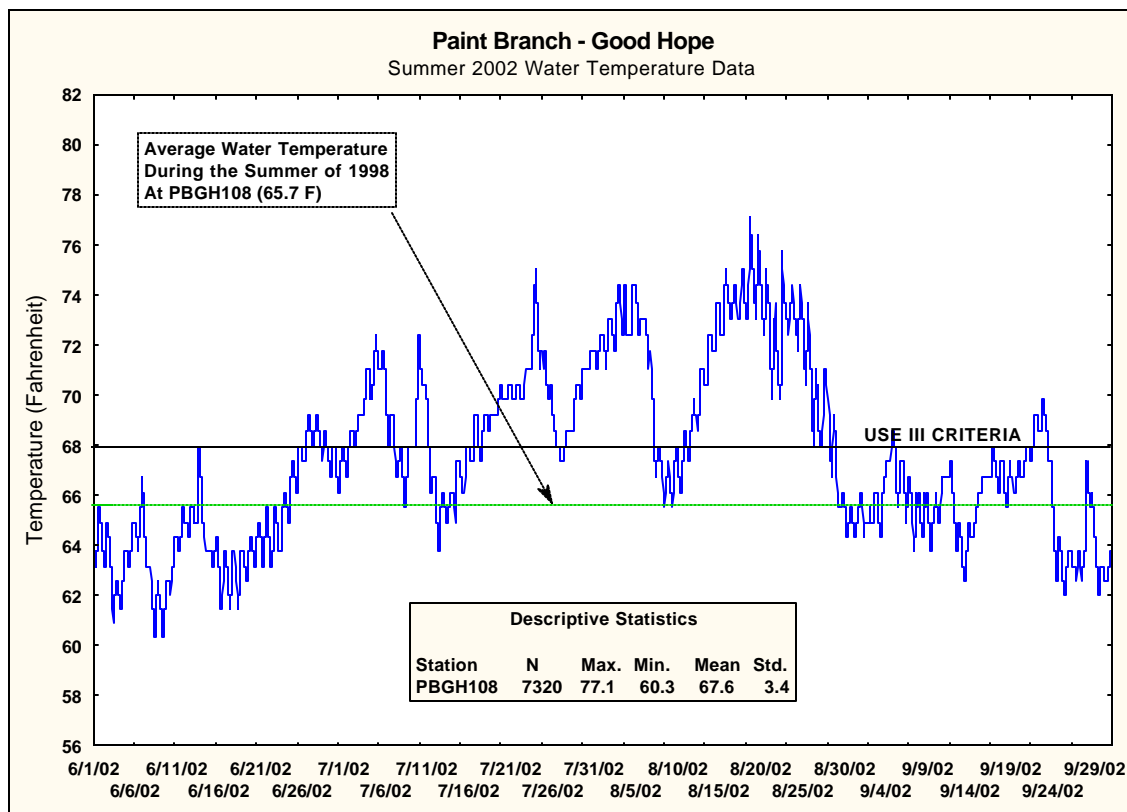


Figure 41 Stream Water Temperature Data From Upper Good Hope

Paint Branch Mainstem

One temperature logger was deployed in the Paint Branch mainstem during the summer of 2002 just upstream of Fairland Road at PBPB305C. Results show water temperatures remained above the Maryland Use III criteria for extended periods just as at all other locations monitored in the Paint Branch SPA (Figure 42). Temperature spikes are not apparent in the data due to the mixing effect in the higher flowing mainstem.

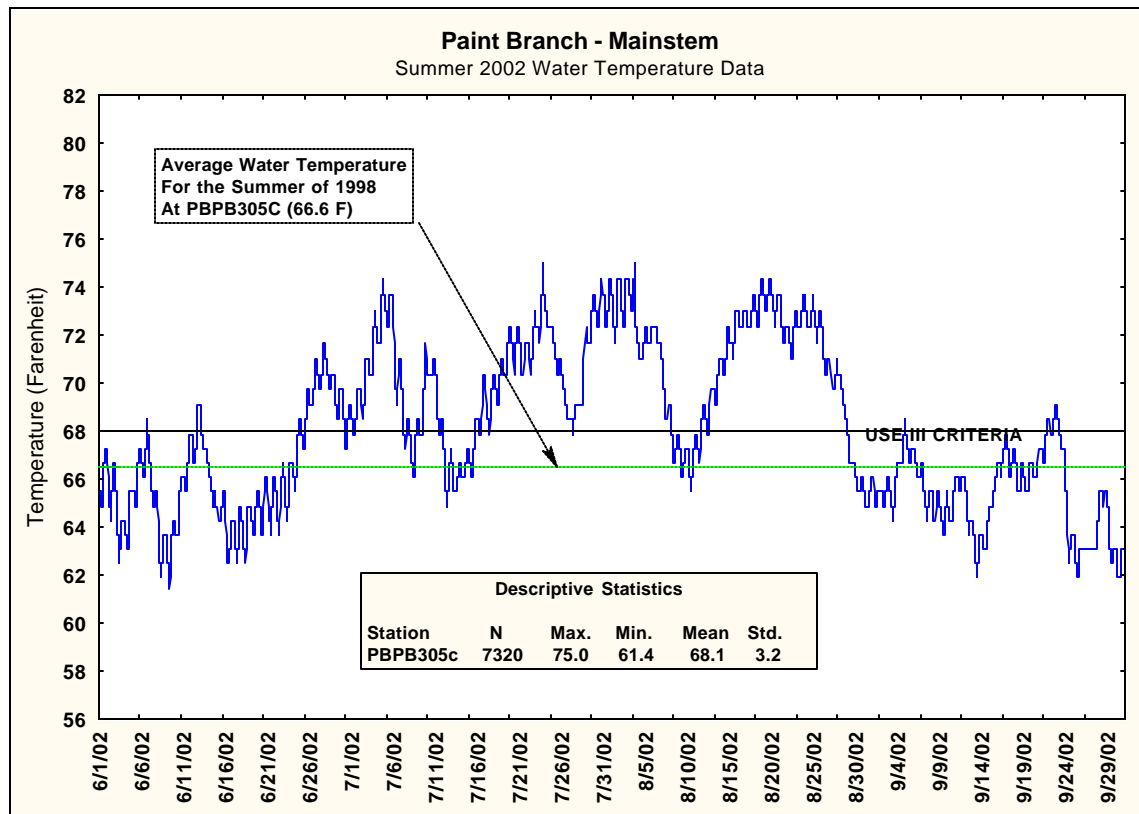


Figure 42 Water Temperature Data From Paint Branch Mainstem