

# Anacostia River

# Paint Branch

## 3.5 Hollywood Branch Stream Restoration Project

### 3.5.1 Introduction

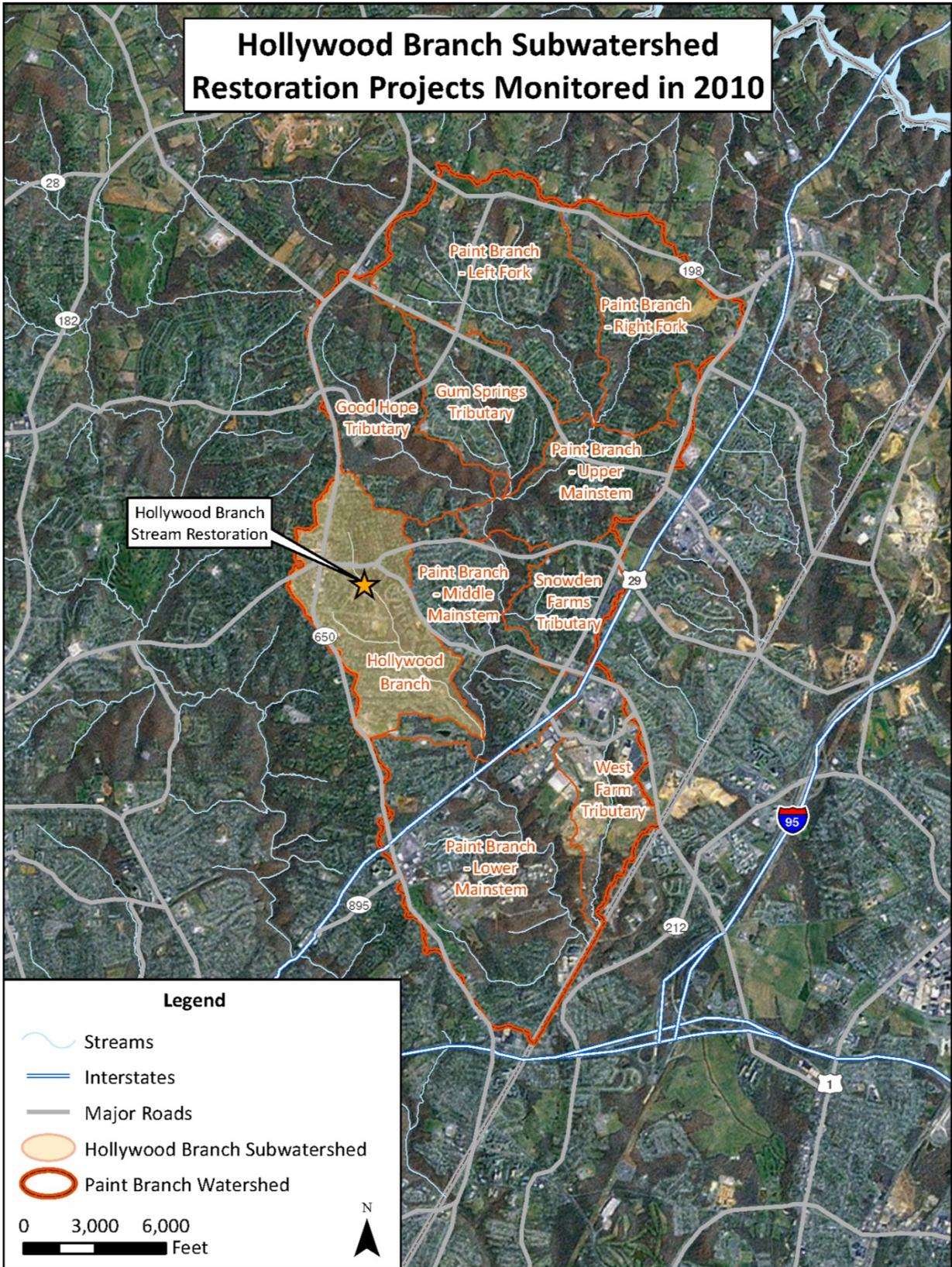
The Hollywood Branch tributary is located in the Hollywood Branch subwatershed of the Paint Branch watershed, in Colesville, Maryland (*Figure 3.5.1*). The Montgomery County Department of Environmental Protection (DEP), in collaboration with Maryland-National Capital Park and Planning Commission (M-NCPPC), plans to restore approximately 4,800 linear feet of stream, from Midland Road to Cannon Road. The State Highway Administration (SHA) is expected to restore the lower portion of Hollywood Branch downstream of Cannon Road, as an Intercounty Connector (ICC) stewardship project.

DEP plans to stabilize severely eroded streambanks, improve floodplain access, restore stream habitat, create wetlands, and reforest stream buffer areas (*Figure 3.5.2*). Restoration is proposed to occur in 2014. The Maryland Department of Environment (MDE) classifies the Paint Branch as a Use III, cold water stream system that supports a naturally reproducing brown trout population. The proposed restoration aims to improve aquatic habitat conditions for this sensitive species in a watershed dominated by medium-density residential development. This is a first year pre-construction report, summarizing 2010 monitoring activities performed prior to restoration.

Preliminary designs for the Hollywood Branch stream restoration project included reaches upstream of Midland Road (starting below outfall of a MD SHA stormwater management pond and continuing to Midland Road). These reaches were dropped in the early design phase due to concerns from the public and watershed groups about perceived construction impacts in the riparian areas.



*Figure 3.5.2 – Hollywood Branch Pre-Restoration (2012)*



*Figure 3.5.1 – Hollywood Branch Subwatershed Projects Monitored in 2010*

*Subwatershed facts*

Subwatershed Drainage Area: 844 acres  
Subwatershed Imperviousness: 18 percent

*Project Facts*

**Project Area:** Approximately 4,800 linear feet of the Hollywood Branch tributary from Midland Road to Cannon Road.

**Estimated Costs:** Construction (\$1,529,000), Funded in part through Chesapeake & Atlantic Coastal Bays Trust Fund

**Anticipated Completion Date:** Construction – Spring/Summer/Fall 2014

**Property Ownership:** Private and Maryland-National Capital Park and Planning Commission

*Project Selection*

The Hollywood Branch stream restoration project was identified as one of the highest priority projects in the Lower Paint Branch Study (2006). DEP also received public complaints regarding stream erosion from residents along Anderson Street and Clifton Road, where the stream flows through private property. Stream conditions were documented as fair by Montgomery County’s Stream Protection Strategy Update (DEP, 2003) and are impacted by urbanization in the subwatershed. Uncontrolled runoff has contributed to severe streambank erosion, high sedimentation, channel enlargement, and degraded instream habitat conditions for aquatic biota.

*Pre-Restoration Conditions*

In general, the existing riparian conditions in the upper half of the project (on private property) is mostly manicured lawn with scattered trees, while the lower half is located within stream valley parkland and has forested riparian conditions. Not surprisingly, the most significant streambank erosion occurs through the private property portion where there is little to no streambank protection (*Figures 3.5.3 – 3.5.5*).



**Figure 3.5.3 – Hollywood Branch Pre-Restoration (2012), examples of streambank erosion and invasive bamboo within study reach 4, between Midland Road and Randolph Road.**



***Figure 3.5.4 – Hollywood Branch exposed sanitary sewer (left) and eroding streambank adjacent to sanitary sewer manhole (right) within study reach 5, just below Randolph Road, prior to restoration (2009)***



***Figure 3.5.5 – Hollywood Branch pre-restoration (2012) examples of streambank erosion within study reach 5 downstream of Randolph Road***



***Figure 3.5.6 – Hollywood Branch pre-restoration (2012) examples of sediment deposition, debris jams, active streambank erosion, and failing streambanks with collapsed trees, within study reach 6, on parkland downstream of Randolph Road, just upstream of pedestrian bridge***



**Figure 3.5.7 – Hollywood Branch pre-restoration (2012) small tributary (study reach 7), showing head-cut with debris jam and aggradation upstream. Tree roots are temporarily holding elevations in place.**

#### *Proposed Restoration Actions*

The objectives for the Hollywood Branch Stream Restoration Project are to stabilize eroding streambanks, reconnect the stream with its floodplain to decrease vertical instability where possible, enhance habitat features, improve sediment transport, enhance riparian buffers, and protect public utilities. In select locations on Parkland, the design includes the construction of wetland pools to treat runoff and improve baseflow for Hollywood Branch. The project aims to address surface water impairments associated with sediment and nutrient loadings impacting the Anacostia River watershed.

### **3.5.2 Restoration Goals**

The primary goals of the project are to:

1. Address severely degraded conditions along the Hollywood Branch tributary through stream channel restoration, stabilization, and aquatic habitat enhancement.
2. Protect public utilities.
3. Reconnect the stream to its floodplain.
4. Enhance riparian buffers.

The more specific restoration goals are presented below in **Table 3.5.1**, along with the monitoring performed to characterize pre-restoration conditions, and when and where monitoring has occurred or is planned to occur following restoration. This is a pre-construction monitoring report and summarizes the pre-restoration conditions within the Hollywood Branch Stream Restoration Project area.

**Table 3.5.1 – Summary of Restoration Project Goals and Associated Monitoring**

<b>Why: Restoration Goals</b>	<b>What: Monitoring Done to Evaluate Goal</b>	<b>When: Years Monitored</b>	<b>Where: Station or Location Monitored</b>
<ul style="list-style-type: none"> <li>• Improve aquatic habitat conditions to increase and improve aquatic insect, fish, and stream salamander populations</li> </ul>	<ul style="list-style-type: none"> <li>• Qualitative Habitat</li> <li>• Aquatic Communities:               <ul style="list-style-type: none"> <li>▪ Benthic macroinvertebrates</li> <li>▪ Fish</li> <li>▪ Stream Salamanders</li> </ul> </li> <li>• Water Chemistry</li> </ul>	2010 (pre)	PBHB101A PBHB101B
<ul style="list-style-type: none"> <li>• Reduce stream erosion and sedimentation</li> <li>• Reduce erosive stream flows</li> </ul>	<ul style="list-style-type: none"> <li>• Quantitative habitat (stream morphology surveys)</li> </ul>	2012 (pre)	PBHB101A PBHB101B

<sup>1</sup> Quantitative habitat surveys were scheduled for 2010, but were delayed due to missing benchmarks. These benchmarks were located and survey work was performed in 2012. The 2012 report will include updates for this monitoring.

### **3.5.3 Methods to Measure Project Goals**

The basic sampling design for the Hollywood Branch Stream Restoration project is pre-restoration (before) and post-restoration (after) monitoring. The County monitored the biological communities (benthic macroinvertebrates, fish, and stream salamanders), performed rapid habitat assessments (RHAB), and took in-situ water chemistry measurements at two biological monitoring sites (PBHB101A and PBHB101B) to evaluate the aquatic habitat conditions and water quality during the pre-restoration period (*Figure 3.5.8*). The County was also scheduled to perform quantitative survey for the entire project length in 2010, but this work was postponed until 2012 due to missing benchmarks. If the project is completed as planned in summer 2014, all data collected prior to 2014 will be considered pre-restoration data and all subsequent data will be considered post-restoration. Another year of pre-restoration monitoring is planned for 2012 and post-restoration monitoring is planned for at least years one, three, and five years after restoration.



Figure 3.5.8 – 2010 Monitoring Locations for Hollywood Branch Restoration Project

### 3.5.4 Results and Analysis

#### *Benthic Macroinvertebrates*

##### BIBI (Benthic Index of Biological Integrity) Scores

Pre-restoration benthic macroinvertebrate assessments were conducted at sites PBHB101A and PBHB101B in 2010 (**Table 3.5.2**). Both sites were rated by the Benthic Index of Biological Integrity (BIBI) as Poor, with percent scores of 30. With the exception of the taxa richness and the proportion of dominant taxa, which were in the median range, the remaining individual metric scores at PBHB101A were in the low range. At site PBHB101B, most individual metrics were in the low range, except the biotic index and the proportion of Hydropsyche and Cheumatopsyche, which were in the median range. Field data sheets for this task from 2010 are included in **Appendix D**.

**Table 3.5.2 – Benthic Index of Biological Integrity (BIBI) Percentages at PBHB101A and PBHB101B**

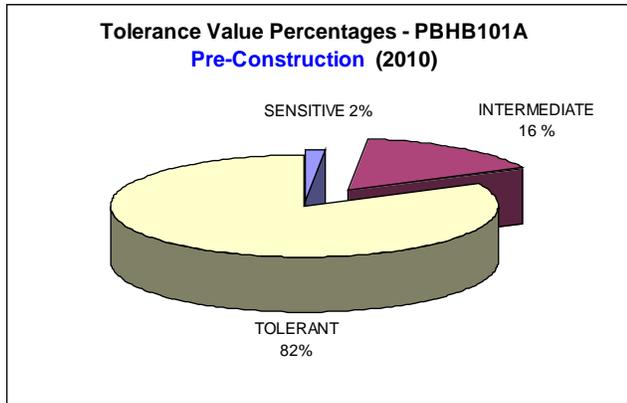
Station ID	Percent Score (Narrative Ranking)
	2010
PBHB101A	30 (Poor)
PBHB101B	30 (Poor)

##### Dominant Taxa

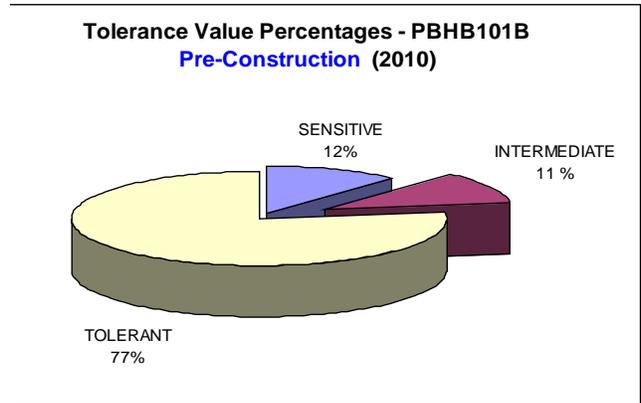
Both Hollywood Branch sites were dominated by Chironomidae (midges, subtribe Orthocladiinae). However, the second most dominant taxon was different between sites. Naididae (a pollution tolerant family of aquatic worm) was second most dominant at PBHB101A and *Dolophilodes* sp. (net-spinning caddisfly), a genus sensitive to stressors, was the second most dominant at PBHB101B. The two most dominant taxa comprised 80 percent of the community at PBHB101A and 85 percent at PBHB101B.

##### Tolerance Values

Pollution-tolerant taxa were dominant at Hollywood Branch sites, comprising 82 and 77 percent of the community, at PBHB101A and PBHB101B, respectively (**Figure 3.5.9 and 3.5.10**). Intermediately-tolerant taxa were second most dominant at PBHB101A, comprising 16 percent of the community. Sensitive taxa represented only two percent of the community at PBHB101A, but were second most dominant at PBHB101B, comprising 12 percent of the community.



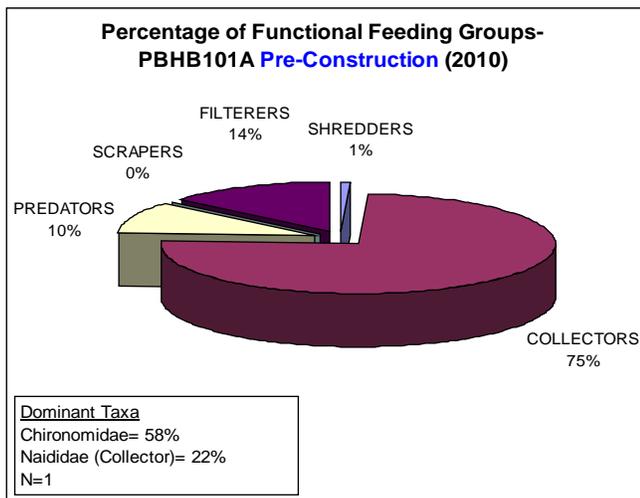
**Figure 3.5.9 – Benthic Macroinvertebrate Tolerance Composition at PBHB101A Prior to Restoration**



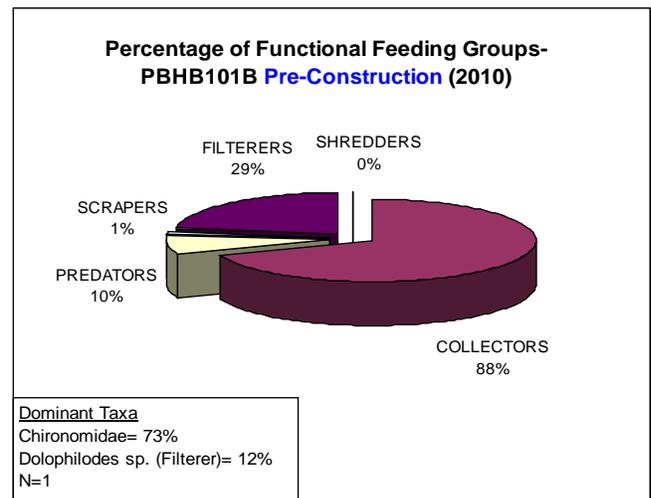
**Figure 3.5.10 – Benthic Macroinvertebrate Tolerance Composition at PBHB101B Prior to Restoration**

### Functional Feeding Groups

Collectors were the most dominant functional feeding group at both sites, followed by filterers and predators (**Figures 3.5.11 and 3.5.12**). More specialized feeders, like scrapers and shredders that require less degraded stream conditions or specific habitat features comprised only one percent of the benthic macroinvertebrate community at each site.



**Figure 3.5.11 – Benthic Macroinvertebrate Functional Feeding Group Composition at PBHB101A Prior to Restoration**



**Figure 3.5.12 – Benthic Macroinvertebrate Functional Feeding Group Composition at PBHB101B Prior to Restoration**

### *Fish*

#### FIBI (Fish Index of Biological Integrity) Scores

The pre-restoration fish communities were assessed at both Hollywood Branch sites in 2010. Sites were rated as Poor, with percent scores of 30 and 35, at PBHB101A and PBHB101B,

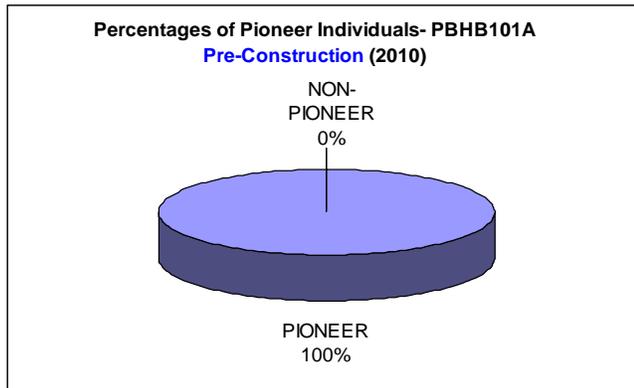
respectively (*Table 3.5.3*). Both sites scored in the low range for most individual metrics, but scored in the high range for the proportion of fish with disease/anomalies, meaning that very few of the captured fish appeared diseased or to have anomalies. The slightly higher score at PBHB101B was due to a higher number of minnow species, which placed this individual metric in the median range. Field data sheets from 2010 fish monitoring are included in *Appendix D*.

**Table 3.5.3 – Fish Index of Biological Integrity (FIBI) Percentages at PBHB101A and PBHB101B**

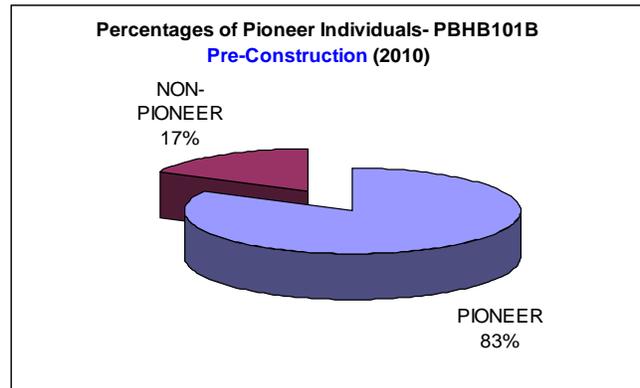
Station ID	Percent Score (Narrative Ranking)
	2010
PBHB101A	30 (Poor)
PBHB101B	35 (Poor)

Dominant Species and Pioneering Species

The most dominant fish species found in Hollywood Branch was *Rhinichthys atratulus* (blacknose dace). This species comprised 90 percent of the PBHB101A community and 67 percent of the PBHB101B community. *Semotilus atromaculatus* (creek chub) was second most dominant at both sites, with *Clinostomus funduloides* (rosyside dace) comprising an equal portion of the community at PBHB101B. The two dominants collected at PBHB101A were the only species found at this site. Blacknose dace and creek chub are considered pioneer fish species, and rosyside dace is a non-pioneer species (*Figures 3.5.13 and 3.5.14*).



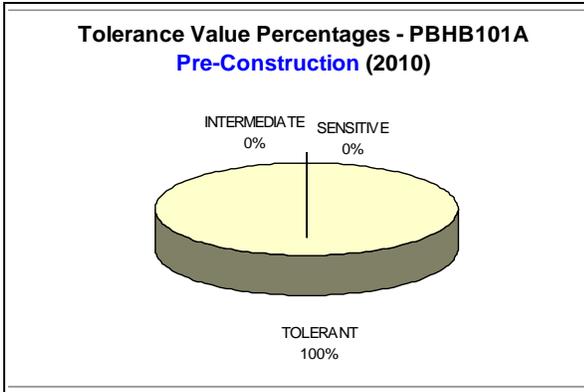
**Figure 3.5.13 – Pioneer Fish Composition at PBHB101A Prior to Restoration**



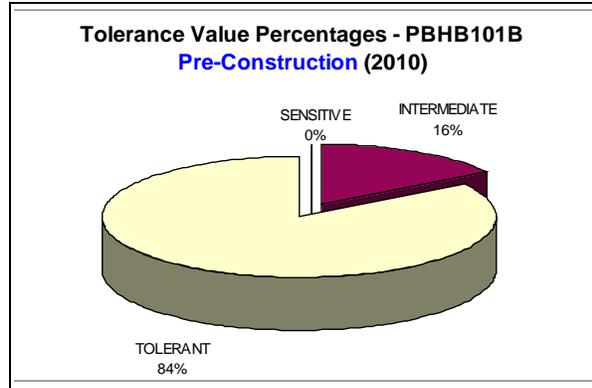
**Figure 3.5.14 – Pioneer Fish Composition at PBHB101B Prior to Restoration**

Tolerance Values

All fish species collected at PBHB101A are tolerant to degraded stream conditions (*Figure 3.5.15*). Tolerant fish species were also dominant at PBHB101B, comprising 84 percent of the community (*Figure 3.5.16*). Species intermediate in sensitivity made up the remainder of the communities. No sensitive species were present at either site.



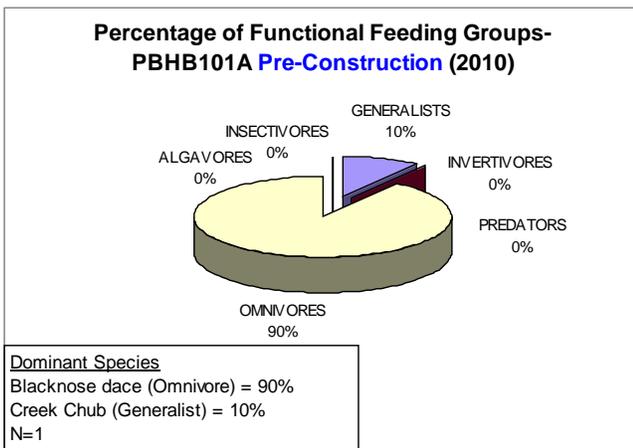
**Figure 3.5.15 –Fish Tolerance Composition at PBHB101A Prior to Restoration**



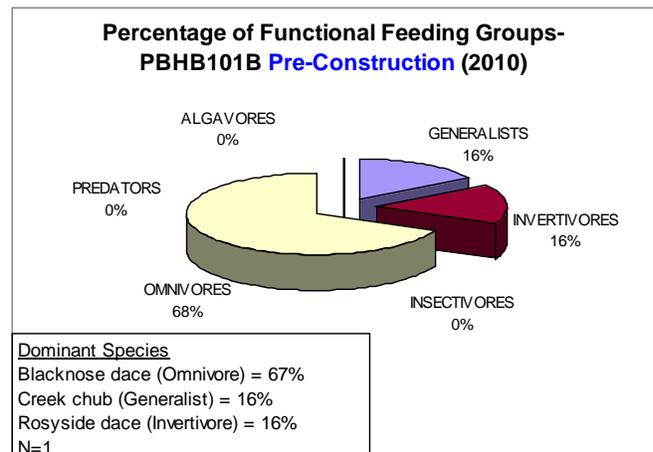
**Figure 3.5.16 –Fish Tolerance Composition at PBHB101B Prior to Restoration**

### Functional Feeding Groups

Omnivores and generalists were the dominant feeding groups at both Hollywood Branch sites and the only feeding groups represented at PBHB101A (*Figures 3.5.17 and 3.5.18*). One invertivore species, rosyside dace, represented the other feeding group present at PBHB101B. This was the only specialized feeding group present at either site.



**Figure 3.5.17 – Fish Functional Feeding Group Composition at PBHB101A Prior to Restoration**



**Figure 3.5.18 – Fish Functional Feeding Group Composition at PBHB101B Prior to Restoration**

### *Stream Salamanders*

Stream salamanders were surveyed at both Hollywood Branch sites in the summer of 2010. Only one species of salamander, *Eurycea bislineata* (northern two-lined salamander) was collected at both sites and was represented by both adults and larvae. Site PBHB101A was given a score of 6.25 out of 10 and PBHB101B had a score of 5 out of 10 for the provisional Stream Salamander Index of Biological Integrity (SSIBI) for the Piedmont eco-region (*Tables 3.5.4 and 3.5.5*).

Both sites received narrative rankings of “Non-Degraded”. However, this narrative is based on

the first iteration of the SSIBI (Southerland et al. 2004) that places the SSIBI scores from 0-10, with scores below 5 as “degraded” (as opposed to “non-degraded”). The SSIBI is undergoing validation and may look to reassign the thresholds and may even set conditional classes such as good, fair, poor, or very poor.

No other herpetofauna were documented at the Hollywood Branch sites during the stream salamander survey. Field data sheets from 2010 stream salamander monitoring are included in *Appendix D*.

**Table 3.5.4 – PBHB101A and PBHB101B Pre-restoration (2010) Stream Salamander Summary Data**

Station	Date	# of Species	# of Salamander Individuals	# of Sensitive Individuals	# of Adults
PBHB101A	8/23/2010	1	93	0	12
PBHB101B	8/23/2010	1	74	0	5

**Table 3.5.5 – PBHB101A and PBHB101B Pre-restoration (2010) Provisional Stream Salamander Index of Biological Integrity (SSIBI) Scores**

Station	Date	SSIBI METRIC SCORES (out of 10)				SSIBI (Average Score)	% SSIBI
		# of Species	# of Salamander Individuals	# of Sensitive Individuals	# of Adults		
PBHB101A	8/23/2010	5	10	0	10	<b>6.25</b>	<b>63</b>
PBHB101B	8/23/2010	5	10	0	5	<b>5</b>	<b>50</b>

*Qualitative Habitat*

Aquatic habitat assessed by the EPA Rapid Bioassessment Protocol (RHAB) at PBHB101A scored between 50 and 57 percent (Fair to Good) in the spring and summer of 2010, and between 61 and 65 (Good) at PBHB101B (*Table 3.5.6*). Sediment deposition, instream cover for fish, embeddedness, and bank vegetative protection were the lowest scoring parameters at both sites but generally scored higher at PBHB101B.

**Table 3.5.6 - Pre-Restoration Rapid Habitat Assessment (RHAB) Percentages at PBHB101A and PBHB101B**

Station ID	Percent Score (Narrative Ranking)		
	Spring (Benthic Macroinvertebrate Survey)	Summer (Salamander Survey) (8/23)	Summer (Fish Survey)
PBHB101A	50 (Fair)	54 (Good/Fair)	57 (Good)
PBHB101B	65 (Good)	65 (Good)	61 (Good)

### Water Chemistry

All in-situ water chemistry values collected at Hollywood Branch sites were within compliance with Use III stream standards (*Table 3.5.7 and 3.5.8*). However, water temperatures collected at PBHB101A and PBHB101B during the salamander surveys neared the 20°C COMAR standard at 19.7 °C and 19.6 °C, respectively. Additionally, the dissolved oxygen reading collected during the salamander survey (5.03) was very close to the lower limit of 5.0 mg/L.

**Table 3.5.7 – In-situ Water Chemistry Data at PBHB101A**

Water Quality Parameter	2010		
	Spring	Summer (Salamander Survey) (8/23)	Summer (Fish Survey) (8/31)
Dissolved Oxygen (mg/L)	7.31	6.36	5.03
Dissolved Oxygen (% Saturation)	74	-	56
pH	6.36	6.73	7.68
Conductivity (µmhos)	290	326	291
Water Temperature (°C)	15.6	19.7	18.4

**Table 3.5.8 – In-situ Water Chemistry Data at PBHB101B**

Water Quality Parameter	2010		
	Spring	Summer (Salamander Survey) (8/23)	Summer (Fish Survey) (8/31)
Dissolved Oxygen (mg/L)	7.58	6.58	7.04
Dissolved Oxygen (% Saturation)	78	75	76
pH	6.81	7.01	6.79
Conductivity (µmhos)	285	310	273
Water Temperature (°C)	16.3	19.6	19

### 3.5.5 Discussion

Overall, pre-restoration monitoring at PBHB101A and PBHB101B reflects a Poor biological stream condition. Midges were the most dominant benthic macroinvertebrate taxa collected, and collectors were the most dominant feeding group at these sites. Tolerant benthic macroinvertebrate individuals were most abundant at both sites and comprised 100 percent of the community at PBHB101A. Individuals intermediate in sensitivity made up the remainder of the community at PBHB101B (16 percent). Sensitive benthic macroinvertebrates were absent from both sites.

The fish communities at these sites were also rated as Poor by the FIBI, with PBHB101B scoring slightly higher than PBHB101A. Both sites were dominated by blacknose dace, a tolerant fish species, and were comprised primarily of omnivorous species, with other feeding groups present in much lesser amounts. Non-pioneer fish species were absent from PBHB101A, which may indicate a lack of stable habitat. Rosyside dace, a non-pioneer species and also an invertivore,

made up 17 percent of PBHB101B and was the only species that represented a non-pioneer species or specialized functional feeding group. The presence of this non-pioneer species in the lower portion of Hollywood Branch is also an indication that improvements made to habitat stability and reliability of baseflows may result in additional rosyside dace individuals or additional non-pioneer species throughout the stream.

Stream salamander communities consisted of only one salamander species, the northern two-lined. The northern two-lined salamander is ubiquitous and can tolerate degraded stream conditions. However, the numbers of both larvae and adults found is encouraging that perhaps the stream water quality is adequate and that habitat improvements may result in the potential for sensitive stream salamander species to be supported. All in-situ water chemistry values collected in Hollywood Branch were in compliance with COMAR standards.

An additional year of pre-restoration data will be collected in 2012 and post-restoration monitoring will begin after completion of the Hollywood Branch stream restoration. The project is planned to start in spring 2014.