

**Newton Creek and Hog Island Inlet
2016 Post Remediation Assessment Summary
Wisconsin Department of Natural Resources
April 2017**



This document is intended to provide a brief overview of the recovery monitoring and assessment work conducted on Newton Creek and Hog Island Inlet after completion of the contaminated sediment remediation projects in the late 90's and early 2000's. Please reference the complete reports for detailed information at <http://dnr.wi.gov/water/waterDetail.aspx?key=305141>.

A 2015 review of post-remediation monitoring conducted from 2003-2014 (Graham and Roesler 2015) identified the following concerns regarding the health of Newton Creek and Hog Island Inlet:

1. Fish populations in Newton Creek that commonly had biotic index ratings of poor.
2. Macroinvertebrate populations in Newton Creek that commonly had biotic index ratings of poor and appeared to have declined in recent years.
3. A 91% decline in aquatic plant abundance in Hog Island Inlet between 2010 and 2014.
4. Observations of petroleum-like odors released from disturbed sediment in both Newton Creek and Hog Island Inlet.
5. Observations of petroleum-like odors emanating from the undisturbed water of Newton Creek.
6. Observations of chronic foaming in Newton Creek.
7. Indications of possible sediment toxicity in Newton Creek.

These concerns prompted more in-depth monitoring and assessment work in 2016 of these systems. Components of the 2016 Newton Creek and Hog Island Inlet assessment work included:

Newton Creek

Water chemistry sampling
Water toxicity testing
Fish surveys
Fish abnormalities assessment
Macroinvertebrate sampling
Sediment chemistry sampling
Sediment toxicity testing

Hog Island Inlet

Aquatic plant survey
Soft sediment depth survey
Fish surveys
Sediment odor survey
Macroinvertebrate sampling
Sediment chemistry sampling
Sediment toxicity testing

Summary of 2016 Newton Creek and Hog Island Inlet Monitoring

Newton Creek:

1. Fish abnormalities were observed, specifically:
 - a. Fin erosion was the most notable abnormality. Partial to total reduction in fin size was observed. White suckers were most frequently affected.
 - b. Other abnormalities observed included reddened areas on fins, sides, gill covers, jaws, heads, one deformed snout, one tumor, and partial barbel loss.
 - c. A pathology exam found inflamed nerve endings, inflamed gut linings, and abnormal thyroid glands.
 - d. A caged white sucker test showed fin erosion/deterioration and reddened areas developed in two weeks of exposure to Newton Creek water.
2. Fish surveys found fish IBI values ranged from poor to fair. Total of 17 species were found.
3. Water chemistry results show a variety of petroleum related parameters present.
4. Water toxicity testing found significant chronic toxicity to fat head minnow growth, *C. dubia* (a zooplankton) reproduction and *Selenastrum* (an algae) growth on one or more dates.
5. Macroinvertebrate surveys have shown a decline over the last 3 years of sampling with average MIBI scores of poor.
6. Sediment testing results indicate elevated levels of petroleum hydrocarbons and invertebrate toxicity in samples taken from the uppermost portion of the creek, referred to as the 21st Street impoundment.
7. Observations of chronic foaming below the culvert at 21st Street and foam could be generated by agitating the water.



Hog Island Inlet:

1. Abundance of aquatic plants increased from 2014-2016. Field observations suggest aquatic plant health is still not optimal when compared to Loons Foot Bay, the reference site.
2. Application of the trimetric index indicated reasonably good benthic macroinvertebrate communities were present.
3. The fish community observed indicates reasonably good conditions and is fairly typical of fish communities found elsewhere in the lower St. Louis River estuary.
4. Sediment chemistry/toxicity results from Hog Island Inlet indicate that cleanup goals continue to be met, even though minor petroleum sheens and odors are present.

2016 Monitoring Indicates Potential Source of Fin Erosion & Chronic Toxicity

WI DNR staff delineated Newton Creek watershed and identified outfalls and discharges (Figure 1). The 2016 monitoring results show indications that fish fin erosion and chronic toxicity are influenced by sources above the 21st Street (21st) site.

1. Caged sucker at 21st showed fin deterioration/erosion after 2 weeks of exposure (Figure 2).
2. Fin erosion rates in suckers were higher at 21st compared to downstream sites at 11th & 3rd (Figure 3).
3. Total petroleum hydrocarbons (TPH's) are higher at 21st than at the 3rd St. site downstream (Figure 4).
4. Multiple references show that fin erosion can occur in areas with petroleum contaminants.
5. Naphthenic acids, correlated with fin erosion in one study, are present in Newton Creek at 21st.
6. Chronic toxicity test results show higher toxicity at 21st than at the 3rd St. site downstream (Figures 5 & 6).
7. Laboratory results from the testing of sediment samples indicate elevated levels of Total Petroleum Hydrocarbons (Figure 7) and invertebrate toxicity in samples taken from the uppermost portion of the creek, referred to as the 21st Street impoundment (Figure 8). Invertebrate survival was further reduced by exposure to UV light which suggests photo-activation of toxic compounds.

Figure 1. Newton Creek Watershed Boundary, Outfalls and Discharges

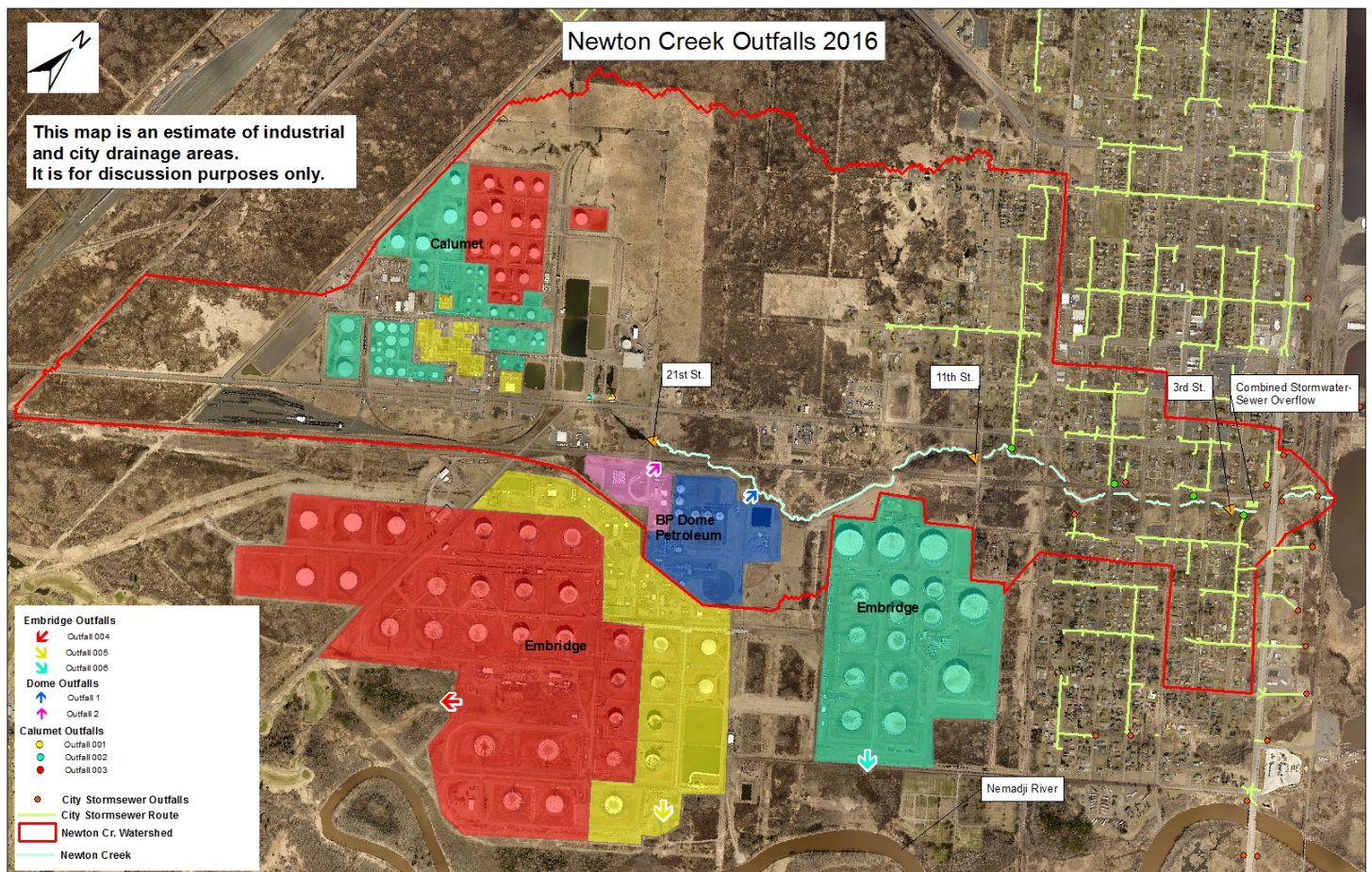


Figure 2. Caged White Sucker after 2 weeks exposure in Newton Creek (A) and Faxon Creek (B, Control Site).

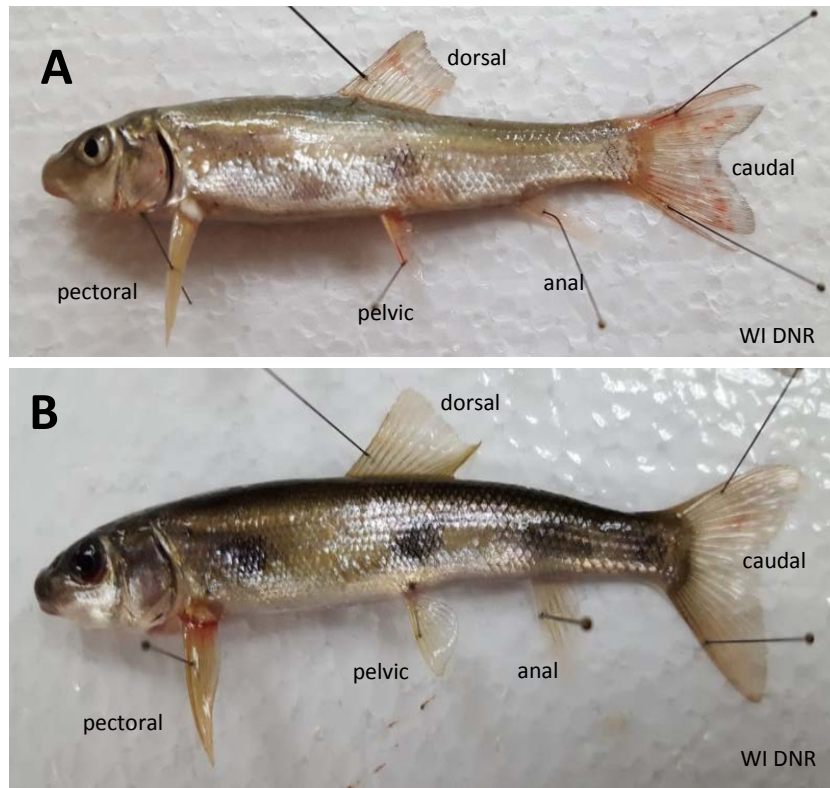


Figure 3. Percent Fin Erosion in White Sucker from Newton Creek.

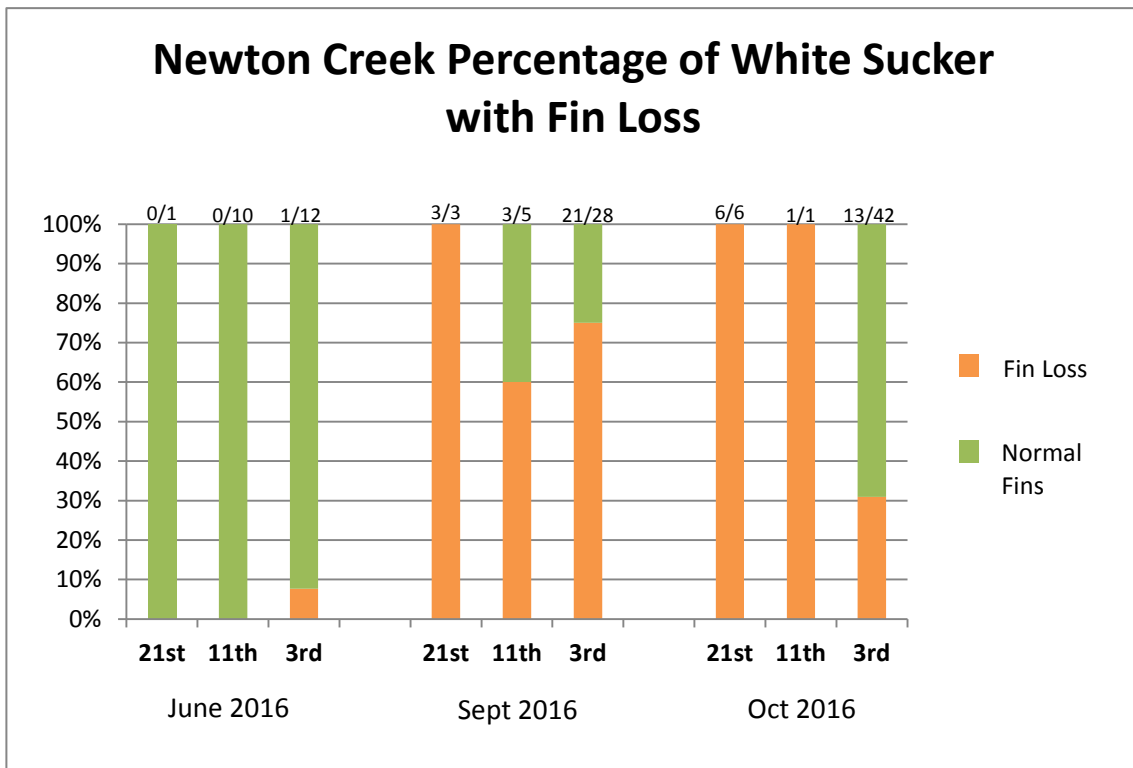


Figure 4. Total Petroleum Hydrocarbons (TPH C₆-C₃₄) Concentration in Newton Creek Water.

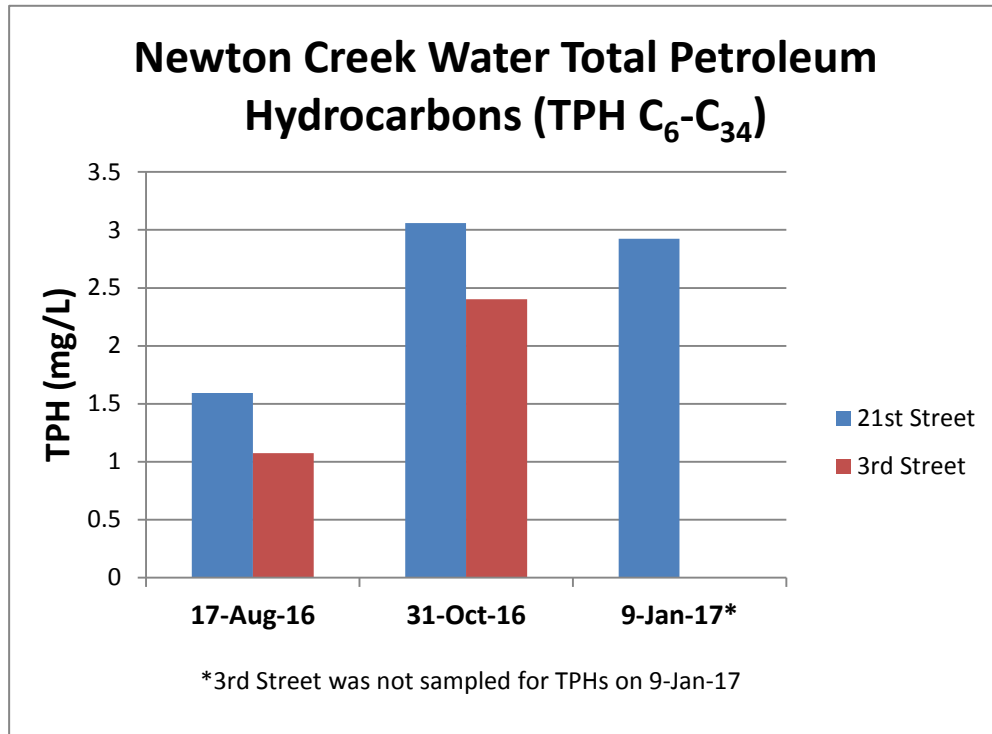


Figure 5. Significant Water Toxicity Algae Test Results for Newton Creek.

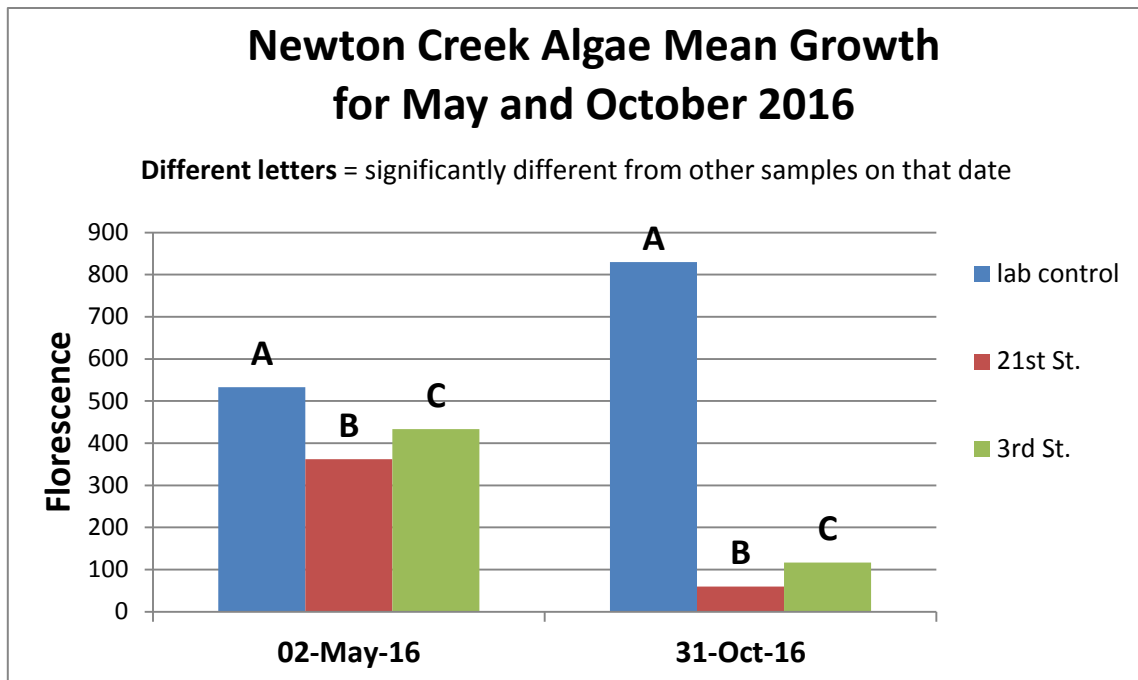


Figure 6. Significant Water Toxicity for Zooplankton and Fathead Minnow Test Results for Newton Creek.

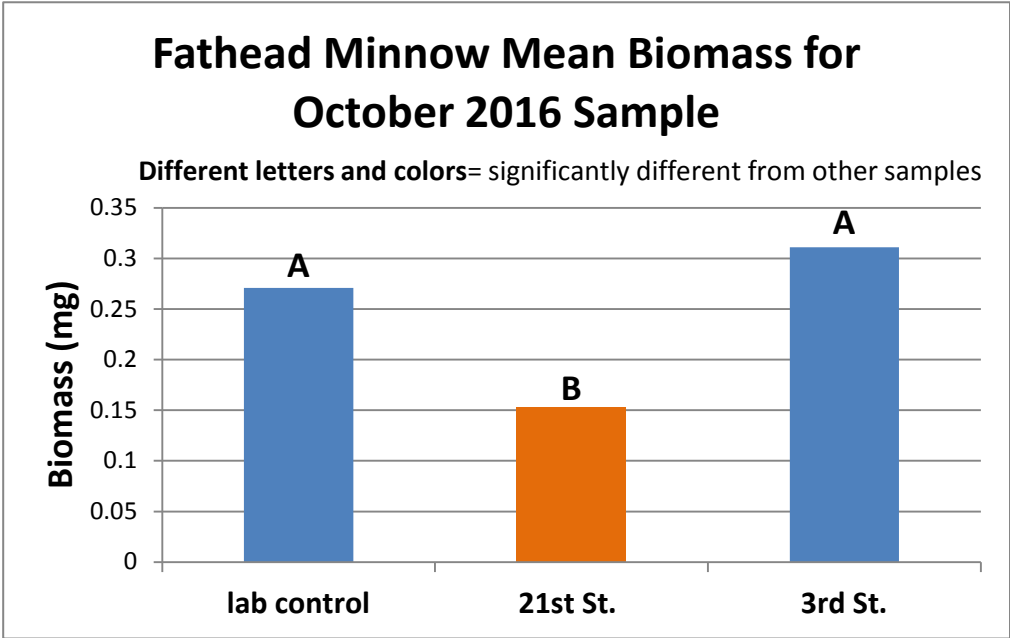
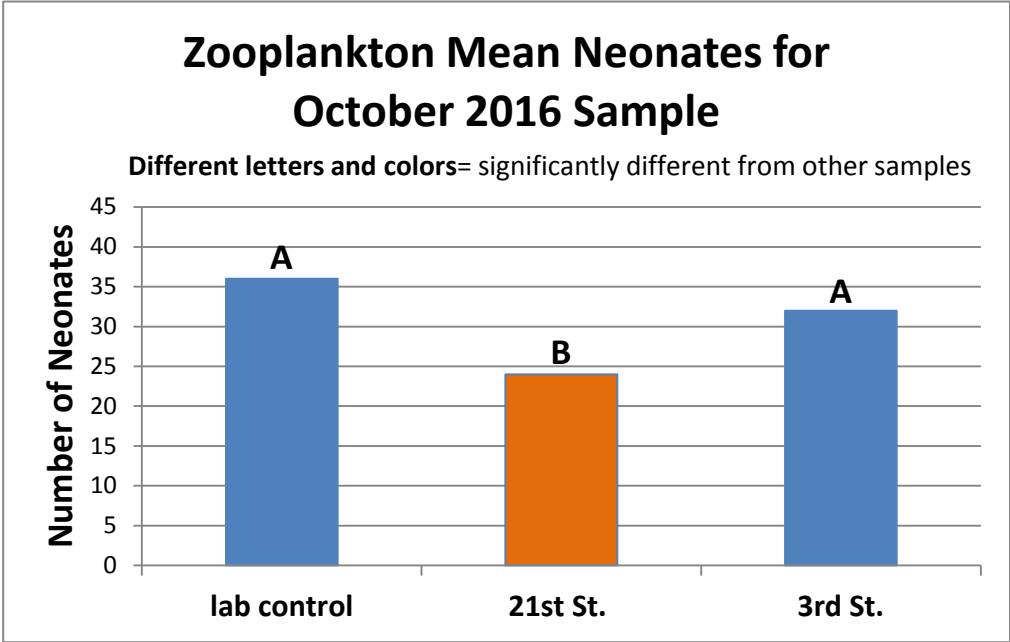


Figure 7. Total Petroleum Hydrocarbons (TPH C₆-C₃₄) Concentration in Newton Creek Sediments.

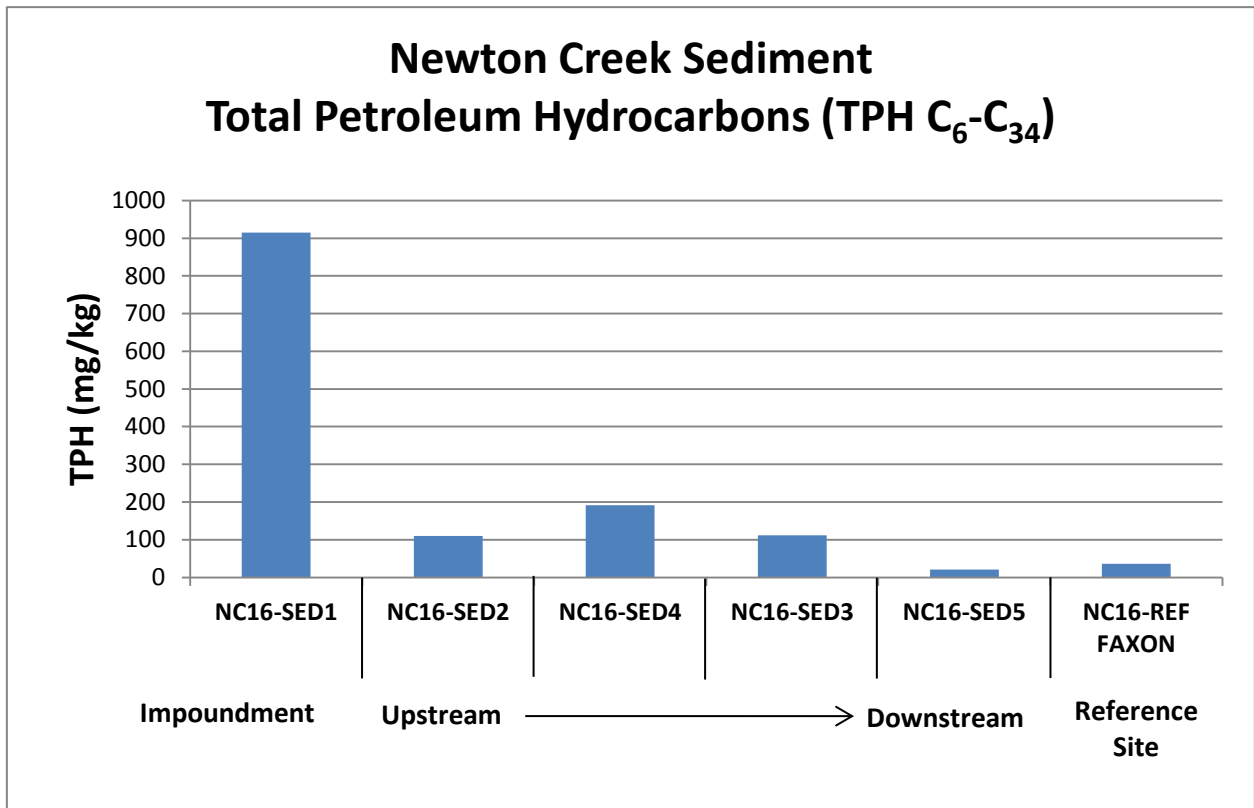


Figure 8. Scud Survival Sediment Toxicity Test Result for Newton Creek.

