

REPORT

**Freshwater Mussel Survey in Muddy Brook and Stony Brook
at Two Gas Pipeline Crossings (Suffield, Connecticut)**

prepared for

AECOM

500 Enterprise Drive, Rocky Hill, CT 06067

prepared by

biodrawversity



Biodrawversity LLC

433 West Street, Amherst, Massachusetts

June 2014



Part of the mussel survey area in Stony Brook.

INTRODUCTION

Biodiversity LLC conducted a freshwater mussel survey at one location in Muddy Brook and one location in Stony Brook (Suffield, Connecticut) at gas pipeline crossings. Target species included the Dwarf Wedgemussel (*Alasmidonta heterodon*) and Brook Floater (*Alasmidonta varicosa*), both of which are listed as Endangered in Connecticut (the Dwarf Wedgemussel is also a federally endangered species). Surveys were required for the environmental review and permitting for a proposed pipeline expansion project. Objectives were to document the presence, distribution, and habitat use of the two species in areas that would be affected by the pipeline project (including a buffer), to identify potential mussel relocation sites a safe distance away from these crossings, and to recommend steps to avoid and minimize “take” of these species and alterations to their habitat.

METHODS

The survey was conducted on June 3, 2014. River discharge was normal for early June, water was clear, and weather was sunny and warm. The survey was conducted in all areas where the stream or its riverbank may be affected by project-related construction, including a 50-meter upstream buffer and a 100-meter downstream buffer (per standard USFWS and CTDEEP protocols). Two biologists conducted visual surveys by snorkeling, and

also attempted to find buried mussels (which tend to be juveniles) by excavating and sieving sediment from within 25 0.25m² quadrats at each crossing. Quadrats were placed in areas with suitable juvenile habitat, and substrate was excavated to a depth of 10 cm.

Biologists recorded the shell length, microhabitat (depth, substrate, and a qualitative estimate of flow velocity), and location of each target mussel species that is encountered. Biologists evaluated potential mussel relocation sites upstream from the pipeline crossings. The sites were selected based on habitat (i.e., flow velocity, depth, and substrate) similar to the survey area, and a brief survey was conducted to confirm that target mussel species inhabited these areas.

RESULTS

Muddy Brook

Twenty-six live Dwarf Wedgemussels were found: 25 were found in the primary survey area and one was found at a potential relocation site upstream (Figure 1). Brook Floater were not found. Mean shell length of Dwarf Wedgemussels was 32.7 mm and ranged from 23.0 to 44.0 mm (Table 1). Dwarf Wedgemussels were found primarily in silt, sand, and gravel substrates in water depths ranging from 1.0 to 2.5 feet, in light to moderate flow velocities (typically less than 0.2 m/s). Four other mussel species were also found: two Creeper (*Strophitus*



Part of the mussel survey area in Muddy Brook.

undulatus), six Triangle Floater (*Alasmidonta undulata*), two Eastern Floater (*Pyganodon cataracta*), and several hundred Eastern Elliptio (*Elliptio complanata*). Forty-eight live mussels were found in quadrats, including 46 Eastern Elliptio (23 surface, 23 buried) and two Dwarf Wedgemussel (both buried). The potential relocation site contained habitat similar to the primary survey area, and four species were found there: Dwarf Wedgemussel, Creeper, Triangle Floater, and Eastern Elliptio.

Stony Brook

Ten live Dwarf Wedgemussels were found: nine were found in the primary survey area and one was found at a

potential relocation site upstream (Figure 2). Brook Floater were not found. Mean shell length of Dwarf Wedgemussels was 33.0 mm and ranged from 24.0 to 38.0 mm (Table 1). Dwarf Wedgemussels were found primarily in silt, sand, and gravel substrates in water depths ranging from 1.0 to 2.5 feet, in water velocities typically less than 0.2 m/s. One Creeper, four Triangle Floater, and several hundred Eastern Elliptio were also found. A total of 130 live Eastern Elliptio were found in quadrats (92 surface, 38 buried). The potential relocation site contained habitat similar to the primary survey area, and three mussel species were found there: Dwarf Wedgemussel, Triangle Floater, and Eastern Elliptio.



Two Dwarf Wedgemussels from Muddy Brook.



Dwarf Wedgemussel from Stony Brook.

Table 1. Summary of location, shell length, and habitat data for each dwarf wedgemussel observed in Muddy Brook and Stony Brook.

Stream	Latitude	Longitude	Shell Length (mm)	Water Depth (ft)	Flow**	Substrate				
						Silt	Sand	Gravel	Cobble	Wood
Muddy Brook	41.994846	-72.658369	41.0	2.5	L		x			
Muddy Brook	41.994846	-72.658369	35.0	2.5	L		x			
Muddy Brook	41.994874	-72.658379	28.7	1.5	L		x			
Muddy Brook	41.99489	-72.658347	32.0	1.3	L	x	x			
Muddy Brook	41.994912	-72.658293	23.0	1.0	L	x	x			
Muddy Brook	41.994918	-72.658272	35.0	1.5	L	x				x
Muddy Brook	41.994949	-72.658173	26.8	1.5	L	x				x
Muddy Brook	41.995299	-72.658411	25.0	1.2	L	x		x		x
Muddy Brook	41.99533	-72.658421	28.0	1.0	LM	x	x			x
Muddy Brook	41.995308	-72.658424	32.5	2.0	L	x	x			
Muddy Brook	41.995309	-72.658426	35.0	2.0	L	x	x			
Muddy Brook	41.995323	-72.658457	29.5	2.0	L	x	x			
Muddy Brook	41.995336	-72.658482	28.5	2.0	L	x	x			
Muddy Brook	41.99533	-72.658484	32.8	2.0	L	x	x	x		
Muddy Brook	41.995332	-72.658503	28.0	2.0	L	x	x	x		
Muddy Brook	41.995337	-72.658534	26.8	2.0	L	x	x	x		
Muddy Brook	41.995338	-72.658541	44.0	2.0	L	x	x	x		
Muddy Brook	41.995339	-72.658543	36.0	2.0	L	x	x	x		
Muddy Brook	41.995497	-72.658735	44.0	2.0	L	x	x	x		
Muddy Brook	41.995521	-72.658812	32.2	2.0	L	x		x		
Muddy Brook	41.995535	-72.658815	32.3	2.0	L	x				
Muddy Brook	41.995538	-72.658802	32.0	2.0	L	x	x			
Muddy Brook	41.995566	-72.658864	33.0	2.0	L	x	x			
Muddy Brook	41.995618	-72.6589	36.5	1.5	L	x				x
Muddy Brook	41.995615	-72.658901	36.5	1.5	L	x	x			
Muddy Brook*	41.996506	-72.659353	36.0	2.0	L	x	x			x
Stony Brook	41.964859	-72.686675	37.2	2.5	M	x			x	
Stony Brook	41.96481	-72.68665	24.0	2.0	LM	x	x			
Stony Brook	41.964931	-72.686826	38.0	2.0	LM	x	x	x		
Stony Brook	41.96494	-72.686843	37.3	1.0	L	x	x			
Stony Brook	41.964991	-72.686913	29.9	1.5	L	x	x			
Stony Brook	41.965043	-72.687078	37.0	1.4	L	x	x			
Stony Brook	41.965203	-72.687441	27.5	1.5	L	x	x	x		
Stony Brook	41.965206	-72.687421	30.5	1.8	L	x	x	x		
Stony Brook	41.965210	-72.687447	28.0	1.5	L	x	x			
Stony Brook*	41.965917	-72.688155	41.0	2.0	L	x	x			

*These two mussels were found at the potential relocation sites, not within the primary survey area.

**L = Light (typically <0.10 m/s), M = moderate (0.10-0.25 m/s). Higher flows not observed.

RECOMMENDATIONS

Due to the presence of Dwarf Wedgemussels near both pipeline crossings, we recommend consultation with both the CTDEEP and the USFWS. It is likely that formal consultation under Section 7 of the United States Endangered Species Act will be necessary; other federal permits (e.g., U.S. Army Corps of Engineers) would be suspended until the Section 7 consultation is complete.

Similar projects in areas where Dwarf Wedgemussels have been documented have used several approaches to avoid “take”. Examples include design modifications to reduce the instream footprint of construction, Best Management Practices to reduce sedimentation or pollution, and a mussel relocation and monitoring plan. In

Connecticut, CTDEEP typically concurs with USFWS on mussel relocation and monitoring requirements. In general, a qualified mussel biologist with a permit from the CTDEEP should collect mussels from within the footprint of instream work plus a 50-meter upstream buffer and 100-meter downstream buffer, and move these animals to a suitable upstream relocation site identified in advance. The survey should target both adult mussels and juveniles; the latter are typically buried and would need to be collected by sieving. Relocated mussels should be marked to distinguish them from resident (non-relocated) mussels, and should be checked one month and one year following relocation to ensure that they survived. A detailed relocation and monitoring plan would be fully developed in the Section 7 document and also submitted as part of Scientific Collection Permit application.



Figure 1. Muddy Brook survey area, Dwarf Wedgemussel locations, and potential relocation site.

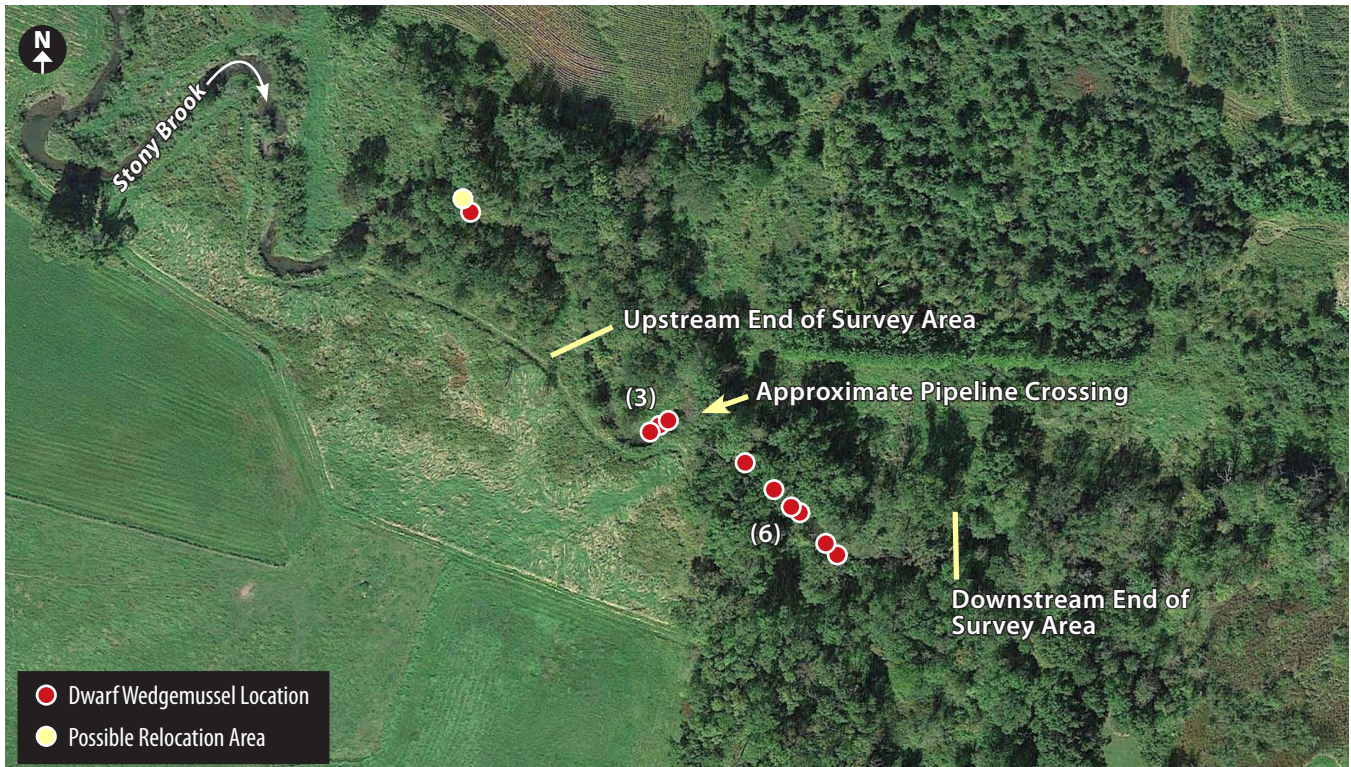


Figure 2. Stony Brook survey area, Dwarf Wedgemussel locations, and potential relocation site.