

POPULATION ASSESSMENT AND POTENTIAL FUNCTIONAL ROLES OF NATIVE MUSSELS IN THE UPPER HUDSON RIVER

HUDSON RIVER NATURAL RESOURCE DAMAGE ASSESSMENT

HUDSON RIVER NATURAL RESOURCE TRUSTEES

STATE OF NEW YORK
U.S. DEPARTMENT OF COMMERCE
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TRUSTEES' EXECUTIVE SUMMARY

Past and continuing discharges of polychlorinated biphenyls (PCBs) have contaminated the natural resources of the Hudson River. The Hudson River Natural Resource Trustees –New York State, the U.S. Department of Commerce, and the U.S. Department of the Interior –are conducting a natural resource damage assessment (NRDA) to assess and restore those natural resources injured by PCBs.

The Hudson River supports a rich array of ecological resources that interact in complex ways, and the river provides habitat for a wide range of plants and animals. As part of the NRDA, the Trustees are documenting exposure and injury of the natural resources of the Hudson River to PCBs, as well as physical impacts to natural resources from the remedial action.

The Hudson River provides habitat for native freshwater pearly mussels (Unionidae). The mussel beds they form provide habitat for other species. Physical removal of PCB-contaminated sediments from portions of the river bottom during the remedial dredging harmed freshwater mussels living in those sediments. Backfilling and capping operations implemented in the dredged areas can smother mussels because of the thickness and specifications of material placed. The cap and backfill material can also be unsuitable for mussels to recolonize, survive, grow and reproduce in the reconstructed river bottom.

As part of the Hudson River NRDA, the Trustees supported the quantitative survey of six pools of the Upper Hudson River to investigate the effects of the remedy on freshwater mussels. The five pools within the Site boundaries were sampled in 2013 and 2015. The surveys targeted non-remediated and before-remediation areas in the Fort Miller and Stillwater Pools and non-remediated and after-remediation areas in the Thompson Island and Northumberland Pools. Non-remediated areas were surveyed in the Upper Mechanicville Pool and in the reference Feeder Dam Pool upstream of the Site. The studies were designed to quantitatively characterize species composition, population size, relative abundance, population structure (i.e., length and age) and ecological services (i.e., biomass, carbon storage and filtration). The surveys provide an estimate of the number of mussels present in each pool prior to remediation and the number present after the remedy.

Over 4,000 native freshwater Unionidae mussels were collected during the surveys. Nine species were identified: *Elliptio complanata*, *Lampsilis cariosa**, *Lampsilis radiata*, *Lasmigona costata*, *Leptodea fragilis*, *Ligumia nasuta**, *Pyganodon cataracta*, *Strophitus undulatus*, and *Utterbackiana (Anodonta) implicata**

including three listed in New York State as Species of Greatest Conservation Need (*). Historical records document the presence of five of these species from this stretch of river. This study expands the known species list from five¹ to 11.

Average pool-wide densities of mussels for all five pools was 30.97/m² ranging from 12.7 mussels/m² in the reference Feeder Dam Pool to 51.2 mussels/m² in the Northumberland Pool. The average pool-wide density for the first four pools downstream of the GE plant sites was 35.53 mussels/m². The lowest and highest density of mussels were measured in non-remediated areas of the Upper Mechanicville Pool (0.7 mussels/m²) and the Northumberland Pool (66.7 mussels/m²), respectively. Mussel density in the non-remediated and before-remediation areas of the same pool were similar, while densities in the after-remediation areas were an order of magnitude (91-94%) lower.

Pool-wide population estimates² (density x area) varied by pool in part due to differences in pool size³ and whether portions of the pool had already been dredged⁴. Over 110 million mussels were estimated as inhabiting the Stillwater Pool. This pool was sampled prior to remediation and was about 2.6 – 4.6 times larger in size than other pools. The overall mussel population in the four upper pools (Thompson Island, Northumberland, Fort Miller, and Stillwater) of the Hudson River Superfund Site is estimated at almost 218 million.

Mussel populations were substantially reduced in the after-remediation areas, altering the amount of ecosystem services generated. Populations were estimated at 2.7 and 1.3 million mussels in the after-remediation areas compared to 29 and 41 million mussels in the non-remediated areas of the Thompson and Northumberland Pools, respectively. In comparison, estimated mussel populations were 4.2 and 4.5 million in the before-remediated areas and 29 and 106 million in the non-remediation areas of the Fort Miller and Stillwater Pools, respectively. After-remediation population estimates are not available for the Fort Miller and Stillwater Pools from the current study because the surveys were conducted prior to remediation.

Only 2-3% of the pool-wide biomass (tissue mass x density) remained in the after-remediation areas of Thompson Island and Northumberland Pools. Filtration rates following remediation of these two pools were reduced 10-fold or more relative to filtration rates in non-remediated sections of the four upper pools or by approximately 4.5- to more than 10-fold from the before-remediation areas of Fort Miller and Stillwater Pools.

¹ These five species have previously been documented from the Hudson River between Corinth and Troy, New York: *Elliptio complanata*, *Lampsilis radiata*, *Ligumia nasuta*, *Pyganodon grandis*, and *Leptodea ochracea*.

² Pool-wide estimates refers to the sum of before-remediation or after-remediation and non-remediated areas minus the navigation channel and setbacks. Pool-wide estimates were not calculated for the Upper Mechanicville Pool because only the non-remediated area of the pool was surveyed.

³ The surveyed area of the two smallest pools (Fort Miller and Northumberland), was approximately 22% of the total survey area of the largest pool (Stillwater).

⁴ Population estimates for the Thompson Island and Northumberland Pools were calculated from after-remediation and non-remediated areas. Population estimates for the Fort Miller and Stillwater Pools were calculated from before-remediation and non-remediated areas

Based on external aging, substantially more juvenile mussels were collected from the after-remediation areas compared to other age classes, but it is too early to know whether juveniles will persist in these modified environments. While the presence of juveniles suggests some level of recruitment pre- and post-remediation, information is lacking on where recruitment is occurring and whether the juveniles observed in after-remediation areas were mobilized from adjacent or upstream non-remediated locations or were not fully removed by the dredging.

Estimates of mussel age based on external ring counts are provided in this report. A separate report will describe the results of a mussel thin-sectioning study to provide ages based on internal growth rings.

The survey information provided an estimate of the mussels removed as a result of the remedial action and a baseline for future restoration activities of remediated areas to address loss of ecological structure and function.

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POPULATION ASSESSMENT AND POTENTIAL FUNCTIONAL ROLES OF NATIVE MUSSELS IN THE UPPER HUDSON RIVER

Contract completion report to the Hudson River Natural Resource Trustees

National Oceanic and Atmospheric Administration

New York State Department of Environmental Conservation

U.S. Department of the Interior

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EXECUTIVE SUMMARY

General Electric Company (GE) directly and indirectly released polychlorinated biphenyls (PCBs) into the Hudson River and the surrounding environment starting in the late 1940's, making it one of the most PCB-contaminated rivers in North America. Source control at two GE plant sites was implemented in 2009 to stem the influx of PCBs into the river. The Hudson River, like many other rivers, contains populations of native freshwater mussels—a group of animals that perform vital functions in freshwater systems. While there was anecdotal evidence of mussels residing in the Upper Hudson River (north of Troy, NY), quantitative data on mussel assemblages were lacking. Systematic quantitative surveys for native mussels were completed in 2013 and 2015 in a total of six pools of the Upper Hudson River including one upstream reference pool (Feeder Dam) located upstream of the former GE plant sites and five contaminated pools downstream of the GE plant sites (Thompson Island, Fort Miller, Northumberland, Stillwater, and Upper Mechanicville). Surveys were designed to estimate species composition, relative abundance, population size, population structure, and ecological services (i.e., biomass and filtration) of mussel communities prior to and after remedial actions to remove PCB contaminated sediments (i.e., dredged and subsequently capped or backfilled). In most pools, the experimental design incorporated stratification on remediated (before or after remedial activities were completed) and non-remediated areas.

A total of 4,119 live mussels, representing nine species, were obtained across the surveyed pools; in all pools, *Elliptio complanata* was the dominant species. Generally, these pools contained a relatively robust assemblage of mussels based on the following characteristics: (1) juveniles comprised 13-26% of the mussel assemblage; (2) six of the nine species were represented by juveniles, albeit in low numbers; (3) five of the six species with juveniles also contained multiple age classes; and (4) the presence of few fresh dead mussels (<0.05%) suggests little recent mortality. However, the quality of the mussel assemblage varied considerably among pools from a relatively low-quality assemblage in Upper Mechanicville Pool to high quality assemblages in non-remediated areas in Thompson Island, Fort Miller, Northumberland, and Stillwater Pools.

Differences in several biological traits (i.e., density, age and length distributions, biomass, and filtration) between remediated and non-remediated areas suggest that remedial activities dramatically altered mussel assemblages. Recently remediated areas in Northumberland and Thompson Island Pools (remediated prior to sampling) were almost devoid of mussels, relative to non-remediated

areas. For example, estimated densities in remediated areas in these pools were 91-94% lower than estimates in non-remediated areas. Similarly, 97-98% of the mussel biomass across these pools was removed from within remediated areas during remedial actions. These two pools are unique in that 26-61% of the area in these pools was remediated, relative to only 6-14% in other pools.

Given the substantial effects of remediation on native mussels in the Upper Hudson River, coupled with the long response times that mussels require to recover from disturbance, strategies to restore native mussel assemblages are limited. After the remediated areas are capped and backfilled with sediment, and these newly replaced substrates stabilize, recolonization of mussel communities may occur via horizontal movement of mussels from non-remediated areas and/or by dispersal of larval mussels by host fish. Natural recovery of native mussel populations following remedial activities in the Upper Hudson River is anticipated to be relatively slow, on the scale of decades.

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LIST OF ACRONYMS

AR	after-remediation
BR	before-remediation
DOI	U.S. Department of the Interior
EPA	see USEPA
g/m ²	grams per square meter
GE	General Electric Company
HRNRT	Hudson River Natural Resource Trustees (or “Trustees”)
kg	kilograms
kg/cm ²	kilograms per square centimeter
lb	pounds
mm	millimeter
m ³ /m ² /d	cubic meters per square meter per day
NOAA	National Oceanic and Atmospheric Administration
NR	non-remediated
NRDA	natural resource damage assessment
NYSDEC	New York State Department of Environmental Conservation
PCBs	polychlorinated biphenyls
PW	pool-wide
ROD	Record of Decision
RM	river mile
RS	river section
SD	standard deviation
USEPA	U.S. Environmental Protection Agency
y	year

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1. Introduction

Freshwater pearly mussels are among the most imperiled groups of animals in North America (Strayer *et al.* 2004). Almost 300 species of freshwater mussels have been described as endemic to North America, representing the greatest diversity of these mussels in the world. Of these species, 13% are listed as extinct and 66% are ranked as vulnerable, imperiled, or critically imperiled (Master *et al.* 2000). Historically, 51 species of mussels have been described in the state of New York. Currently, 39 species are listed by the New York State Department of Environmental Conservation (NYSDEC) as Species of Greatest Conservation Need (NYSDEC 2018a) including those designated as extinct, threatened, or endangered (NYSDEC 2018b). However, since mussel assemblages in many rivers and lakes in New York have never been surveyed, substantial assemblages may exist, waiting to be characterized. Such is the case for the Upper Hudson River (north of Troy, NY) where there is anecdotal knowledge that abundant mussel assemblages exist, but documentation of their populations and species diversity is limited.

General Electric Company (GE) directly and indirectly released polychlorinated biphenyls (PCBs) into the Upper Hudson River and the surrounding environment from two manufacturing facilities starting in the late 1940s (Brown *et al.* 1984), making it one of the most PCB-contaminated rivers in North America (Secord *et al.* 1999). The Hudson River PCBs Superfund Site (“Site”) extends about 300 km between Hudson Falls and the Battery in New York City (Figure 1, USEPA 2002). The Champlain Canal runs through parts of the Site and has not been dredged since about 1980 (Hudson River Natural Resources Trustees, HRNRT, 2006). Most of the PCBs that were discharged adsorbed onto river sediments, especially in depositional zones (Connolly *et al.* 2000). Sediment cores showed that maximum PCB concentrations were typically 8–30 cm below the surface (Tofflemire *et al.* 1979; HRNRT 2013)—well within the depth range where native freshwater mussels reside (Newton *et al.* 2015). Targeted dredging to remove approximately 2.1 million m³ of PCB-contaminated sediment from a 64-km section of the Upper Hudson River between Fort Edward and Troy, NY was conducted from spring 2009 through fall 2015 (USEPA 2015c) by GE pursuant to the Record of Decision (ROD) issued by the U.S. Environmental Protection Agency (USEPA 2002, 2010). The USEPA’s 2002 ROD identified more stringent cleanup triggers based on PCB concentrations in sediments from areas closer to the source compared to areas further downstream. Therefore, a higher percentage of the area closer to the source was targeted for remediation relative to downstream pools. Remediation, consisting of dredging and subsequent placement of backfill or cap⁵ materials, began in 2009 and was completed in 2015 (USEPA 2015a). The habitat reconstruction component of the remedy will continue beyond 2015 (USEPA 2015b). The extensive remedial activities in the Upper Hudson River have likely altered habitats for native freshwater mussels.

⁵“Backfill or cap[ping]” is used throughout the report to describe areas that were dredged and subsequently backfilled, engineered capped or capped with an uppermost backfill layer. In some circumstances a habitat layer (backfill) was placed on top of the cap. This is synonymous with “capping and/or backfill” and similar descriptions of the remedy.

The diversity and abundance of freshwater organisms provide critical ecological services in river ecosystems. An important group of organisms for the functioning of freshwater systems are the native pearly mussels (Bivalvia: Unionidae). Mussels can be the most abundant benthic organisms in terms of biomass in some systems, often occurring in high-density beds of multiple species (Strayer *et al.* 1999; Raikow and Hamilton 2001). Freshwater mussels serve as couplers of nutrient and energy flows between pelagic and benthic communities (Nalepa *et al.* 1991; Welker and Walz 1998; Raikow and Hamilton 2001; Vaughn and Hakenkamp 2001) and can be important in removing suspended particles (Newton *et al.* 2011; Hansen *et al.* 2016). In addition, the shells of native mussels provide habitat for other benthic organisms (Sephton *et al.* 1980; Beckett *et al.* 1996) and epiphyton (Vaughn and Hakenkamp 2001; Gutiérrez *et al.* 2003). These services are important for the preservation of clean freshwater ecosystems that provide drinking water and recreational opportunities for residents and visitors to NY. Changes to the diversity, abundance, and long-term viability of native mussel communities may affect the ecosystem services that these communities provide (Atkinson *et al.* 2013).

The mussel surveys conducted in 2013 and 2015 were designed to quantitatively characterize species composition, population size, relative abundance, population structure (i.e., age and length) and ecological services (i.e., biomass and filtration) of mussels within six pools of the Upper Hudson River prior to and after remedial actions as part of a natural resource damage assessment by the HRNRT (Figure 2). Remedial actions, largely designed to remove PCB contaminated sediments, generally consisted of dredging and subsequent capping (submerged contaminated sediments are covered by stable layers of sediment, gravel, or rock) or backfilling. The survey information provided an estimate of the mussels removed as a result of the remedial action and provided a baseline for future restoration activities of remediated areas to address loss of ecological structure and function. Our objectives were:

1. Quantify freshwater mussel assemblages in areas targeted for dredging (i.e., before remediation) to estimate the potential loss of mussels and the associated services they provide in areas that will be dredged.
2. Quantify freshwater mussel assemblages in areas not targeted for dredging (i.e., non-remediated) to provide context for mussel assemblages in areas targeted for dredging.
3. Quantify freshwater mussel assemblages in areas following remediation (i.e., after remediation).
4. Characterize the mussel community in the relatively non-PCB contaminated, non-remediated upstream reference pool.

2. Methods

This study was designed to estimate species composition, relative abundance, population size, population structure, and potential ecosystem services of native freshwater mussels across six pools of the Hudson River (Figure 2). Four pools (Thompson Island, Fort Miller, Northumberland, and

Stillwater) were targeted for remediation due to contamination associated with two GE plant sites; one reach (Feeder Dam) served as an upstream reference, and one pool (Upper Mechanicville) was sampled because it is located downstream of the last pool sampled in 2013. Because of logistical constraints (i.e., funding, variable dredging schedules), we were unable to sample each of the four pools before and after remediation. Details on the timing of the mussel surveys as a function of remediation can be found in Table 1. We used biological responses (i.e., species composition, relative abundance, population size, population structure, ecosystem services) at reaches (pools) that were not remediated (i.e., Feeder Dam) or only sampled in the non-remediated areas of the reach (i.e., Upper Mechanicville Pool) or were sampled before remediation (i.e., Fort Miller and Stillwater Pools) as a type of ‘control’—comparing differences among pools without or before remediation. Next, we looked at two pools that were sampled after remediation (i.e., Thompson Island and Northumberland Pools) and compared biological responses among pools that were remediated with those non-remediated as a type of ‘experimental’ treatment. Differences in biological responses between remediated and non-remediated strata within a pool were evaluated by non-overlapping 95% confidence intervals.

2.1 Sampling design

The study area consisted of six pools, formed by dams of the Upper Hudson River (Figures 1 and 2): Feeder Dam (Figure 3A), Thompson Island (Figure 3B), Fort Miller (Figure 3C), Northumberland (Figure 3D), Stillwater (Figures 3E and 3F), and Upper Mechanicville (Figure 3G). Feeder Dam Pool, a relatively non-contaminated area up river from the main source of contamination, has been frequently used as a reference location to evaluate the effects of PCBs on other biota in the Upper Hudson River (Sloan *et al.* 2005; Madden and Skinner 2016; Pinkney *et al.* 2017). Thompson Island Pool is immediately downstream of the GE facilities that were the source of PCB contamination and is in River Section 1 (RS1) in the investigations performed by the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (USEPA). Fort Miller and Northumberland pools are in River Section 2 (RS2) and Stillwater and Upper Mechanicville pools are in River Section 3 (RS3). Descriptions of study reaches, timing of surveys, and strata sampled can be found in Table 1.

Mussel surveys were initially planned in Lower Mechanicville Pool (LMP) (HRNRT 2014a,b,c; 2015), but due to active remedy operations underway in the pool, it was unsafe to conduct these surveys. Upper Mechanicville Pool (UMP) was chosen as an alternative location since remedial work had occurred the previous year, and only non-remediated areas were targeted for mussel surveys. The study area excluded the navigation channel and setbacks from dams for safety reasons. The study area was surveyed using a probabilistic sampling design that incorporated stratification on remediated and non-remediated areas within each pool. The sampling frame (i.e., potential sampling locations to select from) was a square lattice of points created in a Geographical Information System. The points were spaced 10 m apart. A random selection of sites was drawn within each stratum (Table 2). The remediated areas were areas targeted for dredging and subsequent placement of backfill or cap and largely corresponded with GE’s-certification units designated for dredging (GE 2014; USEPA 2015d). Mussel surveys in Fort Miller and Stillwater Pools were done prior to

remediation, while surveys in Thompson Island and Northumberland Pools were done after remediation. Non-remediated areas were those not targeted for remediation. Pool-wide (PW) estimates exclude mussels that might inhabit the navigation channel, areas near dams, and other inaccessible areas, which were not sampled, and thus estimates of population size, biomass, and filtration are likely under-estimated.

2.2 Mussel sampling

Surveys were conducted in Fort Miller Pool on August 20, 21, 22 and September 3, 4, and 6, 2013; in Stillwater Pool on September 17, 19, 20, 24, 26, 27 and October 1, 3, 15, 29, and 31, 2013; in Feeder Dam Pool on August 6, 10, 13, 14, and 17, 2015; in Thompson Island Pool on September 15, 16, 17, 18, 22, 23, 24, 29 and October 1 and 2, 2015; in Northumberland Pool on August 26, 27, 28, 31 and September 1, 2, 3, 8, 9, and 10, 2015; and in Upper Mechanicville Pool on August 3, 5, 18, 20, and 24, 2015. Sampling and specimen collection were authorized under the appropriate NYSDEC license to collect or possess issued to the New York State Museum Division of Research and Collections.

Each location selected for sampling was quantitatively sampled. Sample sites were located in the field using a Global Positioning System (GPS); a labeled marker buoy was placed at the location and coordinates for the sampled site were recorded. At each site, a diver excavated substrate within two adjacent 0.063 m² quadrats, generally oriented downstream to upstream, to a depth of about 15 cm and the sample was placed into a 6-mm mesh bag attached to the sampling frame. To capture newly transformed juvenile mussels (e.g., ~≤ 3-mm in length, Schneider 2006), a 2-mm mesh bag was used in 2015 when sampling in areas that had already been remediated to potentially document early recolonization. The duplicate quadrats were used to increase the area sampled at each site to 0.125 m². Excavated material was rinsed through the mesh bag and transferred to labeled buckets.

Materials from non-remediated (NR), before-remediation (BR), and reference areas, sampled with ca. 6 mm mesh bag, were passed through a series of graduated sieves with a minimum size <6 mm (i.e., 5.6 mm). Materials from after-remediation (AR) areas, sampled with ca. 2 mm mesh bag, were passed through a series of graduated sieves with a minimum size <3 mm (i.e., 2.8 mm). Mussels and shells retained on sieves were transferred to labelled trays for processing. All live mussels were identified to species, counted, aged via external annuli, and measured for shell length (to the nearest mm using the posterior/anterior axis). The identity of each species was confirmed by at least one other scientist with expertise in regional mussel species identification. Appendices contain raw field data (Appendix A), images of all mussel species obtained (Appendix B), and confirmation of species identification by regional experts (Appendix C).

The number of fresh dead mussels, with soft tissue and/or clean, shiny nacre, was also counted as an index of recent mortality. Water depth to the nearest 0.1 m, the presence and type of aquatic vegetation, the presence or absence of *Dreissena polymorpha* (zebra mussel) and *Corbicula fluminea* (Asian clam), substrate penetration resistance (2015 surveys only), and substrate type were also recorded at each site. Substrate penetration resistance was measured in each quadrat by pushing the tip of a hand-held pocket penetrometer (Humboldt Mfg. Co., Elgin, IL) into the riverbed to a depth

of 6 mm and the resulting resistance was recorded in kg/cm² (Geist and Auerswald 2007). A 2.5-cm adapter foot was attached for all measurements to increase sensitivity in areas of soft sediment. Readings were divided by 16 to calculate actual resistance. A minimum value of 0.001 kg/cm² was assigned to areas with extremely soft mud (Geist and Auerswald 2007). Substrate type was characterized by subjective tactile/visual methods and was recorded as the percentage of cobble, gravel, sand, silt, detritus, and/or clay (Cummins 1962). Field data were recorded on data sheets.

Most mussels collected in 2013 and all mussels collected in 2015 were retained for various subsequent analyses; those that were not retained were returned to the pool from which they were collected. The retained mussels from each site were placed in zip-lock bags in the field and the bags were labeled to indicate collection date, site number, and analysis to be conducted. Mussels were transported on ice in coolers to the laboratory where they were either refrigerated at 5°C (specimens for length-weight regression) or frozen at -20°C. Chain of custody forms were completed in the field and accompanied samples to the laboratory. A subset of 20-40 specimens of *Elliptio complanata*, representing a range of length classes, from before-remediation, after-remediation, and non-remediated areas were retained by selecting up to 5 mussels from each pool that fit into 10-mm length bins (i.e., 1-10 mm, 11-20 mm, etc.) for estimation of wet and dry tissue and shell mass for length-weight regressions for calculation of ecosystem services (see below). Frozen mussels destined for possible future analysis of PCB concentrations (not part of the current study) were processed in the months following the field season.

Each mussel shell, whole tissue, and DNA tissue sample (see below) was assigned and labeled with a unique identification number and preserved for future studies. Both shells of each mussel were labeled with permanent marker, length recorded, and then stored in labeled boxes. When processing the mussels, all soft tissues were removed, a small piece of foot tissue was placed in 95 percent ethanol to preserve DNA for possible extraction in future studies, and was stored at -80°C. The remaining soft tissue was weighed and placed in a zip-lock bag and stored at -80°C (2013 surveys) or into a pre-cleaned glass jar and stored at -20°C (2015 surveys) for potential future analysis of PCB concentrations. Shells and tissues for DNA extraction will be curated into the New York State Museum's malacology collection.

2.3 Estimation of ecosystem services

Because all pools were dominated by *E. complanata*, ecosystem services (biomass and filtration capacity) were only estimated for this species. In the laboratory, tissues were removed from the shell and the tissue and shell were dried overnight at 60°C and weighed (Strayer *et al.* 1994). We developed a shell length (L, mm) to dry tissue mass (M, g) regression for *E. complanata* in each stratum in each pool. Carbon content of *E. complanata*, an index of carbon storage, was estimated as one half of the mean dry tissue mass (Strayer and Smith 2001).

To estimate biomass, the predicted tissue dry mass for each sampled individual was generated using the allometric function $M=aL^b$, where a is the y-intercept and b is the slope of the regression line; values for parameters a and b were estimated from pool- and stratum-specific data (Table 3). For

each pool, the mean tissue mass (g/mussel) was multiplied by density (number of mussels/m²) to obtain the mean biomass (g/m²) in remediated and non-remediated strata as in Newton *et al.* (2011). Confidence limits were approximated by multiplying the mean biomass by the lower and upper confidence limits around density. This estimate does not include the variance associated with the length–mass regressions; however, in these relationships length explains an average of 93% of variation in mass (across pool and strata, Table 3), suggesting that the magnitude of error from this source is relatively low. To estimate biomass pool-wide, stratum-specific biomass (g/m²) was weighted by stratum area. The total biomass in each stratum (g) was estimated by multiplying the mean biomass (g/m²) by stratum area (m²); these data were used to estimate the percent of the biomass attributed to remediated areas compared to pool-wide. Mean production was estimated from biomass using a production to biomass (P/B) ratio of roughly 0.2 (Nalepa and Gauvin 1988, Strayer *et al.* 1994).

To estimate the filtration capacity of the *E. complanata* community, the mean stratum-specific biomass (g) was multiplied by a filtration rate of 0.5 L/hr/g (Patterson 1984; Vanderploeg *et al.* 1995; Pusch *et al.* 2001). Variance associated with filtration rate estimates was not incorporated. Stratum-specific filtration capacity (m³/d) was divided by the stratum-specific area to obtain filtration capacity in m³/m²/d. Confidence limits were approximated by multiplying the mean filtration capacity by the lower and upper confidence limits around the mean biomass. To estimate filtration capacity pool-wide, stratum-specific filtration (m³/m²/d) was weighted by stratum area.

2.4 Data analysis and quality assurance

To maintain consistency in data collection among years, the scientific staff conducting the field, laboratory, and analytical portions of this study were the same in 2013 and 2015. All data entered into electronic data files were checked by a two-person quality assurance team to ensure that data matched the original data sheet. An on-site field audit was completed on August 10-11, 2015 by an HRNRT quality assurance coordinator.

Population size and density were estimated using survey sampling statistical software (SURVEYMEANS procedure, SAS 2003). These methods accommodate our stratified sampling design and allow weights to address unequal probabilities across strata. Data on population size and density are presented in areas before-remediation, after-remediation, non-remediated, and pool-wide (sum of before-remediation or after-remediation and non-remediated areas minus the navigation channel and setbacks). Differences in biological responses (i.e., density, biomass, production, filtration capacity) between remediated and non-remediated strata within a pool were evaluated by non-overlapping 95 percent confidence intervals. Data on age structure (particularly juvenile mussels) and potential ecosystem services were analyzed as in Newton *et al.* (2011).

3. Results

The surveyed pools of the Upper Hudson River varied ~5-fold in size from 826,600 m² in Fort Miller Pool to 3,762,400 m² in Stillwater Pool (Table 2). Similarly, the percent of each pool that was

(or was planned to be) remediated ranged from 6% in Stillwater Pool to 61% in Thompson Island Pool (Table 1). Average water depth was similar across pools, ranging from 1.7 to 3.2 m in Stillwater and Feeder Dam Pools, respectively (Table 4). About one third of the sites across all pools had vegetation present (Table 4), most commonly Water Celery (*Vallisneria americana*) and *Elodea* sp., but Water Chestnut (*Trapa natans*) was also common in Stillwater Pool. Substrates were heterogeneous across pools. Sand was the most prevalent substrate surveyed in the reference (Feeder Dam Pool), Thompson Island, Fort Miller, and Northumberland Pools across all strata (Figure 4). Sand was also the most prevalent substrate in non-remediated strata of Stillwater Pool (Figure 4). Bedrock was the primary substrate in non-remediated strata of Fort Miller and Upper Mechanicville Pools (Figure 4). Silt was the prevalent substrate in Stillwater Pool at sites sampled before remediation (Figure 4). Substrate resistance was highest in Upper Mechanicville, which was predominately bedrock substrate and lowest in Feeder Dam Pool, which was largely sand and silt (Table 5, Figure 4). In areas where both strata were sampled (Thompson Island and Northumberland Pools), substrate resistance was 0.116 and 0.080 kg/cm², respectively, in non-remediated areas compared to 0.067 and 0.045 kg/cm², respectively, in after-remediation areas (Table 5). Non-unionid macroinvertebrates found during sampling in 2015 include *Corbicula* spp., *Dreissena* spp., fingernail clams, and snails (Table 6).

A total of 4,119 live mussels, representing nine species, were obtained across the six pools surveyed in 2013 and 2015. In all pools, the native freshwater mussel community was dominated by *E. complanata*. In the reference pool (Feeder Dam), 191 mussels, representing three species were obtained pool-wide (Table 2). In Thompson Island Pool, 63 mussels, representing two species were obtained from after-remediation strata and 753 mussels, representing five species were obtained from non-remediated areas (Table 2). In Fort Miller Pool, 443 mussels, representing five species were obtained from before-remediation strata and 457 mussels, representing three species were obtained from non-remediated areas (Table 2). In Northumberland Pool, 94 mussels, representing four species were obtained from after-remediation strata and 1,026 mussels, representing four species were obtained from non-remediated areas (Table 2). In Stillwater Pool, 242 mussels, representing three species were obtained from before-remediation strata, and 840 mussels, representing three species were obtained from non-remediated areas (Table 2). In Upper Mechanicville Pool, 10 mussels, representing one species were obtained from non-remediated areas (Table 2). Only two fresh dead mussels were found in all surveys. Weathered dead mussels were not recorded in 2013. The number of weathered dead mussels in 2015 was 32 in Feeder Dam, 71 in Thompson Island, 89 in Northumberland, and 18 in Upper Mechanicville.

Across all strata, ~18% of the mussel assemblages in the six surveyed pools were juveniles ≤5 years old, based on external aging (Table 8). In the two pools sampled after remediation (Northumberland and Thompson Island), juveniles comprised 49 and 70%, respectively, of the population (Table 8). Juvenile *E. complanata* were present in all six pools. Juvenile *P. cataracta* were only found in Feeder Dam Pool and juvenile *L. fragilis* were only found in Fort Miller Pool. *Strophitus undulatus* were present as juveniles in Thompson Island and Northumberland Pools. Juvenile *L. radiata* were found

in Thompson Island, Fort Miller, Northumberland, and Stillwater Pools. *Ligumia nasuta* were present as juveniles in Fort Miller, Northumberland, and Stillwater Pools.

The average length of *E. complanata* was highly variable across pools and ranged from 36.6 mm in after-remediation strata in Thompson Island Pool to 73.9 mm in non-remediated areas in Thompson Island Pool (Table 7). The average shell length of *E. complanata* in the reference pool was 67.3 mm (Table 7). In Thompson Island and Northumberland Pools, where mussels were sampled after remedial activities, the mean size of *E. complanata* was 2.0 and 1.5X lower, respectively, in areas that had been remediated relative to non-remediated areas. In Fort Miller and Stillwater Pools, which were sampled before remediation, mean sizes were similar (1.1X in both) between strata. Sample sizes of the uncommon species obtained in this study (*L. cariosa*, *L. radiata*, *L. costata*, *L. fragilis*, *L. nasuta*, *P. cataracta*, *S. undulatus*, and *U. implicata*) were too small to merit further analysis of size structure and other biometrics.

The average age of *E. complanata* was variable across pools and ranged from 5.3 y in after-remediation strata in Thompson Island Pool to 11.2 y in non-remediated areas in Thompson Island Pool (Table 7, Figure 5). The average age of *E. complanata* in the reference pool was 8.5 y (Table 7). In Thompson Island and Northumberland Pools, where mussels were sampled after remediation, the mean age was 2.1 and 1.5X lower, respectively, in areas that had been remediated relative to non-remediated areas. In Fort Miller and Stillwater Pools, which were sampled before remediation, mean ages were similar (1.1X, respectively) between strata. Ages of uncommon species were: *L. radiata* (n=1, 7 y) and *P. cataracta* (n=8, range, 4-9 y) in Feeder Dam; *L. radiata* (n=8, range, 3-11 y), *L. costata* (n=1, 16 y), *S. undulatus* (n=1, 5 y), and *U. implicata* (n=1, 15 y) in Thompson Island; *L. cariosa* (n=2, 7, 11 y), *L. radiata* (n=9, range, 3-8 y), *L. fragilis* (n=1, 4 y), and *L. nasuta* (n=5, range, 3-7 y) in Fort Miller; *L. radiata* (n=28, range, 3-10 y), *L. nasuta* (n=8, range, 3-9 y), and *S. undulatus* (n=5, range, 2-9 y) in Northumberland; *L. radiata* (n=40, range, 2-7 y) and *L. nasuta* (n=4, range, 4-5 y) in Stillwater. There were too few individuals of the uncommon mussel species to merit an analysis of age structure.

At the pool scale, estimates of density in five pools (pool-wide estimates were not made in Upper Mechanicville Pool) varied 4-fold, from 12.7 mussels/m² in Feeder Dam Pool to 51.2 mussels/m² in Northumberland Pool (Table 9). Pool-wide population estimates ranged from 31.4 million in Thompson Island Pool to 110.5 million in Stillwater Pool (Table 10). Because of its large area, Stillwater Pool contained an average of 3.2X (range, 2.6 to 3.5X) the number of mussels as Feeder Dam, Thompson Island, Fort Miller, or Northumberland Pools.

At the stratum scale, estimates of mussel density in non-remediated areas in five pools (only pool-wide estimates were made in Feeder Dam Pool) ranged from 0.7 mussel/m² in Upper Mechanicville Pool to 66.7 mussels/m² in Northumberland Pool (Table 11). Population estimates varied 141-fold from 0.8 million in Upper Mechanicville Pool to 105.9 million in Stillwater Pool (Table 12). In Stillwater and Fort Miller Pools, both sampled prior to remediation, estimates of mussel density were 19.6 and 36.2 mussels/m², respectively (Table 11). In Thompson Island and Northumberland Pools, both sampled after remediation, estimates of mussel density were 3.1 and 6.1 mussels/m², respectively (Table 11). Population estimates in before-remediation strata in Fort Miller and

Stillwater Pools were similar (4.2 and 4.5 million mussels, respectively (Table 12). In Northumberland and Thompson Island Pools, population estimates in after-remediation strata were 1.3 and 2.7 million mussels, respectively (Table 12).

Pool-wide estimates of *E. complanata* biomass in five pools (no pool-wide estimates in Upper Mechanicville Pool) ranged from 16 g/m² in Feeder Dam Pool to 54 g/m² in Fort Miller Pool (Table 13). These equate to average production estimates of 3 and 11 g/m²/y, respectively (Table 13). In non-remediated areas, biomass ranged from 1 g/m² in Upper Mechanicville Pool to 75 g/m² in Thompson Island Pool (Table 13). In before-remediation strata in Stillwater and Fort Miller Pools, biomass averaged 15 and 38 g/m², respectively (Table 13). In after-remediation strata in Thompson Island and Northumberland Pools, biomass averaged 2 and 3 g/m², respectively (Table 13). Estimates of biomass and production are often used to assess the potential ecological roles of mussels in river ecosystems (Strayer and Smith 2001).

In Fort Miller Pool, the total biomass in before-remediation strata was 4,305 kg and the pool-wide biomass was 44,554 kg; thus, ~10% of the pool-wide biomass resides in before-remediation areas. In Stillwater Pool, the total biomass in before-remediation strata was 3,417 kg and the pool-wide biomass was 115,506 kg; thus, ~3% of the pool-wide biomass resides in before-remediation areas. In Thompson Island Pool, the total biomass in after-remediation areas was 1,428 kg and the pool-wide biomass was 43,792 kg; thus, only 3% of the pool-wide biomass remains in areas that were remediated. In Northumberland Pool, the total biomass in after-remediation areas was 665 kg and the pool-wide biomass was 41,854 kg; thus, only 2% of the pool-wide biomass remains in areas that were remediated.

The mean pool-wide filtration estimates of *E. complanata* in five pools (no pool-wide estimates in Upper Mechanicville Pool) ranged from 0.19 m³/m²/d in Feeder Dam Pool (reference pool) to 0.65 m³/m²/d in Fort Miller Pool (Table 12). Mean filtration estimates of *E. complanata* in non-remediated areas varied from 0.01 m³/m²/d in Upper Mechanicville Pool to 0.90 m³/m²/d in Thompson Island Pool (Table 12). In those areas that were sampled before remediation, filtration estimates were 0.18 m³/m²/d in Stillwater Pool and 0.45 m³/m²/d in Fort Miller Pool. In contrast, estimated filtration rates in areas that were sampled after remediation were 0.02 and 0.04 m³/m²/d in Thompson Island and Northumberland Pools, respectively.

4. Discussion

This research documented an abundant and reproducing assemblage of native freshwater mussels in the Upper Hudson River. To our knowledge, these are the only quantitative data on freshwater mussels in this section of the Hudson River. In all surveyed pools, *E. complanata* comprised ≥97% of the native mussel assemblage. This was not surprising, given that it is the most common and widespread mussel in the Northeastern U.S. (Strayer 1993; Strayer *et al.* 1994). The other eight species were each represented by ≤40 individuals. No federally listed species were encountered; however, these surveys were not designed to target rare species. We did, however, obtain three species (*L. cariosa*, *L. nasuta*, and *U. implicata*) that are listed as Species of Greatest Conservation

Need in New York, albeit in small numbers (2, 17, and 1, respectively; NYSDEC 2018a). A review of museum records from the 1890s suggests eight species were known from the Hudson River (Strayer 1987). Strayer (2012a,b) listed five species of mussels known from the middle Hudson River (Corinth to Troy, NY) and another 14 unlikely, possible or likely species. The nine species that were observed in both recent survey years are among the 19 species that Strayer predicted may be present within our study area, and to our knowledge, extends the known species from this stretch of the river from five to 11. In a review of museum samples, Strayer (1987) enumerated 23 species of Unionid mussels from the Hudson River Basin (Adirondacks, Catskills, Taconics, Hudson Mohawk Lowlands, Hudson Highlands) and found *Elliptio* to be the most abundant. In the tidal Hudson River (south of Troy, NY), Strayer *et al.* (1994) found five species of mussels, of which *E. complanata* was dominant, although seven species had been previously confirmed from the estuary (Strayer 1987).

The presence of multiple age classes of juveniles of most species suggests that the population is reproducing. The percentage of the total population comprised of juveniles in the surveyed pools of the Upper Hudson ranged from 13 to 28%. In comparison, 40 to 62% of the native mussel population in three reaches of the Upper Mississippi River consisted of juveniles (Newton *et al.* 2011). Populations of mussels in rivers may be dominated by older individuals and evidence of recruitment is rare, presumably because conditions are unfavorable for survival of juveniles (Layzer *et al.* 1993; Warren and Haag 2005). In addition, five of the six species (*E. complanata*, *L. radiata*, *L. nasuta*, *P. cataracta*, and *S. undulatus*) represented by juveniles in the Upper Hudson River contained juveniles of multiple age classes, suggesting that recruitment was not restricted to a single year. Three species (*L. cariosa*, *L. costata*, and *U. implicata*) were not represented by juveniles, but they only had sample sizes of one or two individuals. Sampling by excavation of river sediments to a depth of 15 cm and the use of a relatively fine sieve (5.6 mm) is often sufficient to detect juveniles of most species if they are present (Newton *et al.* 2011). Indeed, sampling was able to detect one and two-year-old mussels of several species in the Hudson River. During the 2015 surveys in which the 2-mm sieve was used in after-remediation areas, staff did not recall observing smaller juveniles on the finer sieve, but this was not quantified. Thus, while juveniles did not comprise a large fraction of the total mussel assemblage, the presence of juveniles of several species and age classes suggests that some level of recruitment is occurring in the Upper Hudson River.

While the presence of juveniles typically represents a healthy mussel assemblage, high percentages of juveniles may not represent sustainable assemblages. For example, the high percentage of juveniles in after-remediation strata in Thompson Island and Northumberland Pools (49 and 70%, respectively) probably does not represent a strong sustainable recruitment event given the short time interval (e.g., 0–6 y) between remediation and sampling. Rather, it may result from juveniles being washed in from upstream or adjacent areas or represents the potential bias of dredges for removing larger individuals (Aldridge 2000). Once the percent of juveniles approaches 75%, it suggests a transient or new community that may or may not become sustainable (Dunn *et al.* 2012). Areas with abundant juveniles should be re-sampled over time to determine if these juveniles persist into sustainable mussel assemblages.

Life history traits such as length, growth, age, life span, and fecundity interact to determine the demographic structure of mussel populations (Haag 2012). While there was considerable variation in the lengths of *E. complanata* in the Upper Hudson River, one notable finding was that in individuals sampled from Thompson Island and Northumberland Pools, where mussels were sampled after remedial activities, the mean size was considerably lower in areas that had been remediated relative to non-remediated areas. In Fort Miller and Stillwater Pools, mean sizes were similar between before-remediated and non-remediated areas. These data are consistent with the bias of dredges for removing larger individuals and leaving smaller-bodied mussels behind (Aldridge 2000). Even if smaller-bodied mussels were left behind after dredging, it is unlikely that they could burrow up through the 30+ cm of backfilled or capped sediments. In a laboratory experiment, Knoll *et al.* (2017) found that while the relatively streamlined *E. complanata* was better at burrowing than the more obese *P. cataracta*, successful escape from 10 cm burial in sediments was unlikely for both species.

Shell annuli are the principal source of age and growth rate information in bivalve mollusks (Kessler and Downing 1997). Growth rings appear on the outside of shells (external annuli) and as layers in the cross-section of deposited shell material (internal annuli). Aging of mussels by external annuli can be variable among observers (e.g., Haag and Commens-Carson 2008), however, if all ages are estimated by one individual (as was done here), these data represent relative ages of mussels across strata and pools (Figure 5). On average, the number of external growth rings in *E. complanata* (Veinott and Cornett 1996) and *Actinonaias ligamentina* (Sansom *et al.* 2013) were less than the number of internal growth rings; thus, counting external rings may underestimate age and overestimate growth rates. For many mussels, including *E. complanata*, the accuracy of aging declines in older individuals. In the Hudson River, once mussels reached ~60 mm or ~8 y old, it became difficult to see individual growth lines, suggesting that the accuracy of our age estimates are less reliable for larger (i.e., older) length classes. A portion of shells from this study have been selected for internal aging analyses and will be reported elsewhere.

Longevity of *E. complanata* has been estimated at 16-19 y using external annuli (Ghent *et al.* 1978; Strayer *et al.* 1981), but could be much longer (i.e., 37-149 y; Anthony *et al.* 2001)—considerably longer than the estimated mean ages of mussels in this sampling event, which ranged from 5-11 y. *Elliptio complanata* collected from a tributary to the Housatonic River and aged by internal annuli counts, were predominantly >50 y with the maximum age of 95 y recorded (Schneider and Strayer 2006).

In Thompson Island and Northumberland Pools, where mussels were sampled after remediation, the mean age was substantially lower in areas that had been remediated relative to non-remediated areas, suggesting that younger mussels may have been transported into the remediated areas. In Fort Miller and Stillwater Pools, which were sampled before remediation, mean ages were similar between strata. The age differential between remediated and non-remediated strata, especially in Thompson Island Pool (mean, 5.3 y in after-remediation strata, 11.2 y in non-remediated strata), suggests that dredging removed older mussels and left younger individuals behind. These data are consistent with prior studies which have shown that dredging may be size selective and remove larger (older) individuals (Aldridge 2000).

Quantitative data on mussels in large rivers have generally been confined to relatively well-defined beds (e.g., Miller and Payne 1988; Holland-Bartels 1990). In contrast, there are few unbiased assessments over large spatial scales in large rivers—with a few exceptions (i.e., Strayer *et al.* 1994; Newton *et al.* 2011). Unlike surveys that target specific areas (i.e., mussel beds), this sampling was designed to obtain an unbiased sample across strata allowing computation of rigorous estimates of density. Estimated total density across non-remediated areas in the Upper Hudson River ranged from 1 to 67 mussels/m² (Table 11). Estuary-wide mean total density of unionids in the freshwater tidal Hudson River, before zebra mussel infestation, was 8 mussels/m², including 4.9 *E. complanata*/m² (Strayer *et al.* 1994). For comparison, estimated total density of mussels across three pools in the Upper Mississippi River ranged from 3 to 5 mussels/m² (Newton *et al.* 2011). Densities of mussels in the after-remediation strata were only 6% (Thompson Island Pool) and 9% (Northumberland Pool) of those in the non-remediated areas in these pools, suggesting that removal of river substrates from dredging removed most of the mussels as well. The presence of some mussels, albeit smaller and younger mussels, suggests that remediation did not remove all the mussels and/or that there was some movement of mussels into the recently remediated areas either from an upstream source or from adjacent areas.

Because many of the ecosystem processes performed by mussels increase with biomass (Strayer *et al.* 1999), decreases in biomass may lead to alterations in ecosystem function (Vaughn *et al.* 2008). Indeed, native mussels constituted over half the biomass of macroinvertebrates in the freshwater tidal Hudson River (Strayer *et al.* 1994). There are few estimates of biomass and production of native mussels in rivers for comparison, although Strayer *et al.* (1994) suggest that production by freshwater mussels may be 1-20 g/m²/y in rivers where mussels are dense. Biomass and production estimates for *E. complanata* in the Thames River were 12.1 g/m² and 2.1 g/m²/y, respectively (Negus 1966). Biomass and production estimates of native mussels in three reaches of the Upper Mississippi River ranged from 4.1 to 6.2 g/m² and from 0.8 to 1.2 g/m²/y, respectively (Newton *et al.* 2011). Mean river-wide biomass estimates of native mussels in the Lower Hudson River were 6.2 g/m² before zebra mussels (Strayer *et al.* 1994) and 2.4 g/m² after zebra mussels (Strayer and Smith 2001). Overall, biomass and production of native mussels in the Upper Hudson River were within the ranges reported in other large rivers. However, the changes in biomass (and production) after remedial action were substantial. Biomass was reduced by 95% in Northumberland Pool and by 98% in Thompson Island Pool after remediation. These large reductions in biomass (and production) will likely lead to substantial changes in the ecosystem services (see below) that native mussels perform in the Upper Hudson River ecosystem.

Freshwater mussels perform important ecosystem services in aquatic ecosystems, including supporting services such as nutrient recycling and storage, structural habitat, and substrate and food web modification; provisioning and cultural services including use as a food source and as tools and jewelry; and regulating services such as biofiltration (Vaughn 2017). Freshwater mussels are voracious filter feeders, filtering up to 11 L/d, depending on species and size (Naimo 1995); thus, they can remove particulate matter and sequester contaminants such as PCBs from the water column. Filtration rates vary as a function of biotic and abiotic factors including species, size, population density, water temperature, food concentration, and particle size (Leff *et al.* 1990; Vaughn

et al. 2008). Estimates also differ among experimental testing procedures (e.g., flow-through vs. static). Despite the potential variability, several studies have produced similar estimates and maximum filtration has been estimated at ~0.5 to 1 L/h for a 61-mm-long mussel (Alimov 1969; Kryger and Riisgard 1988; Pusch *et al.* 2001; McIvor 2004).

In the Upper Hudson River, the filtration capacity of *E. complanata*, across all pools and strata, ranged from 0.01 to 0.90 m³/m²/d which overlaps the few other data points for native mussels in large rivers. The average estimate of filtration rates by native mussels in the tidal Hudson was 0.14 m³/m²/d (Strayer *et al.* 1994). Filtration estimates of native mussels in three reaches of the Upper Mississippi River ranged from 0.05 to 0.08 m³/m²/d (Newton *et al.* 2011). However, dredging appeared to strongly reduce the estimated filtration capacities in *E. complanata* in the Upper Hudson River. For example, filtration capacities were reduced by 95% to 98% in after-remediation areas, relative to non-remediated areas, in Northumberland and Thompson Island Pools, respectively. In contrast, filtration capacities were reduced by 34% to 53% in before-remediation areas, relative to non-remediated areas, in Fort Miller and Stillwater Pools, respectively. The order of magnitude reduction in filtration capacity by mussels in dredged reaches of the Upper Hudson River may have cascading effects throughout the rest of the river, including a reduction in the amount of particulate matter and associated contaminants that are removed by mussels.

Many large rivers are dredged for navigation and other purposes. Dredging typically increases levels of suspended solids and turbulence (Aldridge *et al.* 1987). Increased concentrations of suspended solids have been shown to alter abundance, feeding, and fecundity in bivalves (Moore 1977; Gascho Landis *et al.* 2013, Hansen *et al.* 2016). In the Upper Mississippi River, which is dredged to maintain a 9 ft navigation channel, reduced density of native mussels in a turning basin for barges was attributed to dredging which removed most mussels (Miller and Payne 1998). Also, 2 weeks after dredging a reach of the Upper Mississippi River, >1,600 individuals, including 14 specimens of the federally endangered *Lampsilis higginsii* mussel, were found in the disposal area for the dredge spoils (Havlik and Stansberry 1977). Thus, dredging can have catastrophic effects on native mussel assemblages.

In the Upper Hudson River, PCB-contaminated sediments were removed using a hydraulically-operated enclosed clamshell bucket system mounted on a fixed-arm hydraulic excavator, or equivalent (USEPA 2010, 2017). Depending on the level of PCBs, materials were transported off-site and out-of-state by rail into a hazardous waste facility or a landfill. Terrestrial sediments were used to backfill or cap the dredged areas. The volume of material dredged was considerable, approximately 2.1 million m³ (USEPA 2019a,b), especially in Thompson Island Pool where at least 0.9 km² was dredged. Dredged areas in surveyed pools had reduced density, population sizes, biomass, production, and filtration capacities relative to non-remediated areas. These data suggest that dredging removed a substantial proportion of the native mussels and the associated services they perform.

Long-lived, sedentary species such as native mussels can take a long time to recover from extensive ecological disturbance. In the Upper Mississippi River, mussels have been shown to recolonize areas that have been recently dredged. Eckblad (1999) surveyed former dredge cuts and placement sites to

evaluate colonization dynamics. Sites that were dredged ≥ 15 y ago had higher species richness, evenness, and diversity relative to sites that were dredged < 15 y ago. They also observed patterns in the rate of recolonization by different groups such that Amblemines (i.e., *Utterbackiana implicata*) were quick to recolonize, whereas Lampsilines (e.g., *Obliquaria reflexa*) recovered more slowly. Differences in recolonization rates among species may be a function of life history traits given that *U. implicata* is an equilibrium (long life span, low growth rate) strategist and *O. reflexa* is a periodic (moderate life span, moderate growth rate) strategist (Haag 2012). While it is unknown how long it may take for mussels to recolonize riverine areas that have been disturbed, Yokely and Gooch (1976) suggest that at least 10 y were needed for dredged areas to recover in a reservoir and recovery was dependent on the stabilization of the riverbed and its attractiveness to fish hosts carrying larval mussels. Dredging in the Upper Hudson River occurred during 2009 and 2011–2015 in Thompson Island Pool, during 2013 in Northumberland Pool, during 2014–2015 in Fort Miller Pool, during 2013–2014 in Stillwater Pool, and during 2014 in the Upper Mechanicville Pool. Dredging was followed by backfill or capping, depending on residual PCB concentrations, and habitat reconstruction between 2010 and 2016. Thus, most reaches have had little time for long-lived mussels to recover from disturbance.

Native freshwater mussels move both horizontally and vertically in sediments, although rates of movement have been little quantified, especially in rivers. While some species are capable of moving substantial distances ($\sim 5\text{--}15$ m/wk) in response to environmental stresses, movement during other time periods is generally less (< 5 m/wk; Newton *et al.* 2015). The average movement of *E. complanata* in a headwater stream in Virginia was 3 m in 1 y, but a few individuals moved up to 46 m (Balfour and Smock 1995). We are unaware of any movement data on *E. complanata* in rivers. However, Amyot and Downing (1991) observed that only between 2 and 8% of *E. complanata* individuals moved each month during the ice-free season in an oligotrophic lake (Montréal, Québec) and the distance travelled averaged < 1 m/wk. Thus, recolonization of dredged areas by horizontal movement of adults may take considerable time.

Ecological responses to disturbances and stresses may not be instantaneous, especially in long-lived animals. Populations of long-lived species may take decades to fully respond to a disturbance (Newton *et al.* 2008). Freshwater mussels, which have a life span ranging from several years to several decades are one such group which may take decades to recover from a disturbance event. Adult mussels can persist for many years after conditions become unsuitable for the recruitment of young (Strayer *et al.* 2014). For example, the response of freshwater mussels to the zebra mussel invasion in the Lower Hudson River is still incomplete after 20 y (Strayer and Malcom 2014). Thus, the long-term dynamics of changes in freshwater mussel assemblages in the Upper Hudson River as a result of remedial activities may take many decades to fully resolve.

While this study was not designed to evaluate the direct effects of PCBs on mussels—rather, it was designed to document existing mussel resources in the river after the release of PCBs—we offer a few observations regarding possible effects that PCBs may have had on mussels. If the time of peak PCB release into the Upper Hudson River was ~ 1962 (i.e., half way between the 1947–1977 discharge period), mussels that resided in the river during that time would have been 51–53 y old at

the time of sampling in 2013 or 2015. Assuming our age estimates are reasonable, the oldest mussel obtained from our sampling was 20 y; thus, mussels that currently reside in the Upper Hudson were probably not present during peak PCB release periods. While it is unknown if the PCBs that were in the river during 1947-1977 (or thereafter) adversely affected mussels at that time, the current mussel assemblage—based on relatively high densities, the prevalence of multiple year classes, and the presence of juveniles of many species—suggests that the existing population is relatively robust. However, it is unknown what the mussel assemblage in the Upper Hudson River would be like today without the PCB contamination in the past. In several river systems, legacy effects from contaminants continue to adversely affect mussel communities and limit their recovery (Haag 2012). Recent data from the Hudson River suggest that PCBs persisted in surface water through 2014 (HRNRT 2018) and will persist into the future (USEPA 2019a,b). Given that PCBs are known to be persistent and bioaccumulate up the food chain (Koslowski *et al.* 1994; Morrison *et al.* 1995), it is possible that present day mussels may still be accumulating PCBs from river sediments. For example, half-lives for Aroclor 1248 and Aroclor 1242 in sediments from the Lower Hudson River (from the Federal Dam [Troy, NY] to the Battery [New York, NY]), have been estimated at 5 and 14 y, respectively (Rodenburg and Ralston 2017). In addition, given that freshwater mussels possess relatively poor chemical biotransformation capacities (Newton and Cope 2007), it is possible that any PCBs that are accumulated by mussels will remain for some time.

5. Summary

We hypothesized that differences between before-remediation and non-remediated strata would be minimal in Fort Miller and Stillwater Pools because they were sampled prior to dredging and subsequent capping, and/or backfill. In contrast, we hypothesized that differences between after-remediation and non-remediated strata would be considerable in Northumberland and Thompson Island Pools because they were sampled after dredging and subsequent capping and/or backfill. Generally, the magnitude of the differences in estimated mean biological responses (i.e., density, biomass, production, filtration capacity) between after-remediation and non-remediated strata relative to before-remediation and non-remediated strata within a pool suggest massive effects of remediation on mussel assemblages in the Upper Hudson River.

The quality of mussel assemblages is often based on a suite of biological characteristics including species richness, recruitment, density, and meristic data such as age, length, and biomass (Warren and Haag 2005; Newton *et al.* 2011). Collectively, our data suggest that the Upper Hudson River contains a relatively robust assemblage of mussels based on the following characteristics. First, juveniles comprised 13-26% of the mussel assemblage. Second, six of the nine species were represented by juveniles, albeit in low numbers. Third, five of the six species with juveniles also contained multiple age classes. Fourth, the presence of few fresh dead mussels (<0.05%) suggests little recent mortality. However, the quality of the mussel assemblage varied among pools. Upper Mechanicville Pool contains a relatively depauperate mussel assemblage, comprised of relatively older and larger individuals that contributed little biomass or filtration capacity to this ecosystem. In contrast, high quality and similar mussel assemblages were observed in non-remediated areas in

Thompson Island, Fort Miller, Northumberland, and Stillwater Pools, which were species rich, dense, and contained relatively high biomass and filtration capacities.

Changes in several biological traits (i.e., density, age and length distributions, biomass, and filtration) between remediated and non-remediated areas suggest that remedial activities in the Upper Hudson River dramatically altered freshwater mussel assemblages. In Fort Miller and Stillwater Pools, relatively robust assemblages were presumably affected by dredging that occurred after sampling. Remediated areas in Northumberland and Thompson Island Pools (remediated prior to sampling) were almost devoid of mussels, relative to non-remediated areas. Estimated densities of mussels in remediated areas in Northumberland and Thompson Island Pools were 91 and 94% lower than estimated densities in non-remediated areas, respectively. Similarly, estimates of the percent of the pool-wide biomass that were removed during remedial activities were 97% in Thompson Island and 98% in Northumberland Pools (comparable estimates in Stillwater and Fort Miller Pools were 3 and 10%, respectively). The higher estimates of losses of mussel biomass in Northumberland and Thompson Island Pools likely results from the larger percentage of the total pool area that was remediated in these pools (26 and 61%, respectively) relative to Stillwater and Fort Miller Pools (6 and 14%, respectively).

The most likely limiting factors influencing future recovery of native mussels into the Upper Hudson River are stability of newly backfilled sediments and development of sufficient organic materials, associated with the new sediments, to provide a food source for mussels. Once the sediments are stabilized and the food sources are re-established, mussels from non-remediated areas may be able to initiate recolonization into remediated areas—likely by dispersal of larval mussels by host fish.

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TABLES

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Table 1. Description of surveyed pools in the Upper Hudson River and sampled strata.

Pool (abbreviation)	River section ^A	Pool length (km)	Distance downstream from PCB source ^B (km)	% of surveyed area remediated (AR, BR) ^{C,D}	Year(s) of remedial activity ^E	Year of mussel survey	Strata surveyed ^D
Feeder Dam (reference) (REF)	--	9.6	-16.8 – -7.2	0	No remedy	2015	PW
Thompson Island (TIP)	RS1	10.1	0 – 10.1	61	2009, 2011-2015	2015	NR, AR
Fort Miller (FMP)	RS2	3.7	10.1 – 13.8	14	2014-2015	2013	NR, BR
Northumberland (NUP)	RS2	4.5	13.8 – 18.3	26	2013	2015	NR, AR
Stillwater (SWP)	RS3	24.5	18.3 – 42.8	6	2013-2014	2013	NR, BR
Upper Mechanicville (UMP)	RS3	3.4	48.8 – 46.2	0 ^F	2014	2015	NR

^A River sections were defined in the 2002 record of decision (ROD, USEPA 2002), see Figure 2.

^B PCB source is the location of the former Fort Edward Dam (the start of RS1), marking the downstream end of the 4-km river section that included the sources of PCB contamination (General Electric Company's Hudson Falls and Fort Edward plants) as defined in the 2002 ROD. Negative values indicate locations upstream from the source of PCB contamination.

^C Estimated from sampling frames used in site selection, area values shown in Table 2.

^D Strata designated as: (1) pool-wide (PW) where no remedial activities were part of the ROD, (2) non-remediated (NR) were areas that were not dredged and backfilled or capped, and (3) after remediation (AR) were areas that were surveyed after remedial work (dredged and backfilled or capped) had occurred, and (4) before remediation (BR) were areas that were surveyed prior to remedial work. Note that in the Feeder Dam (REF) the entire pool was NR since no remedial activities were required in that pool; subsequent calculations are pool-wide.

^E Year of remedial activity derived from Table 5-1 of Phase 1 and Table 2-2 of the Phase 2 remedial action completion reports (USEPA 2011, 2019a).

^F Only non-remediated areas of UMP were included in our surveys.

Table 2.

Community characteristics of native freshwater mussels in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Estimates were made in four strata: areas targeted for remediation that were sampled before (BR) or after (AR)^A remediation, non-remediated areas (NR), and pool-wide (PW)^B. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

	Feeder Dam ^C	Thompson Island (RS1)			Fort Miller (RS2)			Northumberland (RS2)			Stillwater (RS3)			Upper Mechanicville ^D
Parameter	PW	AR	NR	PW	BR	NR	PW	AR	NR	PW	BR	NR	PW	NR
Surveyed area (m ²)	2,599,300	892,700	562,200	1,454,900	114,800	711,800	826,600	214,600	620,800	835,400	230,900	3,531,500	3,762,400	1,133,900
No. sites sampled	105	162	115	277	98	90	188	122	118	240	99	224	323	111
Percent of sites without mussels	44.8	72.2	29.6	54.5	36.7	35.6	36.2	58.2	15.3	37.1	40.4	33.0	35.3	91.0
Total number of live mussels	191	63	753	816	443	457	900	94	1,026	1,120	242	840	1082	10
No. species	3	2	5	5	5	3	5	4	4	4	3	3	3	1
No. <i>Elliptio complanata</i>	182	62	743	805	432	451	883	87	992	1,079	231	807	1038	10
No. <i>Lampsilis cariosa</i>	0	0	0	0	1	1	2	0	0	0	0	0	0	0
No. <i>Lampsilis radiata</i>	1	1	7	8	4	5	9	2	26	28	9	31	40	0
No. <i>Lasmigona costata</i>	0	0	1	1	0	0	0	0	0	0	0	0	0	0
No. <i>Leptodea fragilis</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0
No. <i>Ligumia nasuta</i>	0	0	0	0	5	0	5	4	4	8	2	2	4	0
No. <i>Pyganodon cataracta</i>	8	0	0	0	0	0	0	0	0	0	0	0	0	0
No. <i>Strophitus undulatus</i>	0	0	1	1	0	0	0	1	4	5	0	0	0	0

	Feeder Dam ^C	Thompson Island (RS1)			Fort Miller (RS2)			Northumberland (RS2)			Stillwater (RS3)			Upper Mechanicville ^D
Parameter	PW	AR	NR	PW	BR	NR	PW	AR	NR	PW	BR	NR	PW	NR
No. <i>Utterbackiana implicata</i>	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Range of densities (no/m ²)	0-160	0-32	0-296	0-296	0-696	0-680	0-696	0-48	0-744	0-744	0-120	0-232	0-232	0-8
% Anodontini ^E	4.2	0	0.4	0.4	0	0	0	1.1	0.4	0.5	0	0	0	0
% Lampsilini ^E	0.5	1.6	0.9	1.0	2.5	1.3	1.9	6.4	2.9	3.2	4.6	3.9	4.1	0
% Pleurobemini ^E	95.3	98.4	98.7	98.6	97.5	98.7	98.1	92.5	96.7	96.3	95.4	96.1	95.9	100
No. fresh dead ^F	0	0	0	0	0	0	0	0	0	0	0	2	2	0
No. weathered dead ^G	32	4	67	71	--	--	--	7	82	89	--	--	--	18

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

^C There were no remediated areas in the reference Feeder Dam.

^D Remediated areas in Upper Mechanicville were not sampled.

^E Tribes as described in Williams et al. 2017. Among species observed in this survey, *Lasmigona costata*, *Pyganodon cataracta*, *Strophitus undulatus*, and *Utterbackiana implicata* are in the tribe Anodontini; *Lampsilis cariosa*, *Lampsilis radiata*, *Leptodea fragilis*, and *Ligumia nasuta* are in the tribe Lampsilini; and *Elliptio complanata* is in the tribe Pleurobemini.

^F Fresh dead mussels were defined as shells with soft tissue, lustrous nacre, intact periostracum, and a flexible hinge line.

^G Weathered dead mussels were defined as shells without soft tissue and a chalky nacre; weathered dead mussels were not quantified in 2013 (Fort Miller and Stillwater Pools).

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Table 3.

Parameter estimates (a is the y-intercept and b is the slope of the regression line) associated with allometric functions used to describe tissue dry mass (M , g) as a function of shell length (L , mm), $M=aL^b$, in *Elliptio complanata* obtained in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam). N = sample size. Pools are arranged from upstream to downstream. Estimates were made in four strata: areas targeted for remediation that were sampled before (BR) or after (AR)^A remediation, non-remediated areas (NR), and pool-wide (PW)^B. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

Pool	Stratum	N	R²	a	b
Feeder Dam	PW	37	0.89	1.67 x 10 ⁻⁵	2.65
Thompson Island (RS1)	AR	19	0.99	2.00 x 10 ⁻⁶	3.11
Thompson Island (RS1)	NR	35	0.96	1.87 x 10 ⁻⁵	2.60
Thompson Island (RS1)	PW	54	0.97	1.78 x 10 ⁻⁵	2.61
Fort Miller (RS2)	BR	53	0.89	1.24 x 10 ⁻⁵	2.67
Fort Miller (RS2)	NR	52	0.91	2.14 x 10 ⁻⁵	2.58
Fort Miller (RS2)	PW	105	0.89	1.46 x 10 ⁻⁵	2.65
Northumberland (RS2)	AR	19	0.98	6.09 x 10 ⁻⁶	2.85
Northumberland (RS2)	NR	39	0.89	4.61 x 10 ⁻⁵	2.38
Northumberland (RS2)	PW	58	0.92	3.46 x 10 ⁻⁵	2.45
Stillwater (RS3)	BR	40	0.96	1.59 x 10 ⁻⁵	2.61
Stillwater (RS3)	NR	69	0.91	5.63 x 10 ⁻⁵	2.34
Stillwater (RS3)	PW	109	0.92	3.36 x 10 ⁻⁵	2.45
Upper Mechanicville (RS3)	NR	10	0.92	7.21 x 10 ⁻⁵	2.31

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

Table 4.

Estimated mean water depth (± 1 SD), percentage of sites with vegetation and invasive bivalve species in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in a reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Estimates are reported in areas that were remediated^A (sampled before or after remediation), in non-remediated areas, and pool-wide^B. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

Pool, stratum	Average water depth (m)	Sites with vegetation (%)	Sites with invasive bivalve species ^C (%)
Feeder Dam, pool-wide	3.2 ± 1.8	28%	0%
Thompson Island (RS1), after remediation	2.1 ± 1.5	33%	20%
Thompson Island (RS1), non-remediated	2.1 ± 1.4	35%	6%
Thompson Island (RS1), pool-wide	2.1 ± 1.4	35%	14%
Fort Miller (RS2), before remediation	2.4 ± 1.9	19%	0%
Fort Miller (RS2), non-remediated	2.4 ± 1.3	35%	0%
Fort Miller (RS2), pool-wide	2.4 ± 1.6	27%	0%
Northumberland (RS2), after remediation	2.1 ± 1.5	26%	5%
Northumberland (RS2), non-remediated	2.4 ± 1.7	37%	3%
Northumberland (RS2), pool-wide	2.2 ± 1.6	32%	4%
Stillwater (RS3), before remediation	1.7 ± 1.6	59%	4%
Stillwater (RS3), non-remediated	2.8 ± 1.9	25%	9%
Stillwater (RS3), pool-wide	2.5 ± 1.9	35%	7%
Upper Mechanicville ^D (RS3), non-remediated	1.8 ± 1.4	41%	12%

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel (present as the Champlain Canal in Thompson Island Pool, Northumberland Pool, and Stillwater Pool).

^C *Dreissena polymorpha* (zebra mussel) and/or *Corbicula fluminea* (Asian clam).

^D Remediated areas were not sampled in Upper Mechanicville Pool.

Table 5.

Penetrometer readings (kg/cm^2) in 3 pools of the Upper Hudson River, New York, and at an upstream reference pool (Feeder Dam) in 2015. Penetrometer readings conducted using a 2.5-cm adapter foot were converted to actual resistance by dividing by 16. Zero readings were recorded as 0.001. Resistance values are presented as mean converted penetrometer readings (95% confidence limits in parentheses) in non-remediated areas, in areas sampled after remediation (dredged and subsequently capped or backfilled), and pool-wide in three pools.^A Pools are arranged from upstream to downstream.

	Feeder Dam	Thompson Island	Northumberland	Upper Mechanicville
Non-remediated	NA ^B	0.116 (0.099, 0.133)	0.080 (0.061, 0.098)	0.127 (0.104, 0.150)
Sampled after remediation	NA ^B	0.067 (0.056, 0.077)	0.045 (0.032, 0.058)	NS ^C
Pool-wide	0.045 (0.032, 0.059)	0.087 (0.077, 0.097)	0.062 (0.051, 0.074)	NA

^A Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

^B Not applicable since the Feeder Dam is the upstream reference area upstream of the two General Electric Company plant sites and was not remediated.

^C A total of 13.1 acres of river bottom were remediated in the Upper Mechanicville Pool (GE 2015) but those areas were not sampled for mussels; NS = not sampled.

Table 6.

Number of live non-Unionoida invertebrates (number of sites found at in parentheses) observed in three pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam) in 2015. Pools are arranged from upstream to downstream. Estimates were made in three strata: areas targeted for remediation that were sampled after (AR)^A remediation, non-remediated areas (NR), and pool-wide (PW)^B. Non-Unionoida invertebrates were not quantified in Fort Miller and Stillwater Pools in 2013.

Pool	Stratum	<i>Corbicula</i> spp.	<i>Dreissena</i> spp.	Fingernail clams	Snails
Feeder Dam	PW	0	0	151 (32)	32 (14)
Thompson Island (RS1)	AR	117 (34)	0	259 (51)	963 (97)
Thompson Island (RS1)	NR	9 (6)	1 (1)	287 (45)	167 (35)
Thompson Island (RS1)	PW	126 (40)	1 (1)	546 (96)	1130 (132)
Northumberland (RS2)	AR	15 (6)	0	188 (33)	338 (65)
Northumberland (RS2)	NR	11 (4)	0	1541 (60)	544 (81)
Northumberland (RS2)	PW	26 (10)	0	1729 (93)	882 (146)
Upper Mechanicville (RS3)	NR	16 (12)	2 (2)	18 (11)	13 (4)

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

Table 7.

Mean shell length (95% confidence limits in parentheses), mean age (estimated by external methods, 95% confidence limits in parentheses), and sample size (N) of *Elliptio complanata* in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in a reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Estimates were made in four strata: in areas targeted for remediation that were sampled before (BR) or after (AR)^A remediation, in non-remediated areas (NR), and pool-wide (PW)^B. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

Pool, stratum	Length (mm)	Age (y)	N
Feeder Dam Pool, pool-wide	67.3 (64.7, 69.9)	8.5 (8.2, 8.8)	182
Thompson Island (RS1), after remediation	36.6 (29.2, 44.0)	5.3 (4.1, 6.5)	62
Thompson Island (RS1), non-remediated	73.9 (72.6, 75.2)	11.2 (11.0, 11.4)	743
Thompson Island (RS1), pool-wide	71.0 (69.5, 72.5)	10.7 (10.5, 10.9)	805
Fort Miller (RS2), before remediation	67.1 (65.5, 68.7)	6.5 (6.3, 6.7)	432/424 ^C
Fort Miller (RS2), non-remediated	72.5 (71.3, 73.7)	7.0 (6.8, 7.2)	451/420 ^C
Fort Miller (RS2), pool-wide	69.8 (68.8, 70.8)	6.8 (6.7, 6.9)	883/844 ^C
Northumberland (RS2), after remediation	44.3 (38.9, 49.7)	6.0 (5.2, 6.8)	87
Northumberland (RS2), non-remediated	64.5 (63.5, 65.5)	8.9 (8.7, 9.1)	992
Northumberland (RS2), pool-wide	62.9 (61.8, 64.0)	8.7 (8.5, 8.9)	1,079
Stillwater (RS3), before remediation	59.2 (56.8, 61.6)	5.8 (5.6, 6.0)	231
Stillwater (RS3), non-remediated	65.6 (64.5, 66.7)	6.4 (6.3, 6.5)	807/806 ^C
Stillwater (RS3), pool-wide	64.1 (63.1, 65.1)	6.2 (6.1, 6.3)	1,038/1,037 ^C
Upper Mechanicville ^D (RS3), non-remediated	66.8 (47.6, 86.0)	9.2 (6.8, 11.6)	10

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

^C Sample sizes for length/age; where there is only one number, sample sizes were equal.

^D Remediated areas in Upper Mechanicville were not sampled.

Table 8.

Data on juvenile (≤ 5 y old, based on external methods) native freshwater mussels in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Estimates were made in four strata: areas targeted for remediation that were sampled before (BR) or after (AR)^A remediation, non-remediated areas (NR), and pool-wide (PW)^B. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

Parameter	Feeder Dam ^C	Thompson Island (RS1)			Fort Miller (RS2)			Northumberland (RS2)			Stillwater (RS3)			Upper Mechanicville ^D
	PW	AR	NR	PW	BR	NR	PW	AR	NR	PW	BR	NR	PW	NR
Number of <i>Elliptio complanata</i>	22	43	58	101	109	77	186	41	88	129	84	197	281	2
Number of <i>Lampsilis radiata</i>	0	1	3	4	4	1	5	2	6	8	5	10	15	0
Number of <i>Leptodea fragilis</i>	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Number of <i>Ligumia nasuta</i>	0	0	0	0	4	0	4	2	2	4	2	2	4	0
Number of <i>Pyganodon cataracta</i>	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of <i>Strophitus undulatus</i>	0	0	1	1	0	0	0	1	2	3	0	0	0	0
Total number of juveniles	27	44	62	106	118	78	196	46	98	144	91	209	300	2
Juveniles (≤ 5 y, % of population)	14.1	69.8	8.2	13.0	26.6	17.1	21.8	48.9	9.6	12.9	37.6	24.9	27.7	20.0
Number of species found as ≤ 5 y old juveniles	2	2	3	3	4	2	4	4	4	4	3	3	3	1

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

^C There were no remediated areas in the reference Feeder Dam.

^D Remediated areas in Upper Mechanicville were not sampled.

Table 9.

Estimates of pool-wide density (number of mussels/m², 95% confidence limits in parentheses) of native freshwater mussels in five pools of three River Sections of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Pool-wide estimates combine results from remediated^A (sampled before or after remediation) and non-remediated areas and does not include the navigation channel. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, and Northumberland were sampled in 2015.

Species	Feeder Dam	Thompson Island (RS1)	Fort Miller (RS2)	Northumberland (RS2)	Stillwater (RS3)
<i>Elliptio complanata</i>	12.13 (7.70, 16.57)	21.32 (16.41, 26.24)	39.42 (24.52, 54.32)	49.40 (36.03, 62.77)	28.20 (23.23, 33.17)
<i>Lampsilis cariosa</i>	--	--	0.09 (0, 0.24)	--	--
<i>Lampsilis radiata</i>	0.07 (0, 0.20)	0.21 (0.07, 0.36)	0.43 (0.10, 0.76)	1.29 (0.64, 1.94)	1.08 (0.55, 1.62)
<i>Lasmigona costata</i>	--	0.03 (0, 0.08)	--	--	--
<i>Leptodea fragilis</i>	--	--	0.01 (0, 0.03)	--	--
<i>Ligumia nasuta</i>	--	--	0.06 (0, 0.12)	0.26 (0.06, 0.46)	0.08 (0, 0.17)
<i>Pyganodon cataracta</i>	0.53 (0.13, 0.94)	--	--	--	--
<i>Strophitus undulatus</i>	--	0.03 (0, 0.08)	--	0.21 (0.02, 0.40)	--
<i>Utterbackiana implicata</i>	--	0.03 (0, 0.08)	--	--	--
Total	12.73 (8.27, 17.20)	21.61 (16.68, 26.54)	40.00 (25.05, 54.95)	51.16 (37.51, 64.81)	29.36 (24.20, 34.52)

^A Remediated areas were dredged and subsequently capped and/or backfilled.

Table 10.

Estimates of pool-wide populations (millions, 95% confidence limits in parentheses) of native freshwater mussels in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Pool-wide estimates combine results from remediated^A (sampled before or after remediation) and non-remediated areas and does not include the navigation channel. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, and Northumberland were sampled in 2015.

Species	Feeder Dam	Thompson Island (RS1)	Fort Miller (RS2)	Northumberland (RS2)	Stillwater (RS3)
<i>Elliptio complanata</i>	31.538 (20.017, 43.059)	31.020 (23.870, 38.169)	32.584 (20.266, 44.902)	41.269 (30.100, 52.437)	106.093 (87.389, 124.797)
<i>Lampsilis cariosa</i>	--	--	0.073 (0, 0.199)	--	--
<i>Lampsilis radiata</i>	0.173 (0, 0.516)	0.310 (0.099, 0.522)	0.354 (0.079, 0.629)	1.078 (0.532, 1.624)	4.078 (2.074, 6.081)
<i>Lasmigona costata</i>	--	0.038 (0, 0.113)	--	--	--
<i>Leptodea fragilis</i>	--	--	0.009 (0, 0.028)	--	--
<i>Ligumia nasuta</i>	--	--	0.047 (0, 0.095)	0.217 (0.051, 0.384)	0.290 (0, 0.643)
<i>Pyganodon cataracta</i>	1.386 (0.326, 2.446)	--	--	--	--
<i>Strophitus undulatus</i>	--	0.038 (0, 0.113)	--	0.175 (0.016, 0.335)	--
<i>Utterbackiana implicata</i>	--	0.038 (0, 0.113)	--	--	--
Total	33.098 (21.500, 44.696)	31.444 (24.269, 38.620)	33.066 (20.709, 45.423)	42.739 (31.337, 54.141)	110.460 (91.037, 129.884)

^A Remediated areas were dredged and subsequently capped and/or backfilled.

Table 11.

Estimates of density (number of mussels/m², 95% confidence limits in parentheses) of native freshwater mussels in sampled areas of five pools of three River Sections (RS) of the Upper Hudson River, New York. Pools are arranged from upstream to downstream. Estimates were made in three strata: in areas targeted for remediation that were sampled before remediation (BR) or after remediation (AR)^A, and in non-remediated (NR). Fort Miller and Stillwater were sampled in 2013 and Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

Species	Thompson Island (RS1)	Fort Miller (RS2)	Northumberland (RS2)	Stillwater (RS3)	Upper Mechanicville (R3) ^B
	<i>sampled AR^A</i>	<i>sampled BR</i>	<i>sampled AR^A</i>	<i>sampled BR</i>	--
<i>Elliptio complanata</i>	3.02 (2.15, 3.90)	35.27 (18.60, 51.93)	5.66 (3.85, 7.47)	18.67 (13.46, 23.87)	--
<i>Lampsilis cariosa</i>	--	0.08 (0, 0.24)	--	--	--
<i>Lampsilis radiata</i>	0.05 (0, 0.15)	0.33 (0.01, 0.65)	0.13 (0, 0.31)	0.73 (0.27, 1.19)	--
<i>Leptodea fragilis</i>	--	0.08 (0, 0.24)	--	--	--
<i>Ligumia nasuta</i>	--	0.41 (0, 0.83)	0.26 (0.01, 0.51)	0.16 (0, 0.39)	--
<i>Strophitus undulatus</i>	--	--	0.07 (0, 0.19)	--	--
Total	3.07 (2.17, 3.97)	36.16 (19.51, 52.81)	6.11 (4.22, 8.01)	19.56 (14.23, 24.88)	--
	NR	NR	NR	NR	NR
<i>Elliptio complanata</i>	50.37 (37.65, 63.09)	40.09 (22.87, 57.31)	64.52 (46.45, 82.59)	28.82 (23.53, 34.12)	0.66 (0.26, 1.06)
<i>Lampsilis cariosa</i>	--	0.09 (0, 0.27)	--	--	--
<i>Lampsilis radiata</i>	0.47 (0.13, 0.82)	0.44 (0.06, 0.83)	1.69 (0.81, 2.57)	1.11 (0.54, 1.67)	--
<i>Lasmigona costata</i>	0.07 (0, 0.20)	--	--	--	--
<i>Ligumia nasuta</i>	--	--	0.26 (0.01, 0.51)	0.07 (0, 0.17)	--
<i>Strophitus undulatus</i>	0.07 (0, 0.20)	--	0.26 (0.01, 0.51)	--	--
<i>Utterbackiana implicata</i>	0.07 (0, 0.20)	--	--	--	--
Total	51.05 (38.29, 63.81)	40.62 (23.35, 57.90)	66.73 (48.28, 85.18)	30.00 (24.50, 35.50)	0.66 (0.26, 1.06)

^A After remediation represents areas that were dredged and subsequently capped and/or backfilled prior to sampling for mussels.

^B Remediated areas in Upper Mechanicville were not sampled.

Table 12.

Estimates of native freshwater mussel populations (millions, 95% confidence limits in parentheses) in five pools of three River Sections (RS) of the Upper Hudson River, New York. Pools are arranged from upstream to downstream. Estimates were made in three strata: in areas targeted for remediation that were sampled before remediation (BR) or after remediation (AR)^A, and in non-remediated (NR). Fort Miller and Stillwater were sampled in 2013 and Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015.

Species	Thompson Island (RS1)	Fort Miller (RS2)	Northumberland (RS2)	Stillwater (RS3)	Upper Mechanicville (R3) ^A
	<i>sampled AR</i>	<i>sampled BR</i>	<i>sampled AR</i>	<i>sampled BR</i>	--
<i>Elliptio complanata</i>	2.700 (1.916, 3.484)	4.048 (2.136, 5.961)	1.214 (0.826, 1.602)	4.310 (3.108, 5.513)	--
<i>Lampsilis cariosa</i>	--	0.009 (0, 0.028)	--	--	--
<i>Lampsilis radiata</i>	0.044 (0, 0.130)	0.037 (0, 0.074)	0.028 (0, 0.067)	0.168 (0.061, 0.274)	--
<i>Leptodea fragilis</i>	--	0.009 (0, 0.028)	--	--	--
<i>Ligumia nasuta</i>	--	0.047 (0, 0.095)	0.056 (0.001, 0.110)	0.037 (0, 0.089)	--
<i>Strophitus undulatus</i>	--	--	0.014 (0, 0.042)	--	--
Total	2.743 (1.940, 3.547)	4.152 (2.240, 6.063)	1.312 (0.906, 1.718)	4.515 (3.286, 5.744)	--
	NR	NR	NR	NR	NR
<i>Elliptio complanata</i>	28.320 (21.169, 35.470)	28.535 (16.277, 40.793)	40.054 (28.836, 51.272)	101.783 (83.085, 120.480)	0.750 (0.298, 1.201)
<i>Lampsilis cariosa</i>	--	0.063 (0, 0.189)	--	--	--
<i>Lampsilis radiata</i>	0.267 (0.072, 0.461)	0.316 (0.042, 0.591)	1.050 (0.502, 1.597)	3.909 (1.906, 5.914)	--
<i>Lasmigona costata</i>	0.038 (0, 0.114)	--	--	--	--
<i>Ligumia nasuta</i>	--	--	0.162 (0.004, 0.319)	0.252 (0, 0.603)	--
<i>Strophitus undulatus</i>	0.038 (0, 0.114)	--	0.162 (0.004, 0.319)	--	--
<i>Utterbackiana implicata</i>	0.038 (0, 0.114)	--	--	--	--
Total	28.701 (21.527, 35.875)	28.915 (16.617, 41.213)	41.427 (29.975, 52.879)	105.945 (86.528, 125.362)	0.750 (0.298, 1.201)

^A Remediated areas in Upper Mechanicville were not sampled.

Table 13.

Estimated biomass, production, and filtering rates of *Elliptio complanata* (approximate 95% confidence limits in parentheses) in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in a reference pool (Feeder Dam). Pools are arranged from upstream to downstream. Estimates were made in four strata: in areas targeted for remediation that were sampled before (BR) or after (AR)^A remediation, in non-remediated areas (NR), and pool-wide (PW)^B. Fort Miller and Stillwater were sampled in 2013 and Feeder Dam, Thompson Island, Northumberland, and Upper Mechanicville were sampled in 2015. Pool-wide estimates were weighted by stratum area. Filtration rates were standardized to 1 g dry tissue weight. Mean tissue biomass (g/m^2) converted to carbon by multiplying by 0.5 (Strayer and Smith 2001). Mean production estimated from biomass by assuming annual P/B of 0.2 (Nalepa and Gauvin 1988).

Pool, stratum	Mean tissue biomass (g dry mass/ m^2)	Mean tissue biomass (g C/ m^2)	Mean tissue production (g dry mass/ m^2/y)	Mean tissue production (g C/ m^2/y)	Filtering rate ($\text{m}^3/\text{m}^2/\text{d}$)
Feeder Dam Pool, PW	16.0 (10.1, 21.8)	8.0 (5.1, 10.9)	3.2 (2.0, 4.4)	1.6 (1.0, 2.2)	0.19 (0.12, 0.26)
Thompson Island (RS1), AR	1.6 (1.2, 2.1)	0.8 (0.6, 1.1)	0.3 (0.2, 0.4)	0.2 (0.1, 0.2)	0.02 (0.01, 0.03)
Thompson Island (RS1), NR	75.3 (56.3, 94.3)	37.7 (28.2, 47.2)	15.1 (11.3, 18.9)	7.6 (5.7, 9.5)	0.90 (0.68, 1.13)
Thompson Island (RS1), PW	30.1 (22.4, 37.7)	15.1 (11.2, 18.9)	6.0 (4.5, 7.5)	3.0 (2.3, 3.8)	0.36 (0.27, 0.45)
Fort Miller (RS2), BR	37.5 (19.8, 55.2)	18.8 (9.9, 27.6)	7.5 (4.0, 11.0)	3.8 (2.0, 5.5)	0.45 (0.24, 0.66)
Fort Miller (RS2), NR	56.6 (32.3, 80.9)	28.3 (16.2, 40.5)	11.3 (6.5, 16.2)	5.7 (3.3, 8.1)	0.68 (0.39, 0.97)
Fort Miller (RS2), PW	53.9 (30.5, 77.3)	27.0 (15.2, 38.7)	10.8 (6.1, 15.5)	5.4 (3.1, 7.8)	0.65 (0.37, 0.93)
Northumberland (RS2), AR	3.1 (2.1, 4.1)	1.6 (1.1, 2.1)	0.6 (0.4, 0.8)	0.3 (0.2, 0.4)	0.04 (0.03, 0.05)
Northumberland (RS2), NR	66.4 (47.8, 85.0)	33.2 (23.9, 42.5)	13.3 (9.6, 17.0)	6.7 (4.8, 8.5)	0.80 (0.57, 1.02)
Northumberland (RS2), PW	50.1 (36.1, 64.2)	25.1 (18.1, 32.1)	10.0 (7.2, 12.8)	5.0 (3.6, 6.4)	0.60 (0.43, 0.77)
Stillwater (RS3), BR	14.8 (10.7, 19.0)	7.4 (5.4, 9.5)	3.0 (2.1, 3.8)	1.5 (1.1, 1.9)	0.18 (0.13, 0.23)
Stillwater (RS3), NR	31.7 (25.9, 37.6)	15.9 (13.0, 18.8)	6.3 (5.2, 7.5)	3.2 (2.6, 3.8)	0.38 (0.31, 0.45)
Stillwater (RS3), PW	30.7 (25.0, 36.4)	15.4 (12.5, 18.2)	6.1 (5.0, 7.3)	3.1 (2.5, 3.7)	0.37 (0.30, 0.44)
Upper Mechanicville (RS3) ^C , NR	1.0 (0.4, 1.6)	0.5 (0.2, 0.8)	0.2 (0.1, 0.3)	0.1 (0.1, 0.2)	0.01 (0, 0.02)

^A Remediated areas were dredged and subsequently capped and/or backfilled.

^B Pool-wide estimates combine results from remediated (sampled before or after remediation) and non-remediated areas and does not include the navigation channel.

^C Remediated areas in Upper Mechanicville were not sampled.

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FIGURES

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Figure 1 Location of the study area (i.e., Hudson River) in the State of New York.

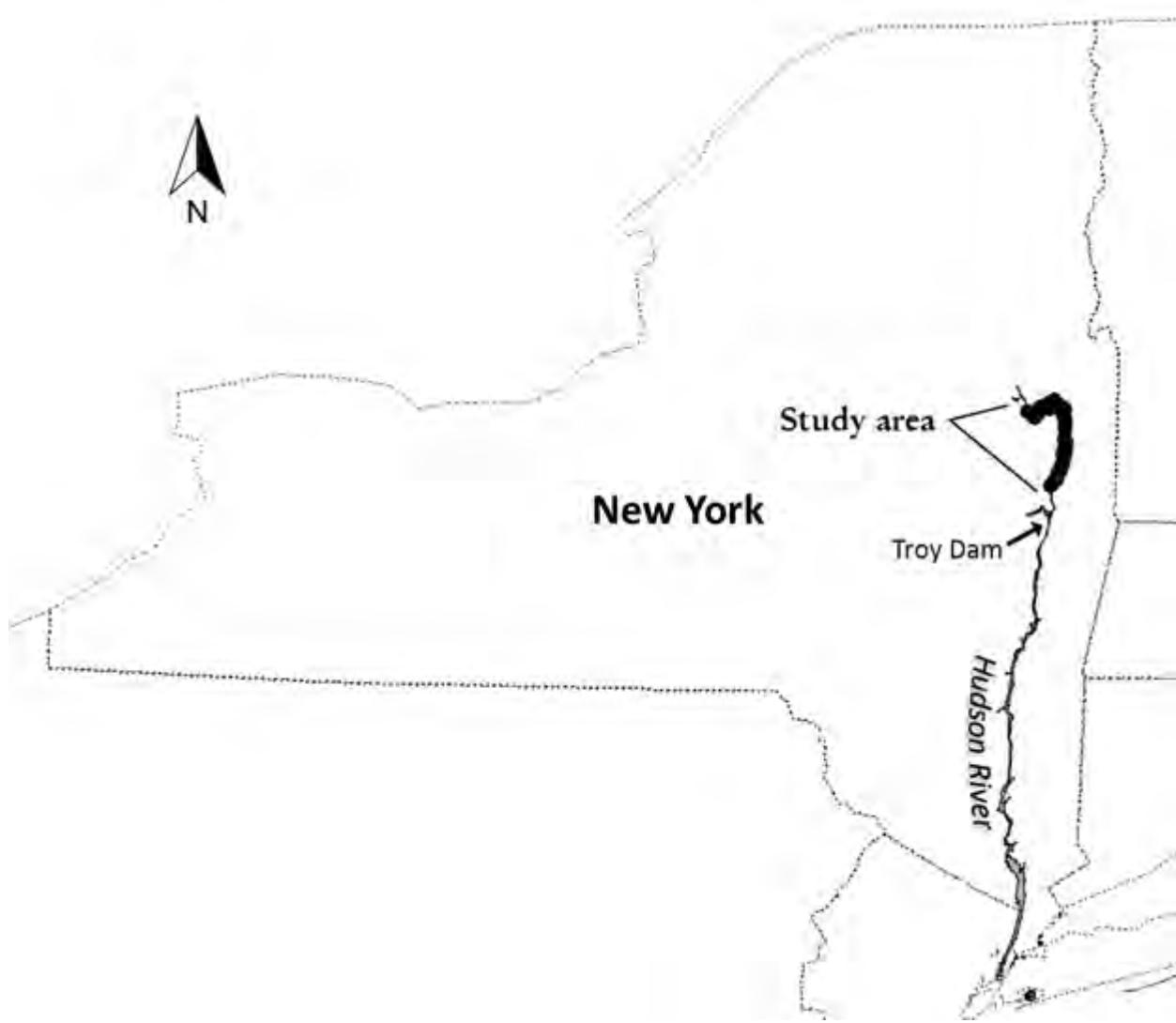


Figure 2

Description of study sites and locations of surveyed pools in the Upper Hudson River in relation to the sources of polychlorinated biphenyls (PCBs).

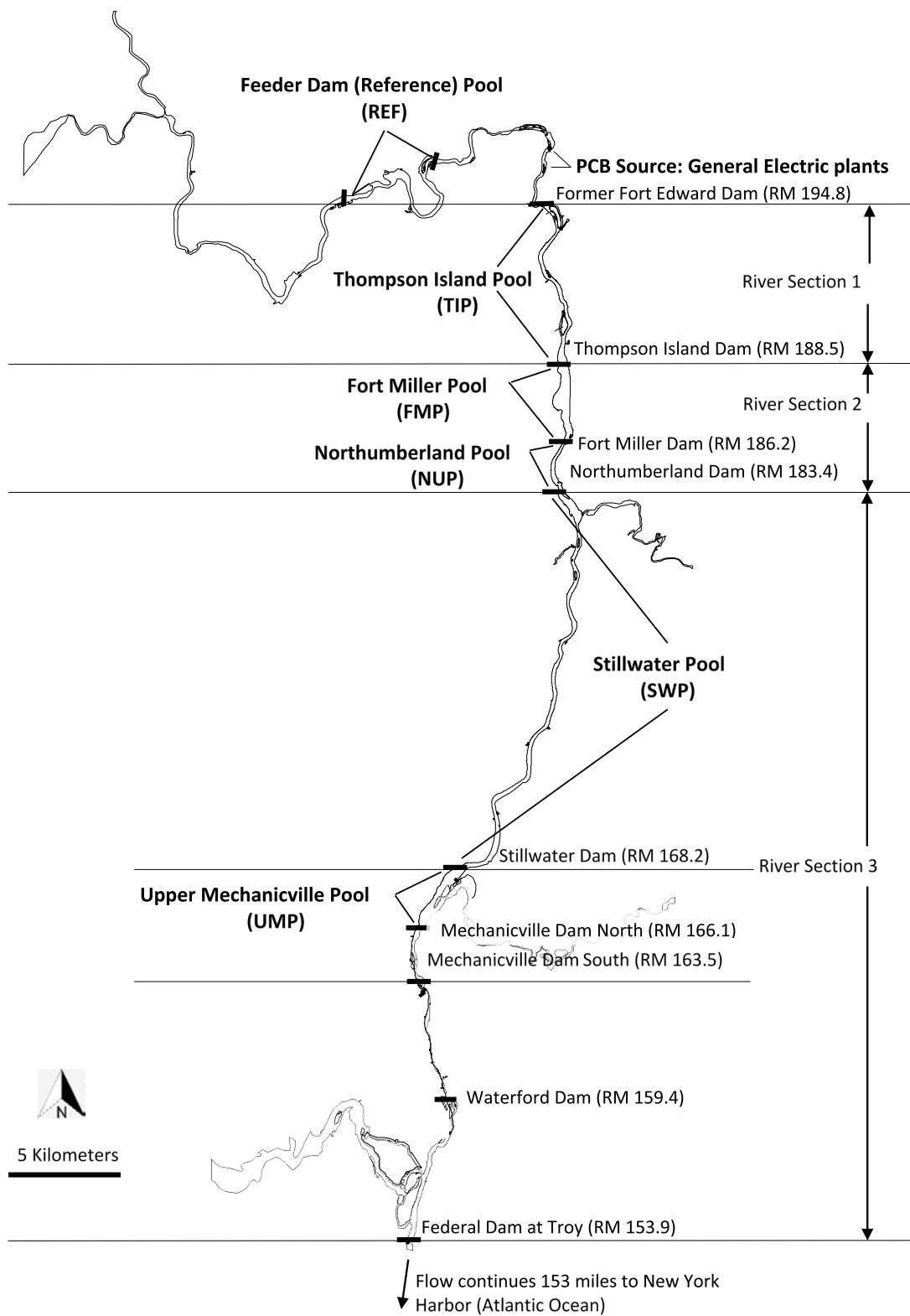
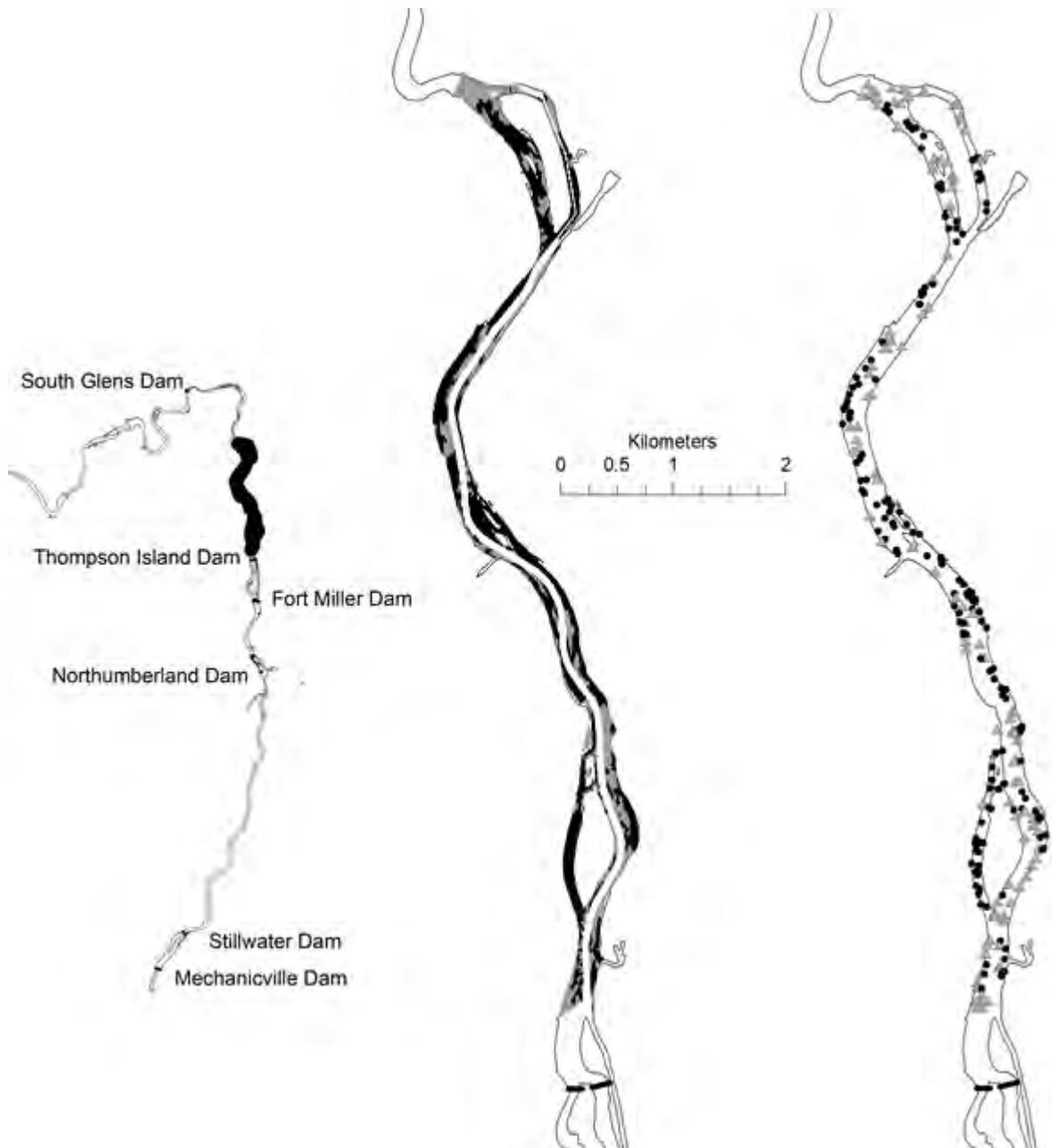


Figure 3 Sampling Location Details

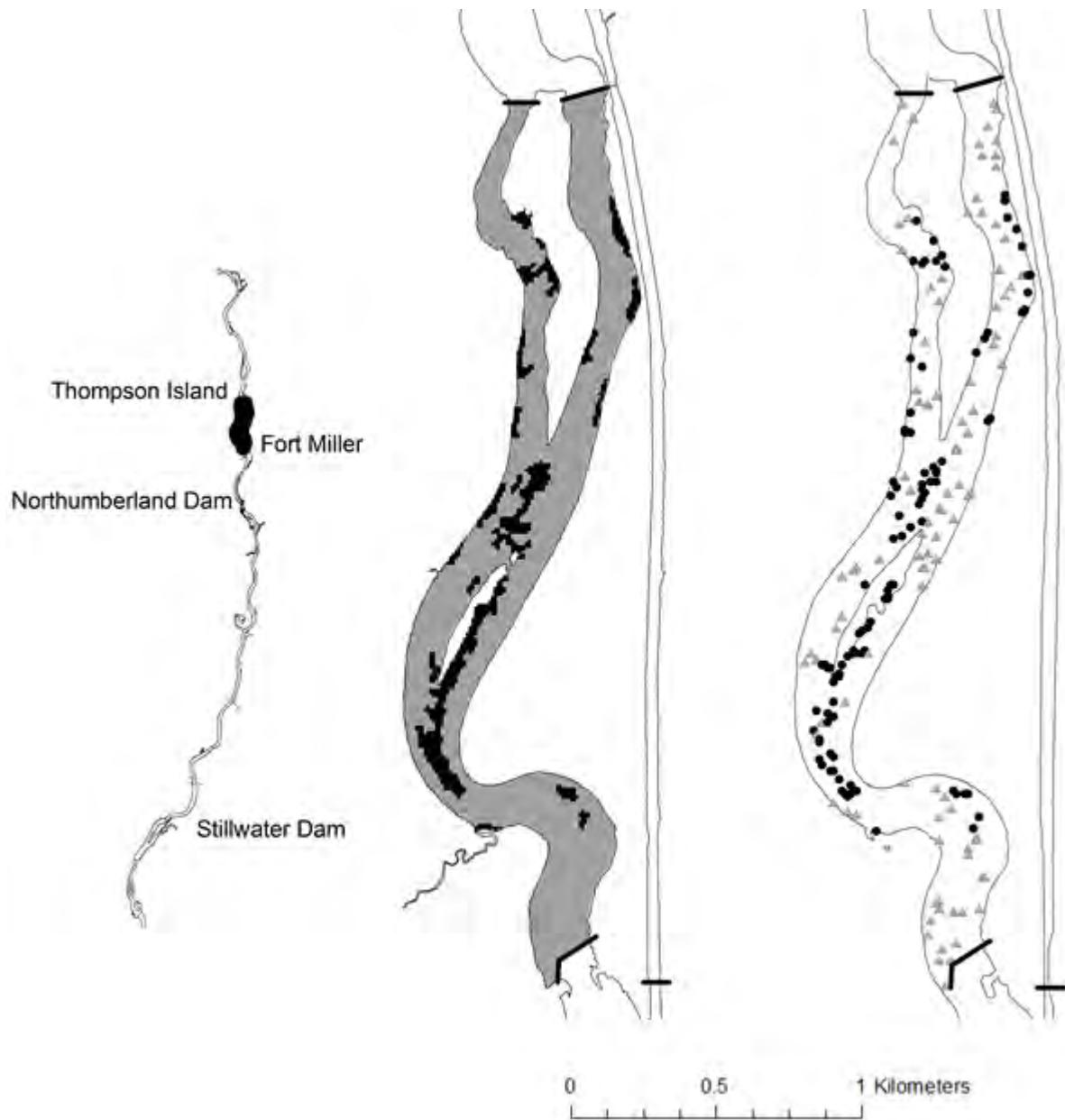
(A) Left: Location of the Feeder Dam Pool in the Upper Hudson River, New York. Top: Sampling frame in which gray represents non-remediated areas. Bottom: Gray triangles represent the location of randomly selected sample sites (all were in non-remediated areas in this pool).



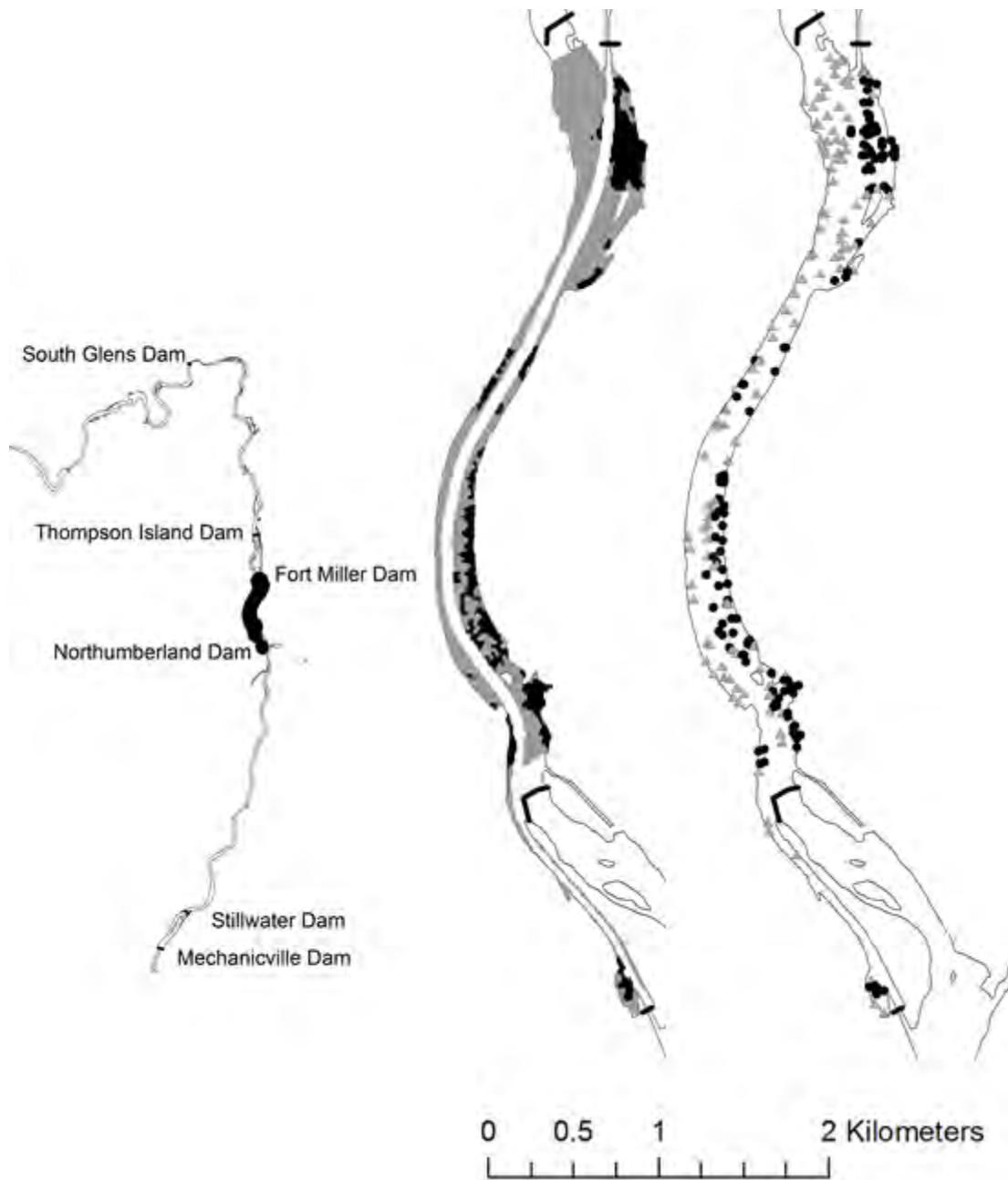
(B) Left: Location of Thompson Island Pool in the Upper Hudson River, New York. Center: Sampling frame in which black represents remediated areas and gray represents non-remediated areas. Right: Location of randomly selected sample sites (black circles represent remediated areas; gray triangles represent non-remediated areas).



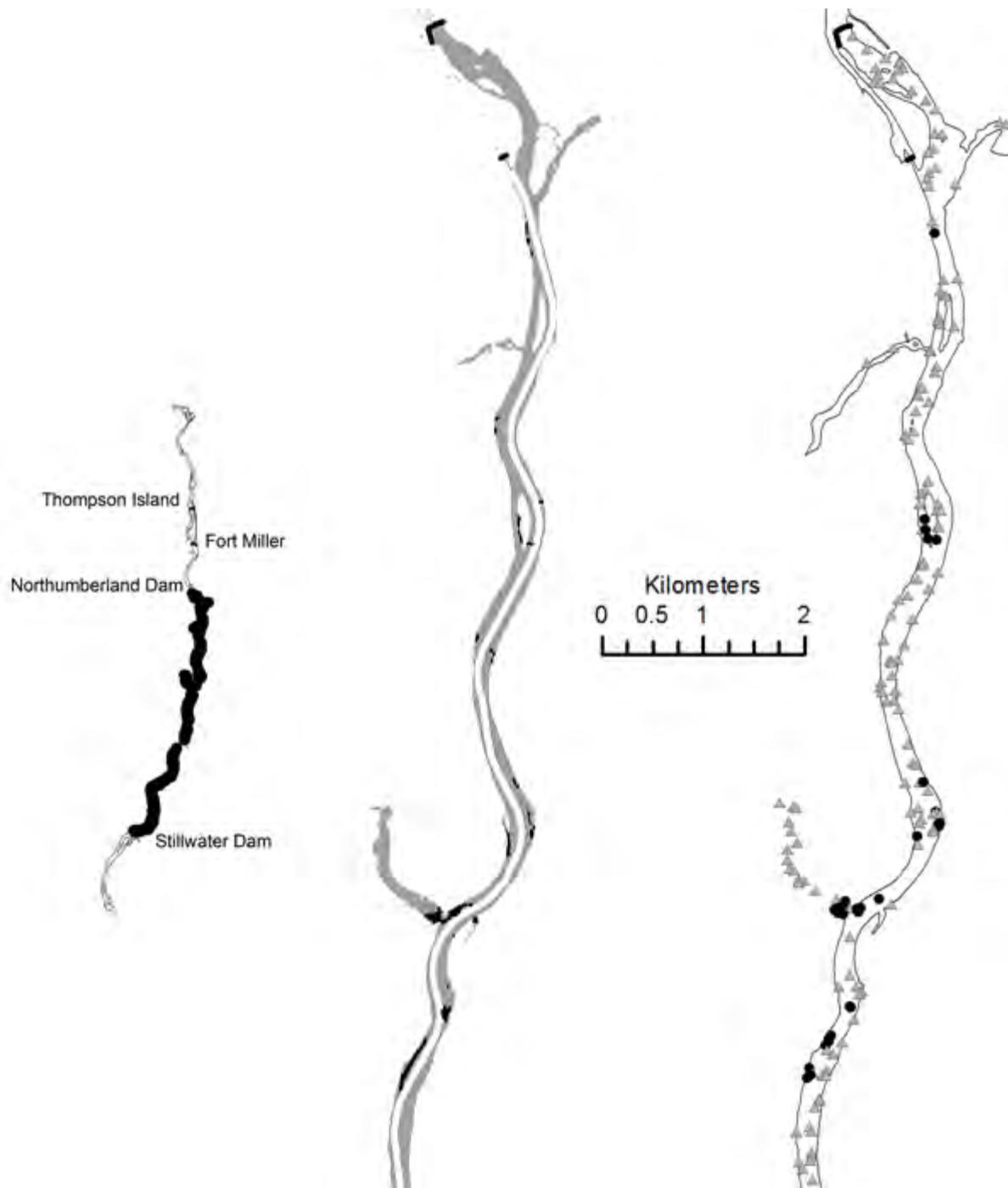
(C) Left: Location of Fort Miller Pool in the Upper Hudson River, New York. Center: Sampling frame in which black represents remediated areas and gray represents non-remediated areas. Right: Location of randomly selected sample sites (black circles represent remediated areas; gray triangles represent non-remediated areas).



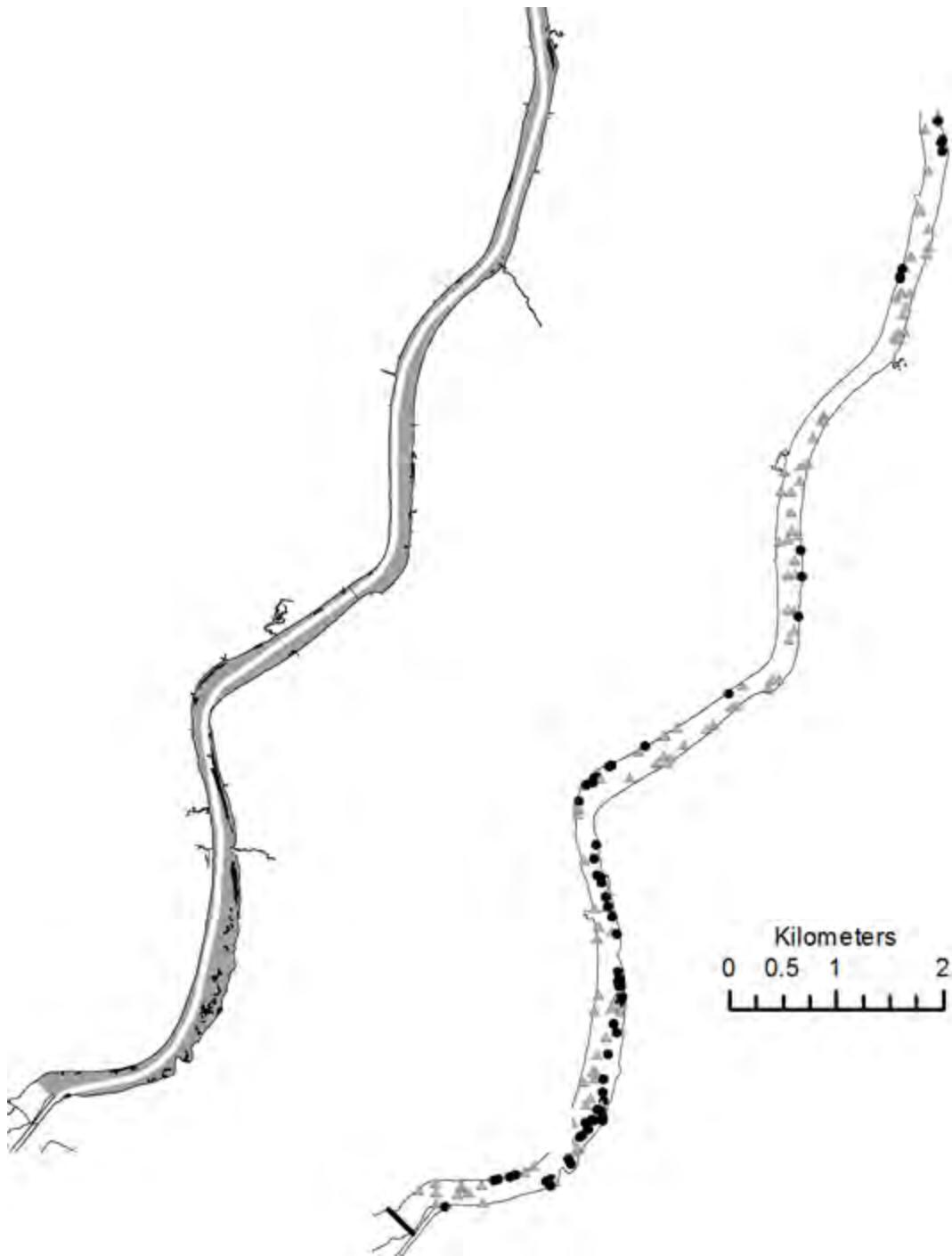
(D) Left: Location of Northumberland Pool in the Upper Hudson River, New York. Center: Sampling frame in which black represents remediated areas and gray represents non-remediated areas. Right: Location of randomly selected sample sites (black circles represent remediated areas; gray triangles represent non-remediated areas).



(E) Left: Location of Stillwater Pool in the Upper Hudson River, New York. Center: Sampling frame of upper half of Stillwater Pool in which black represents remediated areas and gray represents non-remediated areas. Right: Location of randomly selected sample sites (black circles represent remediated areas; gray triangles represent non-remediated areas).



(F) Left: Sampling frame of lower half of Stillwater Pool in which black represents remediated areas and gray represents non-remediated areas. Right: Location of randomly selected sample sites (black circles represent remediated areas; gray triangles represent non-remediated areas). See Figure 3E for the location of Stillwater Pool in the Upper Hudson River, New York.



(G) Left: Location of Upper Mechanicville Pool in the Upper Hudson River, New York. Top: Sampling frame in which black represents areas that were remediated, and gray represents non-remediated areas. Bottom: Gray triangles represent the location of randomly selected sample sites, which for Upper Mechanicville represent non-remediated areas.

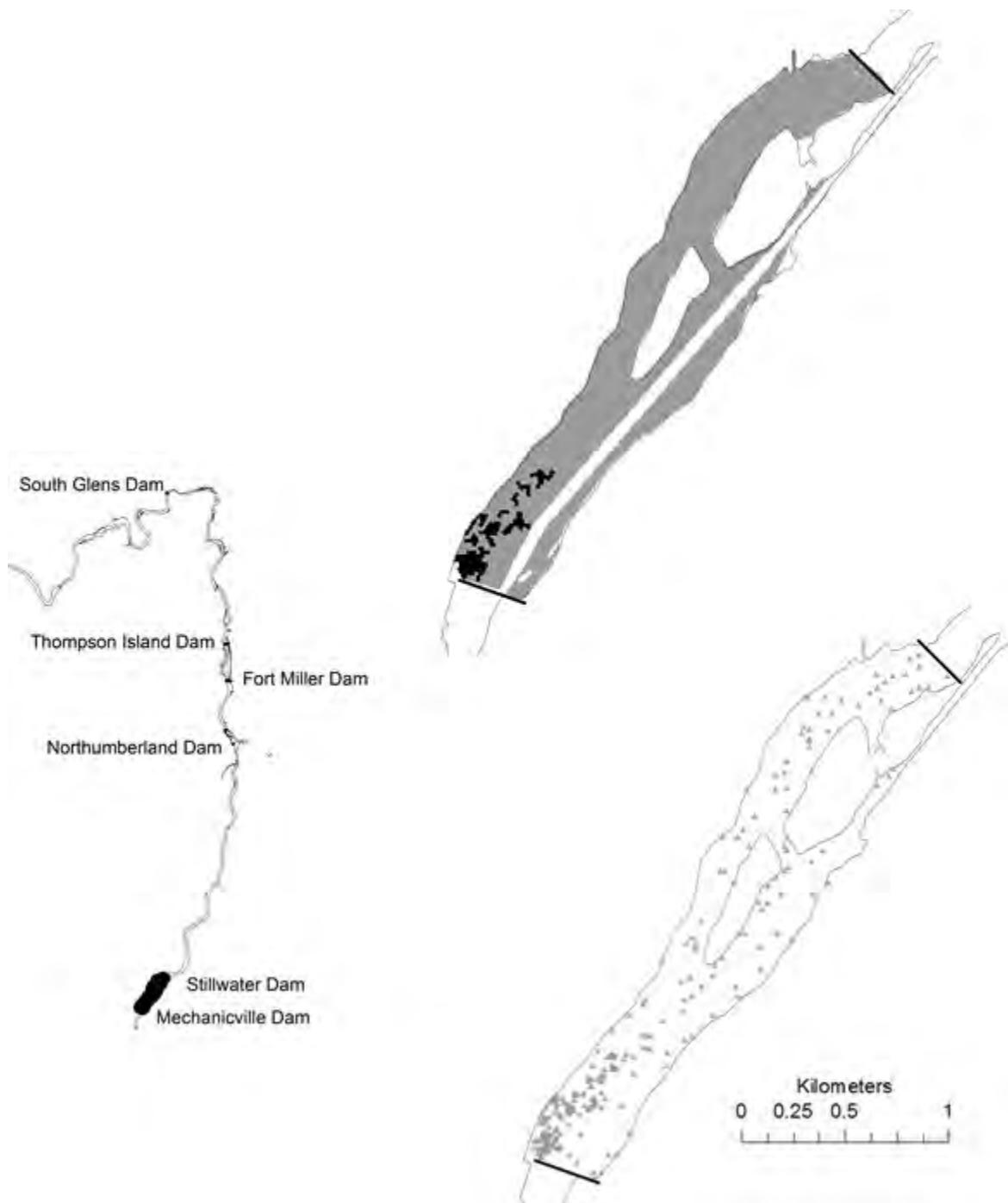


Figure 4

Prevalence of substrate types in five pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam Pool). There were no remedial activities in the reference pool. Fort Miller (RS2) and Stillwater (RS3) Pools were sampled in 2013 prior to dredging and subsequent capping or backfilling. Non-remediated and remediated areas of Thompson Island (RS1) and Northumberland (RS2) Pools were sampled in 2015 after remediation was conducted. Remediated areas in Upper Mechanicville (RS3) were not sampled.

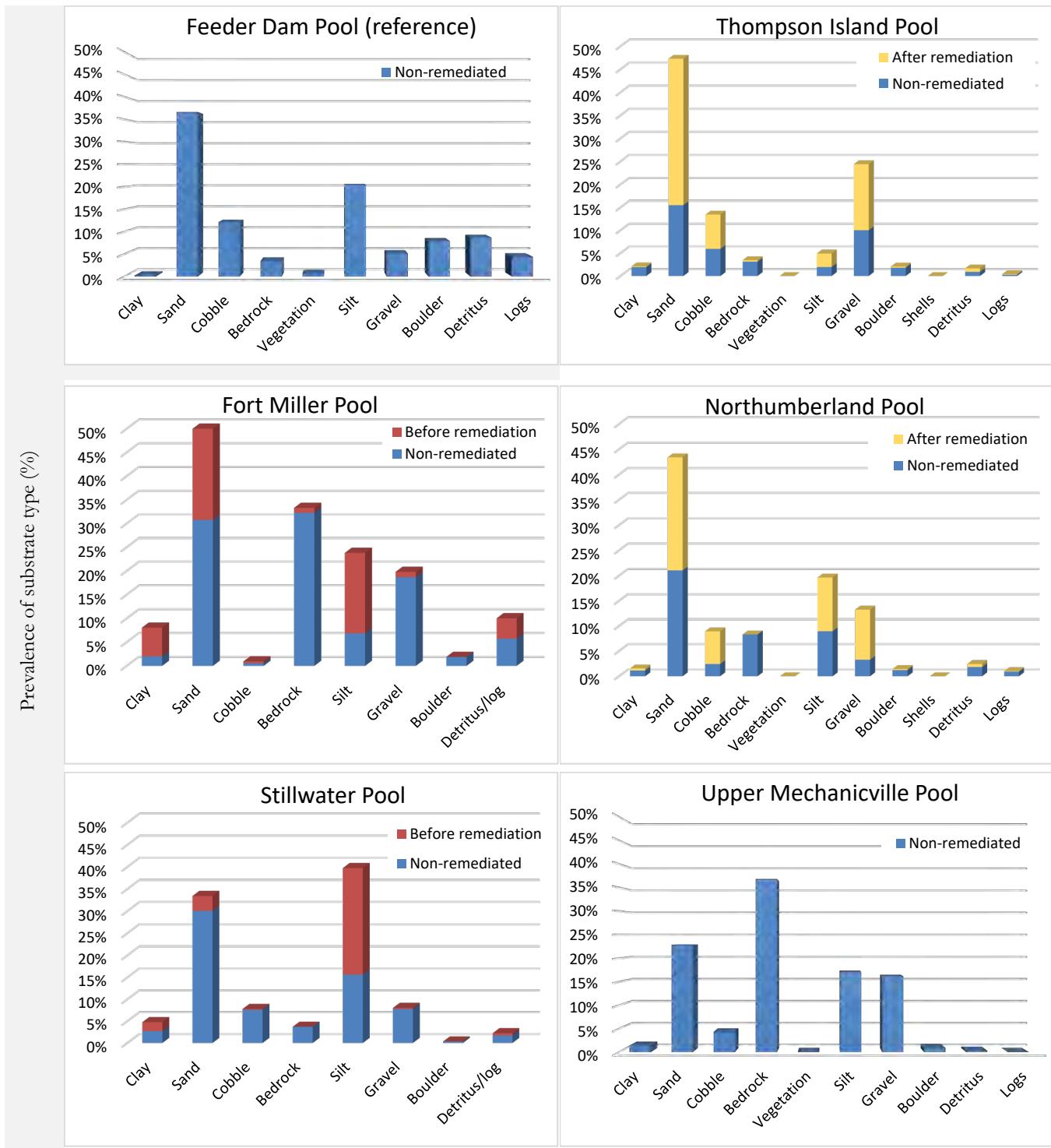
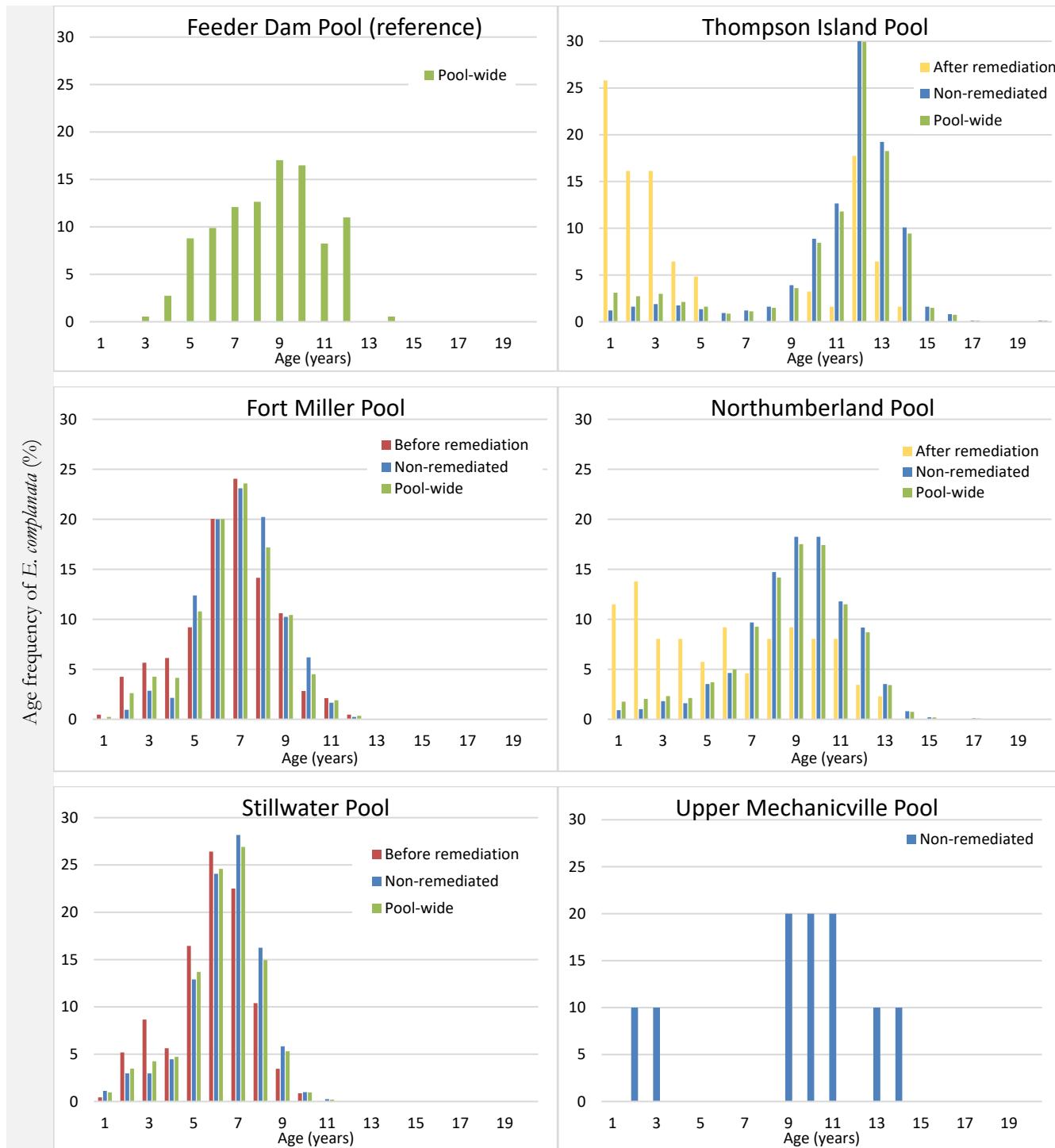


Figure 5

Age frequency distributions of *Elliptio complanata* sampled from five pools of three River Sections (RS) of the Upper Hudson River, New York, and in an upstream reference pool (Feeder Dam). There were no remedial activities in the reference pool, which was sampled in 2015. Fort Miller (RS2) and Stillwater (RS3) Pools were sampled in 2013 prior to dredging and subsequent capping or backfilling. Non-remediated and remediated areas of Thompson Island (RS1) and Northumberland (RS2) Pools were sampled in 2015 after remediation was completed. Although portions of Upper Mechanicville Pool (R3) were also remediated prior to implementation of the 2015 survey, only non-remediated areas were sampled.



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APPENDICES

Data in the following appendices were obtained by the New York State Museum. Contact Denise Mayer (Denise.Mayer@nysed.gov) if additional information is needed. All sampling and specimen collection were authorized under the appropriate NYSDEC license to collect or possess issued to the New York State Museum Division of Research and Collections prior to the surveys being conducted.

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APPENDIX A:

RAW FIELD DATA

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Hudson River Natural Resource
 Trustees Upper Hudson Freshwater
 Mussel Survey

Table 1. Feeder Dam Pool Sampling Location and Field Mussel Data (2015 Surveys)

Hudson River - Reference Section

August 2015

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
122	No	8/17/2015	607762	4794190	0	<i>Elliptio</i>	<i>complanata</i>	57.9	7
123	No	8/17/2015	607789	4794095	0	<i>Elliptio</i>	<i>complanata</i>	62.2	8
123	No	8/17/2015	607789	4794095	0	<i>Elliptio</i>	<i>complanata</i>	81.1	10
123	No	8/17/2015	607789	4794095	0	<i>Elliptio</i>	<i>complanata</i>	83.0	11
124	No	8/17/2015	608039	4794092	0	<i>Elliptio</i>	<i>complanata</i>	55.1	6
124	No	8/17/2015	608039	4794092	0	<i>Elliptio</i>	<i>complanata</i>	74.5	10
125	No	8/17/2015	607897	4793912	0	<i>Elliptio</i>	<i>complanata</i>	54.0	6
125	No	8/17/2015	607897	4793912	0	<i>Elliptio</i>	<i>complanata</i>	66.6	9
125	No	8/17/2015	607897	4793912	0	<i>Elliptio</i>	<i>complanata</i>	80.4	11
126	No	8/17/2015	607553	4793910	0	<i>Elliptio</i>	<i>complanata</i>	85.6	11
126	No	8/17/2015	607553	4793910	0	<i>Elliptio</i>	<i>complanata</i>	90.8	12
127	No	8/17/2015	607400	4793676	0	no mussels	no mussels	no mussels	no mussels
128	No	8/17/2015	607417	4793685	0	<i>Elliptio</i>	<i>complanata</i>	63.1	9
128	No	8/17/2015	607417	4793685	0	<i>Elliptio</i>	<i>complanata</i>	70.6	10
128	No	8/17/2015	607417	4793685	0	<i>Elliptio</i>	<i>complanata</i>	74.7	11
128	No	8/17/2015	607417	4793685	0	<i>Elliptio</i>	<i>complanata</i>	87.2	11
128	No	8/17/2015	607417	4793685	0	<i>Elliptio</i>	<i>complanata</i>	87.2	11
128	No	8/17/2015	607417	4793685	0	<i>Elliptio</i>	<i>complanata</i>	86.3	11
129	No	8/17/2015	607733	4793655	0	<i>Pyganodon</i>	<i>cataracta</i>	63.7	9
129	No	8/17/2015	607733	4793655	0	<i>Elliptio</i>	<i>complanata</i>	47.3	6
129	No	8/17/2015	607733	4793655	0	<i>Elliptio</i>	<i>complanata</i>	40.4	5
130	No	8/17/2015	607417	4793637	0	<i>Elliptio</i>	<i>complanata</i>	77.9	9
131	No	8/17/2015	607400	4793606	0	no mussels	no mussels	no mussels	no mussels
132	No	8/17/2015	607439	4793609	0	no mussels	no mussels	no mussels	no mussels
133	No	8/17/2015	607700	4793570	0	no mussels	no mussels	no mussels	no mussels
134	No	8/17/2015	607406	4793541	0	<i>Elliptio</i>	<i>complanata</i>	34.1	5
134	No	8/17/2015	607406	4793541	0	<i>Elliptio</i>	<i>complanata</i>	77.3	9
136	No	8/13/2015	606200	4793389	0	no mussels	no mussels	no mussels	no mussels
138	No	8/13/2015	606469	4793340	0	no mussels	no mussels	no mussels	no mussels
139	No	8/13/2015	605925	4793331	0	no mussels	no mussels	no mussels	no mussels
140	No	8/17/2015	607469	4793329	0	<i>Elliptio</i>	<i>complanata</i>	60.2	9
141	No	8/13/2015	605867	4793250	0	no mussels	no mussels	no mussels	no mussels
142	No	8/17/2015	607490	4793245	0	<i>Elliptio</i>	<i>complanata</i>	69.3	9
142	No	8/17/2015	607490	4793245	0	<i>Elliptio</i>	<i>complanata</i>	69.0	9
143	No	8/17/2015	607556	4793245	0	<i>Pyganodon</i>	<i>cataracta</i>	21.7	4
144	No	8/13/2015	605999	4793203	0	no mussels	no mussels	no mussels	no mussels
145	No	8/13/2015	606180	4793200	0	no mussels	no mussels	no mussels	no mussels
146	No	8/13/2015	606650	4793170	0	no mussels	no mussels	no mussels	no mussels
147	No	8/17/2015	607630	4793185	0	<i>Elliptio</i>	<i>complanata</i>	77.3	11
148	No	8/13/2015	605751	4793120	0	no mussels	no mussels	no mussels	no mussels
149	No	8/17/2015	607582	4793197	0	<i>Elliptio</i>	<i>complanata</i>	74.9	10
150	No	8/13/2015	606228	4793081	0	<i>Elliptio</i>	<i>complanata</i>	79.9	9
151	No	8/13/2015	606541	4793050	0	<i>Elliptio</i>	<i>complanata</i>	83.2	9
152	No	8/13/2015	605908	4793028	0	no mussels	no mussels	no mussels	no mussels
153	No	8/17/2015	607616	4793037	0	<i>Elliptio</i>	<i>complanata</i>	87.8	9
153	No	8/17/2015	607616	4793037	0	<i>Lampsilis</i>	<i>radiata</i>	72.6	7
154	No	8/13/2015	606820	4793011	0	no mussels	no mussels	no mussels	no mussels
155	No	8/13/2015	606633	4792991	0	no mussels	no mussels	no mussels	no mussels
156	No	8/13/2015	606650	4792980	0	no mussels	no mussels	no mussels	no mussels
157	No	8/13/2015	606814	4792976	0	no mussels	no mussels	no mussels	no mussels
158	No	8/17/2015	607660	4792980	0	<i>Elliptio</i>	<i>complanata</i>	49.4	6

159	No	8/13/2015	606060	4792963	0	<i>Elliptio</i>	<i>complanata</i>	91.1	12
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	47.9	7
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	56.5	8
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	73.1	9
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	74.2	9

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	83.3	10
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	84.2	12
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	82.9	11
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	84.6	12
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	86.2	12
160	No	8/17/2015	607717	4792950	0	<i>Elliptio</i>	<i>complanata</i>	88.7	14
161	No	8/13/2015	605870	4792938	0	no mussels	no mussels	no mussels	no mussels
162	No	8/13/2015	606608	4792940	0	<i>Elliptio</i>	<i>complanata</i>	75.3	8
162	No	8/13/2015	606608	4792940	0	<i>Elliptio</i>	<i>complanata</i>	62.1	7
162	No	8/13/2015	606608	4792940	0	<i>Elliptio</i>	<i>complanata</i>	32.3	5
162	No	8/13/2015	606608	4792940	0	<i>Elliptio</i>	<i>complanata</i>	30.4	5
162	No	8/13/2015	606608	4792940	0	<i>Elliptio</i>	<i>complanata</i>	24.0	4
162	No	8/13/2015	606608	4792940	0	<i>Elliptio</i>	<i>complanata</i>	22.0	5
163	No	8/13/2015	606009	4792922	0	no mussels	no mussels	no mussels	no mussels
164	No	8/17/2015	607762	4792918	0	<i>Elliptio</i>	<i>complanata</i>	85.1	10
165	No	8/13/2015	605882	4792850	0	no mussels	no mussels	no mussels	no mussels
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	50.9	6
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	52.2	6
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	58.1	7
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	63.7	9
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	57.1	7
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	59.1	8
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	65.8	8
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	67.0	8
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	66.8	8
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	63.5	7
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	69.5	8
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	63.6	8
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	76.9	10
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	77.5	9
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	78.5	10
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	81.3	12
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	83.2	11
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	82.6	11
166	No	8/13/2015	606060	4792851	0	<i>Elliptio</i>	<i>complanata</i>	57.9	7
167	No	8/17/2015	607792	4792813	0	<i>Elliptio</i>	<i>complanata</i>	54.7	7
167	No	8/17/2015	607792	4792813	0	<i>Elliptio</i>	<i>complanata</i>	74.7	9
167	No	8/17/2015	607792	4792813	0	<i>Elliptio</i>	<i>complanata</i>	84.8	10
168	No	8/17/2015	607828	4792828	0	<i>Elliptio</i>	<i>complanata</i>	62.0	7
168	No	8/17/2015	607828	4792828	0	<i>Elliptio</i>	<i>complanata</i>	66.1	9
169	No	8/13/2015	605872	4792742	0	no mussels	no mussels	no mussels	no mussels
170	No	8/13/2015	604880	4792710	0	no mussels	no mussels	no mussels	no mussels
172	No	8/13/2015	606009	4792651	0	<i>Elliptio</i>	<i>complanata</i>	89.1	12
172	No	8/13/2015	606009	4792651	0	<i>Elliptio</i>	<i>complanata</i>	56.1	8
172	No	8/13/2015	606009	4792651	0	<i>Elliptio</i>	<i>complanata</i>	64.0	8
173	No	8/17/2015	608110	4792659	0	<i>Elliptio</i>	<i>complanata</i>	18.4	3
174	No	8/14/2015	604930	4792642	0	no mussels	no mussels	no mussels	no mussels
175	No	8/14/2015	605440	4792638	0	<i>Elliptio</i>	<i>complanata</i>	62.2	7
175	No	8/14/2015	605440	4792638	0	<i>Elliptio</i>	<i>complanata</i>	45.0	6
176	No	8/14/2015	605420	4792619	0	<i>Elliptio</i>	<i>complanata</i>	66.5	8
176	No	8/14/2015	605420	4792619	0	<i>Elliptio</i>	<i>complanata</i>	89.4	10
176	No	8/14/2015	605420	4792619	0	<i>Elliptio</i>	<i>complanata</i>	85.3	10
177	No	8/17/2015	607845	4792625	0	no mussels	no mussels	no mussels	no mussels

178	No	8/14/2015	605018	4792614	0	no mussels	no mussels	no mussels	no mussels
179	No	8/14/2015	605110	4792608	0	<i>Elliptio</i>	<i>complanata</i>	37.5	6
180	No	8/13/2015	605821	4792600	0	<i>Elliptio</i>	<i>complanata</i>	87.9	11
180	No	8/13/2015	605821	4792600	0	<i>Elliptio</i>	<i>complanata</i>	83.9	11
180	No	8/13/2015	605821	4792600	0	<i>Elliptio</i>	<i>complanata</i>	84.2	12
180	No	8/13/2015	605821	4792600	0	<i>Elliptio</i>	<i>complanata</i>	84.1	12
180	No	8/13/2015	605821	4792600	0	<i>Elliptio</i>	<i>complanata</i>	75.0	9
181	No	8/10/2015	607990	4792600	0	no mussels	no mussels	no mussels	no mussels
182	No	8/14/2015	605280	4792553	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
183	No	8/10/2015	608061	4792508	0	<i>Elliptio</i>	<i>complanata</i>	83.0	10
184	No	8/13/2015	605710	4792470	0	<i>Elliptio</i>	<i>complanata</i>	56.1	7
185	No	8/10/2015	608119	4792450	0	<i>Elliptio</i>	<i>complanata</i>	61.4	8
185	No	8/10/2015	608119	4792450	0	<i>Pyganodon</i>	<i>cataracta</i>	31.9	5
186	No	8/10/2015	608060	4792443	0	<i>Elliptio</i>	<i>complanata</i>	43.8	5
186	No	8/10/2015	608060	4792443	0	<i>Elliptio</i>	<i>complanata</i>	66.8	9
186	No	8/10/2015	608060	4792443	0	<i>Elliptio</i>	<i>complanata</i>	81.9	10
187	No	8/10/2015	608090	4792430	0	<i>Elliptio</i>	<i>complanata</i>	29.0	4
187	No	8/10/2015	608090	4792430	0	<i>Elliptio</i>	<i>complanata</i>	82.7	10
187	No	8/10/2015	608090	4792430	0	<i>Elliptio</i>	<i>complanata</i>	72.5	10
187	No	8/10/2015	608090	4792430	0	<i>Elliptio</i>	<i>complanata</i>	70.0	8
187	No	8/10/2015	608090	4792430	0	<i>Elliptio</i>	<i>complanata</i>	61.9	8
187	No	8/10/2015	608090	4792430	0	<i>Elliptio</i>	<i>complanata</i>	53.3	7
188	No	8/14/2015	604928	4792390	0	no mussels	no mussels	no mussels	no mussels
189	No	8/14/2015	604892	4792376	0	no mussels	no mussels	no mussels	no mussels
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	86.0	12
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	80.5	12
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	79.3	10
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	66.7	10
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	70.4	10
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	42.9	7
190	No	8/10/2015	608110	4792380	0	<i>Elliptio</i>	<i>complanata</i>	34.7	5
191	No	8/10/2015	606870	4792340	0	<i>Elliptio</i>	<i>complanata</i>	55.4	6
191	No	8/10/2015	606870	4792340	0	<i>Pyganodon</i>	<i>cataracta</i>	33.7	4
191	No	8/10/2015	606870	4792340	0	<i>Pyganodon</i>	<i>cataracta</i>	35.8	4
192	No	8/10/2015	606840	4792290	0	<i>Elliptio</i>	<i>complanata</i>	63.1	7
193	No	8/10/2015	606890	4792241	0	no mussels	no mussels	no mussels	no mussels
194	No	8/14/2015	604685	4792236	0	no mussels	no mussels	no mussels	no mussels
195	No	8/10/2015	606870	4792220	0	<i>Elliptio</i>	<i>complanata</i>	91.6	12
196	No	8/10/2015	608217	4792210	0	<i>Elliptio</i>	<i>complanata</i>	82.5	10
197	No	8/10/2015	608190	4792230	0	no mussels	no mussels	no mussels	no mussels
198	No	8/10/2015	606831	4792180	0	<i>Elliptio</i>	<i>complanata</i>	72.3	9
199	No	8/14/2015	604613	4792187	0	no mussels	no mussels	no mussels	no mussels
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	92.3	12
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	88.0	12
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	80.7	10
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	74.1	9
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	71.2	9
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	57.5	6
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	49.7	5
200	No	8/10/2015	606879	4792170	0	<i>Elliptio</i>	<i>complanata</i>	46.9	6
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	82.8	10
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	68.8	8
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	59.3	7
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	67.3	9
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	71.5	8
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	56.2	7
201	No	8/10/2015	608339	4792130	0	<i>Elliptio</i>	<i>complanata</i>	34.7	4
202	No	8/10/2015	606832	4792110	0	no mussels	no mussels	no mussels	no mussels
203	No	8/10/2015	606843	4792081	0	no mussels	no mussels	no mussels	no mussels

204	No	8/10/2015	608474	4792070	0	<i>Elliptio</i>	<i>complanata</i>	87.9	10
204	No	8/10/2015	608474	4792070	0	<i>Elliptio</i>	<i>complanata</i>	68.1	8
204	No	8/10/2015	608474	4792070	0	<i>Elliptio</i>	<i>complanata</i>	41.8	5
206	No	8/10/2015	606870	4792020	0	<i>Elliptio</i>	<i>complanata</i>	40.7	5
206	No	8/10/2015	606870	4792020	0	<i>Elliptio</i>	<i>complanata</i>	40.6	5
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	84.5	12
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	88.1	12
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	84.3	10
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	88.7	12
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	85.7	11
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	81.8	10
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	86.7	10

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	73.7	9
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	76.7	9
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	69.4	8
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	68.1	8
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	57.1	6
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	52.3	6
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	52.8	7
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	52.8	7
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	45.2	6
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	52.9	6
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	37.9	5
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	33.8	5
212	No	8/10/2015	606950	4791928	0	<i>Elliptio</i>	<i>complanata</i>	31.4	4
214	No	8/6/2015	608635	4791892	0	<i>Elliptio</i>	<i>complanata</i>	29.5	5
214	No	8/6/2015	608635	4791892	0	<i>Elliptio</i>	<i>complanata</i>	78.8	9
215	No	8/10/2015	606978	4791830	0	no mussels	no mussels	no mussels	no mussels
216	No	8/10/2015	606930	4791730	0	no mussels	no mussels	no mussels	no mussels
217	No	8/10/2015	606991	4791690	0	no mussels	no mussels	no mussels	no mussels
218	No	8/6/2015	608530	4791630	0	<i>Elliptio</i>	<i>complanata</i>	66.3	7
218	No	8/6/2015	608530	4791630	0	<i>Elliptio</i>	<i>complanata</i>	72.8	9
218	No	8/6/2015	608530	4791630	0	<i>Elliptio</i>	<i>complanata</i>	80.5	10
218	No	8/6/2015	608530	4791630	0	<i>Elliptio</i>	<i>complanata</i>	90.7	11
219	No	8/6/2015	608430	4791622	0	<i>Elliptio</i>	<i>complanata</i>	65.2	7
220	No	8/6/2015	608550	4791523	0	<i>Elliptio</i>	<i>complanata</i>	34.6	5
220	No	8/6/2015	608550	4791523	0	<i>Elliptio</i>	<i>complanata</i>	63.6	7
220	No	8/6/2015	608550	4791523	0	<i>Elliptio</i>	<i>complanata</i>	97.5	12
221	No	8/6/2015	608490	4791464	0	<i>Pyganodon</i>	<i>cataracta</i>	80.4	9
222	No	8/6/2015	608300	4791422	0	no mussels	no mussels	no mussels	no mussels
224	No	8/6/2015	608431	4791400	0	<i>Pyganodon</i>	<i>cataracta</i>	61.0	8
224	No	8/6/2015	608431	4791400	0	<i>Elliptio</i>	<i>complanata</i>	50.4	6
224	No	8/6/2015	608431	4791400	0	<i>Elliptio</i>	<i>complanata</i>	40.5	6
224	No	8/6/2015	608431	4791400	0	<i>Elliptio</i>	<i>complanata</i>	50.5	7
224	No	8/6/2015	608431	4791400	0	<i>Elliptio</i>	<i>complanata</i>	82.4	10
224	No	8/6/2015	608431	4791400	0	<i>Elliptio</i>	<i>complanata</i>	88.4	12
226	No	8/6/2015	608140	4791260	0	no mussels	no mussels	no mussels	no mussels
227	No	8/6/2015	608161	4791230	0	no mussels	no mussels	no mussels	no mussels
228	No	8/13/2015	607100	4791210	0	<i>Elliptio</i>	<i>complanata</i>	84.6	10
228	No	8/13/2015	607100	4791210	0	<i>Elliptio</i>	<i>complanata</i>	69.8	8
230	No	8/6/2015	608220	4791160	0	<i>Elliptio</i>	<i>complanata</i>	44.4	6
230	No	8/6/2015	608220	4791160	0	<i>Elliptio</i>	<i>complanata</i>	75.9	9
230	No	8/6/2015	608220	4791160	0	<i>Elliptio</i>	<i>complanata</i>	79.5	10
230	No	8/6/2015	608220	4791160	0	<i>Elliptio</i>	<i>complanata</i>	79.0	9
230	No	8/6/2015	608220	4791160	0	<i>Elliptio</i>	<i>complanata</i>	90.2	10
230	No	8/6/2015	608220	4791160	0	<i>Pyganodon</i>	<i>cataracta</i>	33.0	5
232	No	8/6/2015	608140	4791120	0	<i>Elliptio</i>	<i>complanata</i>	95.9	12
234	No	8/6/2015	608050	4791090	0	<i>Elliptio</i>	<i>complanata</i>	28.9	4

235	No	8/6/2015	607989	4790990	0	no mussels	no mussels	no mussels	no mussels
236	No	8/6/2015	607962	4790940	0	no mussels	no mussels	no mussels	no mussels
237	No	8/6/2015	607472	4790912	0	no mussels	no mussels	no mussels	no mussels
238	No	8/6/2015	607611	4790873	0	no mussels	no mussels	no mussels	no mussels
239	No	8/6/2015	607811	4790865	0	<i>Elliptio complanata</i>	35.2	5	
239	No	8/6/2015	607811	4790865	0	<i>Elliptio complanata</i>	74.3	9	
239	No	8/6/2015	607811	4790865	0	<i>Elliptio complanata</i>	75.5	9	
239	No	8/6/2015	607811	4790865	0	<i>Elliptio complanata</i>	78.7	9	
239	No	8/6/2015	607811	4790865	0	<i>Elliptio complanata</i>	82.8	8	
239	No	8/6/2015	607811	4790865	0	<i>Elliptio complanata</i>	80.5	8	
240	No	8/6/2015	607770	4790650	0	no mussels	no mussels	no mussels	no mussels
241	No	8/6/2015	607615	4790513	0	no mussels	no mussels	no mussels	no mussels

Hudson River Natural Resource Trustees
Upper Hudson Freshwater Mussel Survey

Table 2. Thompson Island Pool Sampling Location and Field Mussel Data (2015 Surveys)

Hudson River - River Section 1 Thompson Island Pool

September-October 2015

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
490	No	9/29/2015	613970	4791610	0	no mussels	no mussels	no mussels	no mussels
491	No	9/29/2015	614180	4791580	0	no mussels	no mussels	no mussels	no mussels
492	No	9/16/2015	614280	4791570	0	no mussels	no mussels	no mussels	no mussels
493	No	9/16/2015	614310	4791560	0	no mussels	no mussels	no mussels	no mussels
494	No	9/29/2015	614030	4791548	0	no mussels	no mussels	no mussels	no mussels
495	No	9/16/2015	614460	4791550	0	no mussels	no mussels	no mussels	no mussels
496	No	9/16/2015	614470	4791542	0	no mussels	no mussels	no mussels	no mussels
497	No	9/29/2015	613990	4791530	0	no mussels	no mussels	no mussels	no mussels
498	No	9/29/2015	613930	4791510	0	no mussels	no mussels	no mussels	no mussels
499	No	9/29/2015	614320	4791496	0	no mussels	no mussels	no mussels	no mussels
500	No	9/29/2015	614050	4791490	0	no mussels	no mussels	no mussels	no mussels
501	No	10/2/2015	614200	4791460	0	no mussels	no mussels	no mussels	no mussels
502	No	9/29/2015	614260	4791439	0	no mussels	no mussels	no mussels	no mussels
503	No	9/29/2015	614060	4791440	0	no mussels	no mussels	no mussels	no mussels
504	No	9/16/2015	614730	4791430	0	no mussels	no mussels	no mussels	no mussels
505	No	9/16/2015	614750	4791431	0	no mussels	no mussels	no mussels	no mussels
509	No	9/16/2015	614781	4791332	0	<i>Elliptio</i>	<i>complanata</i>	96.7	14
509	No	9/16/2015	614781	4791332	0	<i>Elliptio</i>	<i>complanata</i>	97.6	13
509	No	9/16/2015	614781	4791332	0	<i>Elliptio</i>	<i>complanata</i>	92.6	13
510	No	9/16/2015	614790	4791300	0	no mussels	no mussels	no mussels	no mussels
513	No	10/2/2015	614234	4791238	0	no mussels	no mussels	no mussels	no mussels
515	No	10/2/2015	614409	4791240	0	no mussels	no mussels	no mussels	no mussels
516	No	10/2/2015	614244	4791230	0	<i>Elliptio</i>	<i>complanata</i>	93.4	14
516	No	9/16/2015	614820	4791209	0	<i>Elliptio</i>	<i>complanata</i>	96.1	14
518	No	9/16/2015	614820	4791209	0	<i>Elliptio</i>	<i>complanata</i>	99.1	14
519	No	9/16/2015	614820	4791209	0	<i>Elliptio</i>	<i>complanata</i>	92.6	13
521	No	10/2/2015	614550	4790950	0	no mussels	no mussels	no mussels	no mussels
522	No	10/2/2015	614610	4790952	0	no mussels	no mussels	no mussels	no mussels
523	No	10/2/2015	614622	4790940	0	no mussels	no mussels	no mussels	no mussels
526	No	10/2/2015	614670	4790931	0	no mussels	no mussels	no mussels	no mussels
528	No	10/2/2015	614710	4790811	0	<i>Elliptio</i>	<i>complanata</i>	91.0	14
530	No	10/2/2015	614718	4790777	0	no mussels	no mussels	no mussels	no mussels
534	No	10/2/2015	614710	4790709	0	no mussels	no mussels	no mussels	no mussels
537	No	10/2/2015	614690	4790538	0	no mussels	no mussels	no mussels	no mussels
538	No	10/2/2015	614670	4790510	0	no mussels	no mussels	no mussels	no mussels
541	No	10/2/2015	614678	4790468	0	no mussels	no mussels	no mussels	no mussels
548	No	9/15/2015	614673	4790122	0	no mussels	no mussels	no mussels	no mussels
557	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	14.6	2
558	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	20.5	3
559	No	9/16/2015	614160	4789430	0	no mussels	no mussels	no mussels	no mussels
560	No	9/16/2015	614159	4789391	0	<i>Elliptio</i>	<i>complanata</i>	89.9	14
560	No	9/16/2015	614170	4789350	0	<i>Elliptio</i>	<i>complanata</i>	15.0	2
560	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	80.8	13
560	No	9/16/2015	614110	4789290	0	<i>Elliptio</i>	<i>complanata</i>	77.4	12
560	No	9/16/2015	614140	4789288	0	<i>Elliptio</i>	<i>complanata</i>	92.9	13
560	No	9/16/2015	614001	4789130	0	<i>Elliptio</i>	<i>complanata</i>	11.2	1
560	No	9/16/2015	613979	4789069	0	<i>Elliptio</i>	<i>complanata</i>	90.8	15
561	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	8.8	1
561	No	9/17/2015	613969	4788870	0	<i>Elliptio</i>	<i>complanata</i>	13.5	1
564	No	9/17/2015	613818	4788600	0	<i>Elliptio</i>	<i>complanata</i>	51.6	7
564	No	9/17/2015	613880	4788600	0	<i>Lampsilis</i>	<i>radiata</i>	21.7	3
564	No	9/17/2015	613868	4788490	0	<i>Elliptio</i>	<i>complanata</i>	75.2	11
564	No	9/17/2015	613890	4788420	0	<i>Elliptio</i>	<i>complanata</i>	87.8	13
564	No	9/17/2015	613842	4788380	0	<i>Elliptio</i>	<i>complanata</i>	20.3	3

566	No	9/17/2015	614040	4788194	0	no mussels	no mussels	no mussels	no mussels
566	No	9/17/2015	614050	4788140	0	<i>Elliptio</i>	<i>complanata</i>	85.2	12
570	No	9/18/2015	613990	4787810	0	<i>Elliptio</i>	<i>complanata</i>	85.6	14
574	No	9/18/2015	614094	4787596	0	<i>Elliptio</i>	<i>complanata</i>	13.0	2
575	No	9/18/2015	614369	4787539	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
577	No	9/18/2015	614485	4787463	0	<i>Elliptio</i>	<i>complanata</i>	67.5	9
577	No	9/18/2015	614551	4787329	0	<i>Lampsilis</i>	<i>radiata</i>	75.3	11
577	No	9/22/2015	614740	4787100	0	<i>Elliptio</i>	<i>complanata</i>	73.6	10
577	No	9/22/2015	614800	4787018	0	<i>Elliptio</i>	<i>complanata</i>	18.6	2
577	No	9/22/2015	614915	4786970	0	<i>Lampsilis</i>	<i>radiata</i>	49.4	6
577	No	9/22/2015	614821	4786889	0	<i>Elliptio</i>	<i>complanata</i>	82.6	12
579	No	9/22/2015	614830	4786780	0	no mussels	no mussels	no mussels	no mussels
580	No	9/22/2015	614829	4786711	0	<i>Lampsilis</i>	<i>radiata</i>	45.2	5
581	No	9/22/2015	614950	4786690	0	<i>Elliptio</i>	<i>complanata</i>	82.5	14
582	No	9/22/2015	614831	4786640	0	<i>Elliptio</i>	<i>complanata</i>	75.5	9
583	No	9/22/2015	614989	4786569	0	<i>Elliptio</i>	<i>complanata</i>	76.4	11
588	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	102.2	14
588	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	33.5	5
588	No	9/23/2015	615220	4786040	0	<i>Elliptio</i>	<i>complanata</i>	82.4	13
588	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	107.1	17
588	No	9/23/2015	615240	4785910	0	<i>Elliptio</i>	<i>complanata</i>	76.9	12
588	No	9/23/2015	615260	4785910	0	<i>Elliptio</i>	<i>complanata</i>	94.0	14
589	No	9/23/2015	615279	4785852	0	<i>Elliptio</i>	<i>complanata</i>	66.4	10
589	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	67.9	12
589	No	9/23/2015	615250	4785660	0	<i>Elliptio</i>	<i>complanata</i>	85.4	13
591	No	9/15/2015	615260	4785480	0	<i>Elliptio</i>	<i>complanata</i>	84.9	13
591	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	65.6	12
594	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	14.3	2
597	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	80.8	12
597	No	9/15/2015	615488	4785230	0	<i>Elliptio</i>	<i>complanata</i>	73.9	10
597	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	38.2	5
598	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	75.5	10
601	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	8.5	1
603	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	19.4	3
605	No	9/15/2015	615450	4785150	0	<i>Elliptio</i>	<i>complanata</i>	68.8	10
608	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	18.2	3
608	No	9/23/2015	615461	4785049	0	<i>Elliptio</i>	<i>complanata</i>	63.9	9
609	No	9/23/2015	615342	4784992	0	<i>Elliptio</i>	<i>complanata</i>	81.3	12
616	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	15.2	2
617	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	45.3	8
617	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	34.8	6
617	No	9/23/2015	615360	4784647	0	<i>Elliptio</i>	<i>complanata</i>	67.2	11
617	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	16.10	2
618	No	9/23/2015	615300	4784561	0	<i>Elliptio</i>	<i>complanata</i>	114.8	16
622	No	9/24/2015	615105	4784432	0	<i>Elliptio</i>	<i>complanata</i>	75.3	12
623	No	9/24/2015	615224	4784421	0	<i>Elliptio</i>	<i>complanata</i>	88.7	13
627	No	9/24/2015	615158	4784307	0	<i>Lampsilis</i>	<i>radiata</i>	45.70	7
628	No	9/24/2015	615067	4784300	0	<i>Lampsilis</i>	<i>radiata</i>	63.7	9
628	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	19.7	3
629	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	93.2	13
630	No	9/24/2015	615041	4784090	0	<i>Strophitus</i>	<i>undulatus</i>	29.6	5
632	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	80.7	12
633	No	9/24/2015	615119	4784038	0	<i>Elliptio</i>	<i>complanata</i>	66.7	10
633	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	36.8	5
633	No	9/24/2015	615123	4783846	0	<i>Elliptio</i>	<i>complanata</i>	68.6	11
633	No	9/24/2015	615132	4783849	0	<i>Elliptio</i>	<i>complanata</i>	82.5	13
634	No	9/24/2015	614967	4783801	0	<i>Elliptio</i>	<i>complanata</i>	67.8	11
636	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	28.9	4
637	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	40.1	6
638	No	9/24/2015	614969	4783610	0	<i>Elliptio</i>	<i>complanata</i>	89.5	13
638	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	68.1	10

638	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	45.0	5
639	No	9/24/2015	615018	4783556	0	<i>Elliptio</i>	<i>complanata</i>	70.7	12
639	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	9.4	1
640	No	9/24/2015	614970	4783519	0	no mussels	no mussels	no mussels	no mussels
640	No	10/2/2015	614244	4791230	0	<i>Elliptio</i>	<i>complanata</i>	95.5	15
640	No	10/2/2015	614244	4791230	0	<i>Elliptio</i>	<i>complanata</i>	8.7	1
640	No	10/2/2015	614710	4790811	0	<i>Elliptio</i>	<i>complanata</i>	93.0	14
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	23.1	3
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	82.9	13

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	80.8	12
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	76.0	11
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	85.8	14
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	64.6	9
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	79.1	12
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	79.1	12
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	95.2	15
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	71.4	10
640	No	9/15/2015	614502	4789649	0	<i>Elliptio</i>	<i>complanata</i>	81.0	12
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	20.2	3
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	16.3	2
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	14.6	2
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	76.2	13
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	94.6	16
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	89.0	14
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	82.7	13
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	77.2	12
640	No	9/15/2015	614451	4789590	0	<i>Elliptio</i>	<i>complanata</i>	88.3	14
640	No	9/15/2015	614451	4789590	0	no mussels	no mussels	no mussels	no mussels
640	No	9/16/2015	614170	4789350	0	<i>Elliptio</i>	<i>complanata</i>	94.4	13
640	No	9/16/2015	614170	4789350	0	<i>Elliptio</i>	<i>complanata</i>	77.5	12
640	No	9/16/2015	614170	4789350	0	<i>Elliptio</i>	<i>complanata</i>	90.3	14
640	No	9/16/2015	614170	4789350	0	<i>Elliptio</i>	<i>complanata</i>	86.1	12
640	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	88.4	14
640	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	78.4	11
640	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	46.0	6
641	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	38.7	4
642	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	34.4	4
643	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	32.6	4
644	No	9/16/2015	614268	4789309	0	<i>Elliptio</i>	<i>complanata</i>	22.1	3
644	No	9/16/2015	614140	4789288	0	<i>Elliptio</i>	<i>complanata</i>	85.8	13
644	No	9/16/2015	614140	4789288	0	<i>Elliptio</i>	<i>complanata</i>	71.5	12
644	No	9/16/2015	614001	4789130	0	<i>Elliptio</i>	<i>complanata</i>	82.7	12
644	No	9/16/2015	614001	4789130	0	<i>Elliptio</i>	<i>complanata</i>	81.6	11
644	No	9/16/2015	614001	4789130	0	<i>Elliptio</i>	<i>complanata</i>	86.0	13
645	No	9/16/2015	614001	4789130	0	<i>Elliptio</i>	<i>complanata</i>	76.0	11
646	No	9/16/2015	613979	4789069	0	<i>Elliptio</i>	<i>complanata</i>	80.6	13
647	No	9/16/2015	613979	4789069	0	<i>Elliptio</i>	<i>complanata</i>	76.5	12
647	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	17.4	2
648	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	32.2	4
649	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	24.6	3
650	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	28.4	3
651	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	30.4	4
652	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	29.3	4
653	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	35.0	4
653	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	38.5	5
653	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	46.5	6
653	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	92.8	13
653	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	76.2	10
654	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	79.9	10
654	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	76.8	10

654	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	72.7	8
655	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	84.6	11
655	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	60.1	8
656	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	71.3	9
656	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	75.9	10
656	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	71.2	11
657	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	75.7	10
658	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	83.4	12
659	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	79.8	10
659	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	67.4	8
659	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	83.6	12
660	No	9/17/2015	614000	4788885	0	<i>Elliptio</i>	<i>complanata</i>	84.6	12
661	No	9/17/2015	613969	4788870	0	<i>Elliptio</i>	<i>complanata</i>	30.9	4
662	No	9/17/2015	613969	4788870	0	<i>Elliptio</i>	<i>complanata</i>	82.6	14

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	74.9	11
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	79.8	12
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	82.6	12
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	80.1	11
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	80.0	12
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	83.0	12
680	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	76.4	12
681	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	80.5	12
681	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	90.7	14
681	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	86.2	14
681	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	79.0	10
681	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	82.9	12
682	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	83.6	13
683	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	88.2	14
684	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	83.2	12
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	89.6	13
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	80.6	12
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	82.0	12
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	89.2	13
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	87.6	13
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	86.6	13
685	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	92.1	15
686	No	9/22/2015	614915	4786970	0	<i>Elliptio</i>	<i>complanata</i>	96.2	15
686	No	9/22/2015	614821	4786889	0	<i>Elliptio</i>	<i>complanata</i>	73.8	10
686	No	9/22/2015	614821	4786889	0	<i>Elliptio</i>	<i>complanata</i>	81.8	12
686	No	9/22/2015	614821	4786889	0	<i>Elliptio</i>	<i>complanata</i>	76.0	12
686	No	9/22/2015	614821	4786889	0	<i>Elliptio</i>	<i>complanata</i>	83.9	12
686	No	9/22/2015	614821	4786889	0	<i>Elliptio</i>	<i>complanata</i>	77.5	11
686	No	9/22/2015	614829	4786711	0	<i>Elliptio</i>	<i>complanata</i>	81.8	13
686	No	9/22/2015	614829	4786711	0	<i>Elliptio</i>	<i>complanata</i>	46.8	6
686	No	9/22/2015	614829	4786711	0	<i>Elliptio</i>	<i>complanata</i>	29.4	4
687	No	9/22/2015	614829	4786711	0	<i>Elliptio</i>	<i>complanata</i>	21.5	3
688	No	9/22/2015	614950	4786690	0	<i>Elliptio</i>	<i>complanata</i>	86.5	13
689	No	9/22/2015	614950	4786690	0	<i>Elliptio</i>	<i>complanata</i>	110.1	20
690	No	9/22/2015	614831	4786640	0	<i>Elliptio</i>	<i>complanata</i>	85.6	12
691	No	9/22/2015	614989	4786569	0	<i>Elliptio</i>	<i>complanata</i>	92.9	13
692	No	9/22/2015	614989	4786569	0	<i>Elliptio</i>	<i>complanata</i>	99.8	14
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	85.4	12
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	97.5	13
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	76.0	12
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	85.9	14
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	67.2	10
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	77.3	12
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	81.3	12
692	No	9/23/2015	615240	4786111	0	<i>Elliptio</i>	<i>complanata</i>	83.7	13
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	86.7	12
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	80.6	11
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	81.9	12

692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	72.1	11
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	82.5	12
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	89.0	13
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	80.2	11
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	76.7	10
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	78.3	11
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	88.4	13
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	93.4	13
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	76.6	12
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	73.0	12
692	No	9/23/2015	615259	4786088	0	<i>Elliptio</i>	<i>complanata</i>	70.8	10
692	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	106.2	16
694	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	87.7	12
695	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	83.3	12
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	82.5	12
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	85.0	13
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	85.0	12

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	80.9	11
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	80.3	12
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	95.7	13
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	87.6	13
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	78.6	12
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	73.0	12
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	87.2	14
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	87.2	14
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	80.8	12
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	86.8	13
696	No	9/23/2015	615239	4785940	0	<i>Elliptio</i>	<i>complanata</i>	78.5	13
696	No	9/23/2015	615240	4785910	0	<i>Elliptio</i>	<i>complanata</i>	82.1	14
696	No	9/23/2015	615240	4785910	0	<i>Elliptio</i>	<i>complanata</i>	73.1	12
696	No	9/23/2015	615240	4785910	0	<i>Elliptio</i>	<i>complanata</i>	80.7	14
696	No	9/23/2015	615240	4785910	0	<i>Elliptio</i>	<i>complanata</i>	75.5	12
696	No	9/23/2015	615260	4785910	0	<i>Elliptio</i>	<i>complanata</i>	80.5	13
696	No	9/23/2015	615260	4785910	0	<i>Elliptio</i>	<i>complanata</i>	61.2	10
696	No	9/23/2015	615279	4785852	0	<i>Elliptio</i>	<i>complanata</i>	79.1	12
696	No	9/23/2015	615279	4785852	0	<i>Elliptio</i>	<i>complanata</i>	79.6	11
696	No	9/23/2015	615279	4785852	0	<i>Elliptio</i>	<i>complanata</i>	92.2	13
696	No	9/23/2015	615279	4785852	0	<i>Elliptio</i>	<i>complanata</i>	92.0	13
696	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	89.4	13
696	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	80.3	11
696	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	94.3	15
697	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	94.6	14
698	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	71.3	12
699	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	100.3	14
699	No	9/23/2015	615269	4785681	0	<i>Elliptio</i>	<i>complanata</i>	75.0	11
699	No	9/23/2015	615250	4785660	0	<i>Elliptio</i>	<i>complanata</i>	75.3	11
699	No	9/23/2015	615250	4785660	0	<i>Elliptio</i>	<i>complanata</i>	68.3	10
699	No	9/23/2015	615250	4785660	0	<i>Elliptio</i>	<i>complanata</i>	81.7	11
699	No	9/23/2015	615250	4785660	0	<i>Elliptio</i>	<i>complanata</i>	73.1	11
699	No	9/15/2015	615260	4785480	0	<i>Elliptio</i>	<i>complanata</i>	9.6	1
700	No	9/15/2015	615260	4785480	0	<i>Elliptio</i>	<i>complanata</i>	44.9	7
700	No	9/15/2015	615260	4785480	0	<i>Elliptio</i>	<i>complanata</i>	78.2	12
700	No	9/15/2015	615260	4785480	0	<i>Elliptio</i>	<i>complanata</i>	84.0	13
700	No	9/15/2015	615260	4785480	0	<i>Elliptio</i>	<i>complanata</i>	86.0	13
700	No	9/15/2015	615260	4785480	0	no mussels	no mussels	no mussels	no mussels
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	83.0	12
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	98.7	12
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	94.6	14
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	90.2	13
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	83.6	12
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	85.8	13

700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	84.6	13
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	68.1	9
700	No	9/15/2015	615300	4785480	0	<i>Elliptio</i>	<i>complanata</i>	71.7	10
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	24.6	4
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	27.0	5
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	42.9	7
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	93.9	14
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	85.7	12
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	80.9	13
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	68.2	12
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	74.2	14
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	78.1	12
700	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	80.8	14
701	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	68.4	12
702	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	80.6	13
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	75.8	12
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	65.8	9
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	76.7	10
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	77.6	12
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	81.1	12
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	65.2	9

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	56.7	8
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	84.8	12
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	67.3	10
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	70.4	10
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	79.6	12
703	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	84.1	13
704	No	9/15/2015	615215	4785310	0	<i>Elliptio</i>	<i>complanata</i>	92.3.	14
705	No	9/15/2015	615215	4785310	0	no mussels	no mussels	no mussels	no mussels
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	81.1	13
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	75.8	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	78.1	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	76.6	11
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	73.2	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	81.3	14
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	73.4	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	74.3	13
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	74.6	13
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	66.2	11
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	74.8	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	65.7	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	98.7	15
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	71.6	10
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	84.4	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	83.1	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	90.2	14
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	88.5	14
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	74.0	11
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	76.0	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	76.7	11
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	81.8	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	75.4	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	80.9	13
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	74.9	12
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	70.8	11
705	No	9/15/2015	615350	4785254	0	<i>Elliptio</i>	<i>complanata</i>	72.8	11
705	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	65.6	9
705	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	89.6	13
705	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	73.2	10
705	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	75.8	12
705	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	71.5	10
705	No	9/15/2015	615342	4785221	0	<i>Elliptio</i>	<i>complanata</i>	86.7	14

706	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	75.5	11
706	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	78.0	12
706	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	73.0	11
707	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	79.1	13
707	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	98.5	15
707	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	90.8	14
708	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	87.5	12
709	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	89.0	12
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	80.3	12
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	88.0	11
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	77.0	10
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	75.8	11
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	71.4	11
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	77.5	11
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	72.0	11
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	77.8	12
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	73.7	12
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	67.1	10
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	79.3	12
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	65.6	11
710	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	75.1	12
711	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	81.7	12
711	No	9/15/2015	615350	4785220	0	<i>Elliptio</i>	<i>complanata</i>	62.8	10
711	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	85.5	14

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
712	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	76.7	12
713	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	66.3	10
713	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	75.2	12
713	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	80.8	12
713	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	49.5	7
714	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	63.3	9
714	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	68.5	10
715	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	66.4	9
716	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	72.1	12
717	No	9/15/2015	615270	4785180	0	<i>Elliptio</i>	<i>complanata</i>	83.6	14
718	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	23.9	4
719	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	15.2	2
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	76.5	11
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	87.5	14
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	88.4	12
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	69.4	10
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	86.4	12
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	85.4	12
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	87.9	13
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	73.3	12
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	74.6	12
720	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	84.2	13
721	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	72.1	12
722	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	71.1	11
723	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	74.7	12
724	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	75.8	13
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	70.0	11
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	76.6	12
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	80.5	12
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	88.0	15
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	87.0	14
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	82.4	14
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	78.6	13
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	71.5	11
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	75.1	12
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	68.2	11
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	75.8	13

725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	70.5	12
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	59.4	11
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	66.8	11
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	67.3	12
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	68.0	12
725	No	9/15/2015	615421	4785164	0	<i>Elliptio</i>	<i>complanata</i>	74.3	13
725	No	9/15/2015	615450	4785150	0	<i>Elliptio</i>	<i>complanata</i>	85.3	12
725	No	9/15/2015	615450	4785150	0	<i>Elliptio</i>	<i>complanata</i>	90.8	13
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	19.8	3
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	38.1	5
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	85.9	12
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	67.1	10
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	63.8	9
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	67.1	10
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	72.2	11
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	82.3	13
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	81.3	12
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	81.6	13
725	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	73.4	11
726	No	9/23/2015	615420	4785100	0	<i>Elliptio</i>	<i>complanata</i>	70.0	11
727	No	9/23/2015	615461	4785049	0	<i>Elliptio</i>	<i>complanata</i>	76.9	13
727	No	9/23/2015	615461	4785049	0	<i>Elliptio</i>	<i>complanata</i>	75.8	13
727	No	9/23/2015	615342	4784992	0	<i>Elliptio</i>	<i>complanata</i>	84.5	14
727	No	9/23/2015	615342	4784992	0	<i>Elliptio</i>	<i>complanata</i>	85.9	14
727	No	9/23/2015	615342	4784992	0	<i>Elliptio</i>	<i>complanata</i>	89.7	14
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	80.1	13
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	66.4	10
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	77.8	12

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	79.9	13
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	76.7	13
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	72.5	10
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	71.6	12
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	64.8	10
727	No	9/23/2015	615470	4784900	0	<i>Elliptio</i>	<i>complanata</i>	68.9	11
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	66.8	10
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	75.3	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	77.6	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	66.8	11
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	76.5	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	80.2	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	84.1	14
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	83.1	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	79.7	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	83.7	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	69.8	9
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	79.7	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	88.2	14
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	78.4	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	86.2	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	71.8	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	76.4	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	88.2	14
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	73.5	11
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	92.2	14
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	78.5	13
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	72.0	12
727	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	71.2	13
728	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	88.2	14
729	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	70.1	13
730	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	94.6	14
731	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	79.7	13
732	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	79.8	13
732	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8

732	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	68.4	9
732	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	69.0	12
733	No	9/23/2015	615441	4784810	0	<i>Elliptio</i>	<i>complanata</i>	69.4	13
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	36.7	6
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	58.2	9
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	58.5	9
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	61.4	10
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	65.0	10
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	67.8	10
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	66.1	9
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	64.5	9
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	69.5	9
733	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	67.8	13
734	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	74.3	12
735	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	79.6	12
735	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	90.4	13
735	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	84.7	13
736	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	81.6	12
737	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	76.7	12
738	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	85.2	13
739	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	62.1	10
739	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	77.9	12
739	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	67.8	12
740	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	76.1	13
740	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	77.3	13
741	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	66.1	12
741	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	68.3	11
742	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	71.1	13
743	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	77.1	13
744	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	69.8	10
744	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	69.5	12

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
745	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	95.6	14
745	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	84.2	13
745	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	76.3	12
745	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	80.1	13
746	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	92.3	14
746	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	70.9	12
746	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	73.6	12
746	No	9/23/2015	615411	4784750	0	<i>Elliptio</i>	<i>complanata</i>	79.3	13
746	No	9/23/2015	615360	4784647	0	<i>Elliptio</i>	<i>complanata</i>	69.5	12
746	No	9/23/2015	615360	4784647	0	<i>Elliptio</i>	<i>complanata</i>	89.2	13
746	No	9/23/2015	615360	4784647	0	<i>Elliptio</i>	<i>complanata</i>	95.6	14
746	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	40.50	5
746	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	80.20	14
746	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	73.60	12
746	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	84.10	13
746	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	84.80	13
747	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	78.90	12
747	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	89.30	14
747	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	76.20	13
747	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	73.40	11
747	No	9/23/2015	615200	4784580	0	<i>Elliptio</i>	<i>complanata</i>	66.70	10
747	No	9/23/2015	615300	4784561	0	<i>Elliptio</i>	<i>complanata</i>	75.6	12
747	No	9/23/2015	615300	4784561	0	<i>Elliptio</i>	<i>complanata</i>	34.3	5
748	No	9/24/2015	615105	4784432	0	no mussels	no mussels	no mussels	no mussels
748	No	9/24/2015	615224	4784421	0	<i>Elliptio</i>	<i>complanata</i>	56.7	8
748	No	9/24/2015	615158	4784307	0	<i>Elliptio</i>	<i>complanata</i>	89.90	13
748	No	9/24/2015	615158	4784307	0	<i>Elliptio</i>	<i>complanata</i>	63.70	9
748	No	9/24/2015	615158	4784307	0	<i>Elliptio</i>	<i>complanata</i>	83.00	13
748	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	99.6	14
748	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	81.5	12

748	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	85.7	14
748	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	79.0	12
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	82.1	12
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	83.6	13
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	75.5	12
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	73.8	11
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	80.9	12
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	74.7	12
749	No	9/24/2015	615067	4784300	0	<i>Elliptio</i>	<i>complanata</i>	76.4	12
749	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	77.8	12
750	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	81.6	13
751	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	68.6	11
751	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	75.0	12
751	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	78.6	13
751	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	74.8	12
751	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	75.4	13
751	No	9/24/2015	615055	4784285	0	<i>Elliptio</i>	<i>complanata</i>	67.0	11
751	No	9/24/2015	615161	4784257	0	<i>Anodonta *</i>	<i>implicata</i>	85.9	15
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	85.8	12
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	81.4	12
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	81.7	13
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	71.9	11
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	70.6	10
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	78.0	12
751	No	9/24/2015	615161	4784257	0	<i>Elliptio</i>	<i>complanata</i>	84.3	14
752	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	80.3	13
752	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	10.1	1
752	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	87.8	13
752	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	88.6	13
753	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	87.9	13
754	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	78.4	12
754	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	81.9	12
754	No	9/24/2015	615041	4784090	0	<i>Elliptio</i>	<i>complanata</i>	82.3	12
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	71.1	11
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	77.8	12

* *Anodonta implicata* is synonymous with *Utterbackiana implicata*.

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	85.3	13
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	81.8	12
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	60.1	10
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	79.2	12
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	79.7	11
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	83.1	12
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	62.8	11
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	76.6	12
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	71.0	11
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	61.7	10
754	No	9/24/2015	615013	4784046	0	<i>Elliptio</i>	<i>complanata</i>	66.4	11
754	No	9/24/2015	615119	4784038	0	<i>Elliptio</i>	<i>complanata</i>	76.9	12
754	No	9/24/2015	615119	4784038	0	<i>Elliptio</i>	<i>complanata</i>	90.6	14
754	No	9/24/2015	615119	4784038	0	<i>Elliptio</i>	<i>complanata</i>	74.4	12
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	61.6	9
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	64.2	10
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	67.7	11
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	67.4	11
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	65.1	11
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	74.2	12
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	79.2	13
754	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	71.7	11
755	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	72.0	11
755	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	80.9	12
755	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	72.5	12

755	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	85.2	13
756	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	78.8	12
757	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	80.0	12
757	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	76.7	11
757	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	75.2	12
757	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	72.2	11
758	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	78.3	12
758	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	73.8	12
758	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	68.1	11
758	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	71.1	12
758	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	78.6	12
759	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	71.3	11
760	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	73.8	12
761	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	66.0	10
761	No	9/24/2015	615003	4783974	0	<i>Elliptio</i>	<i>complanata</i>	79.5	13
764	No	9/24/2015	615123	4783846	0	<i>Elliptio</i>	<i>complanata</i>	74.0	12
764	No	9/24/2015	615123	4783846	0	<i>Elliptio</i>	<i>complanata</i>	85.8	13
764	No	9/24/2015	615123	4783846	0	<i>Elliptio</i>	<i>complanata</i>	101.6	16
764	No	9/24/2015	615132	4783849	0	<i>Elliptio</i>	<i>complanata</i>	80.3	12
764	No	9/24/2015	615132	4783849	0	<i>Elliptio</i>	<i>complanata</i>	75.7	11
764	No	9/24/2015	615132	4783849	0	<i>Elliptio</i>	<i>complanata</i>	75.2	11
764	No	9/24/2015	615132	4783849	0	<i>Elliptio</i>	<i>complanata</i>	82.9	12
764	No	9/24/2015	614967	4783801	0	<i>Elliptio</i>	<i>complanata</i>	10.5	1
764	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	50.2	7
764	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	65.1	11
764	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	64.0	10
765	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	64.6	11
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	70.7	12
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	72.6	13
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	77.4	13
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	77.1	13
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	82.7	12
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	76.6	12
766	No	9/24/2015	614934	4783722	0	<i>Elliptio</i>	<i>complanata</i>	93.3	14
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	42.9	7
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	19.1	3
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	51.5	8
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	60.5	9
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	60.4	10
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	67.5	11

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	70.7	12
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	76.5	12
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	72.4	12
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	79.3	13
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	99.4	14
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	80.2	13
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	70.0	11
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	70.5	11
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	73.8	12
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	85.7	13
766	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	77.1	12
767	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	88.6	13
768	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	85.6	12
768	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	76.5	12
769	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	69.3	10
769	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	71.5	12
769	No	9/24/2015	614937	4783676	0	<i>Elliptio</i>	<i>complanata</i>	72.2	12
769	No	9/24/2015	614969	4783610	0	<i>Elliptio</i>	<i>complanata</i>	18.2	2
769	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	69.0	10
769	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	67.0	9
769	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	63.3	9

769	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	58.8	8
769	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	70.9	11
769	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	76.0	12
770	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	76.2	12
770	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	81.7	12
770	No	9/24/2015	614943	4783557	0	<i>Elliptio</i>	<i>complanata</i>	91.0	13
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	43.8	5
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	52.0	7
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	60.4	8
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	63.1	9
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	65.4	10
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	69.9	11
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	68.5	11
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	69.0	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	89.8	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	83.8	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	81.1	11
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	78.5	11
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	83.6	13
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	71.5	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	83.7	13
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	75.7	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	73.0	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	72.6	11
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	78.8	13
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	71.8	12
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	69.0	9
770	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	70.0	10
771	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	78.9	12
771	No	9/24/2015	614920	4783547	0	<i>Elliptio</i>	<i>complanata</i>	79.4	12
771	No	9/24/2015	615018	4783556	0	<i>Elliptio</i>	<i>complanata</i>	87.6	13
772	No	9/24/2015	615018	4783556	0	<i>Elliptio</i>	<i>complanata</i>	69.2	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	49.3	6
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	71.9	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	90.6	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	85.1	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	97.4	14
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	76.3	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	72.9	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	80.1	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	87.1	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	72.0	11
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	87.8	13

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	84.6	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	81.2	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	83.2	14
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	83.7	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	75.7	10
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	69.7	10
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	85.7	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	78.7	13
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	73.9	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	65.5	11
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	69.8	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	75.0	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	71.3	10
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	75.6	11
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	72.8	12
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	65.4	9
772	No	9/24/2015	614925	4783500	0	<i>Elliptio</i>	<i>complanata</i>	69.9	10
773	No	9/24/2015	614929	4783680	0	no mussels	no mussels	no mussels	no mussels

507	Yes	10/2/2015	614131	4791380	0	<i>Elliptio</i>	<i>complanata</i>	12.5	1
508	Yes	10/2/2015	614160	4791360	0	no mussels	no mussels	no mussels	no mussels
512	Yes	10/2/2015	614310	4791268	0	no mussels	no mussels	no mussels	no mussels
514	Yes	10/2/2015	614330	4791243	0	no mussels	no mussels	no mussels	no mussels
516	Yes	10/2/2015	614362	4791210	0	no mussels	no mussels	no mussels	no mussels
519	Yes	10/2/2015	614460	4791159	0	no mussels	no mussels	no mussels	no mussels
519	Yes	10/2/2015	614440	4791040	0	no mussels	no mussels	no mussels	no mussels
520	Yes	9/16/2015	614930	4790957	0	no mussels	no mussels	no mussels	no mussels
524	Yes	9/16/2015	614890	4790941	0	no mussels	no mussels	no mussels	no mussels
527	Yes	9/16/2015	614940	4790820	0	no mussels	no mussels	no mussels	no mussels
531	Yes	9/16/2015	614969	4790780	0	no mussels	no mussels	no mussels	no mussels
531	Yes	9/16/2015	614950	4790760	0	no mussels	no mussels	no mussels	no mussels
532	Yes	10/2/2015	614610	4790730	0	no mussels	no mussels	no mussels	no mussels
533	Yes	10/2/2015	614595	4790705	0	<i>Elliptio</i>	<i>complanata</i>	21.7	3
535	Yes	10/2/2015	614622	4790681	0	no mussels	no mussels	no mussels	no mussels
536	Yes	9/16/2015	615010	4790559	0	<i>Elliptio</i>	<i>complanata</i>	16.1	2
539	Yes	9/16/2015	615010	4790492	0	<i>Elliptio</i>	<i>complanata</i>	31.1	4
540	Yes	10/2/2015	614660	4790469	0	no mussels	no mussels	no mussels	no mussels
542	Yes	10/2/2015	614650	4790440	0	<i>Elliptio</i>	<i>complanata</i>	95.2	13
543	Yes	9/15/2015	614751	4790399	0	no mussels	no mussels	no mussels	no mussels
544	Yes	9/15/2015	614680	4790340	0	<i>Elliptio</i>	<i>complanata</i>	86.5	12
545	Yes	9/15/2015	614750	4790340	0	no mussels	no mussels	no mussels	no mussels
546	Yes	9/15/2015	614800	4790288	0	no mussels	no mussels	no mussels	no mussels
547	Yes	9/15/2015	614750	4790221	0	no mussels	no mussels	no mussels	no mussels
549	Yes	9/15/2015	614547	4789900	0	no mussels	no mussels	no mussels	no mussels
550	Yes	9/15/2015	614540	4789847	0	no mussels	no mussels	no mussels	no mussels
551	Yes	9/15/2015	614480	4789823	0	no mussels	no mussels	no mussels	no mussels
552	Yes	9/15/2015	614444	4789780	0	no mussels	no mussels	no mussels	no mussels
553	Yes	9/15/2015	614460	4789772	0	<i>Elliptio</i>	<i>complanata</i>	21.5	3
554	Yes	9/15/2015	614441	4789752	0	no mussels	no mussels	no mussels	no mussels
555	Yes	9/15/2015	614420	4789670	0	no mussels	no mussels	no mussels	no mussels
556	Yes	9/15/2015	614431	4789669	0	no mussels	no mussels	no mussels	no mussels
560	Yes	9/16/2015	614100	4789341	0	<i>Elliptio</i>	<i>complanata</i>	85.7	13
560	Yes	9/16/2015	613998	4789180	0	no mussels	no mussels	no mussels	no mussels
560	Yes	9/16/2015	613948	4789110	0	no mussels	no mussels	no mussels	no mussels
560	Yes	9/16/2015	613870	4789029	0	no mussels	no mussels	no mussels	no mussels
560	Yes	9/17/2015	614041	4789011	0	<i>Elliptio</i>	<i>complanata</i>	21.0	3
561	Yes	9/17/2015	613890	4788971	0	no mussels	no mussels	no mussels	no mussels
561	Yes	9/17/2015	613841	4788940	0	no mussels	no mussels	no mussels	no mussels
561	Yes	9/17/2015	613810	4788881	0	no mussels	no mussels	no mussels	no mussels
561	Yes	9/17/2015	613790	4788819	0	<i>Elliptio</i>	<i>complanata</i>	15.9	3
561	Yes	9/17/2015	613781	4788780	0	no mussels	no mussels	no mussels	no mussels
561	Yes	9/17/2015	613760	4788762	0	<i>Elliptio</i>	<i>complanata</i>	33.7	4
561	Yes	9/17/2015	613759	4788750	0	<i>Elliptio</i>	<i>complanata</i>	11.9	2
561	Yes	9/17/2015	613819	4788720	0	no mussels	no mussels	no mussels	no mussels
561	Yes	9/17/2015	613810	4788690	0	no mussels	no mussels	no mussels	no mussels
562	Yes	9/17/2015	613810	4788670	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
563	Yes	9/17/2015	613743	4788621	0	no mussels	no mussels	no mussels	no mussels
565	Yes	9/17/2015	613920	4788350	0	no mussels	no mussels	no mussels	no mussels
566	Yes	9/17/2015	613900	4788306	0	no mussels	no mussels	no mussels	no mussels
566	Yes	9/17/2015	613870	4788280	0	no mussels	no mussels	no mussels	no mussels
566	Yes	9/17/2015	613960	4788129	0	no mussels	no mussels	no mussels	no mussels
566	Yes	9/17/2015	613910	4788122	0	no mussels	no mussels	no mussels	no mussels
566	Yes	9/17/2015	613919	4788040	0	no mussels	no mussels	no mussels	no mussels
566	Yes	9/17/2015	613937	4788012	0	no mussels	no mussels	no mussels	no mussels
567	Yes	9/18/2015	614157	4787957	0	no mussels	no mussels	no mussels	no mussels
568	Yes	9/18/2015	614120	4787940	0	no mussels	no mussels	no mussels	no mussels
568	Yes	9/18/2015	614052	4787910	0	no mussels	no mussels	no mussels	no mussels
568	Yes	9/18/2015	614165	4787899	0	no mussels	no mussels	no mussels	no mussels
569	Yes	9/18/2015	614160	4787849	0	no mussels	no mussels	no mussels	no mussels
570	Yes	9/18/2015	614247	4787849	0	<i>Elliptio</i>	<i>complanata</i>	19.8	2

570	Yes	9/18/2015	614119	4787792	0	no mussels	no mussels	no mussels	no mussels
570	Yes	9/18/2015	614188	4787750	0	<i>Elliptio</i>	<i>complanata</i>	78.0	12
570	Yes	9/18/2015	614310	4787739	0	no mussels	no mussels	no mussels	no mussels
571	Yes	9/18/2015	614197	4787720	0	<i>Elliptio</i>	<i>complanata</i>	12.5	1
572	Yes	9/18/2015	614060	4787680	0	<i>Elliptio</i>	<i>complanata</i>	11.5	1
572	Yes	9/18/2015	614374	4787671	0	no mussels	no mussels	no mussels	no mussels
572	Yes	9/18/2015	614417	4787653	0	no mussels	no mussels	no mussels	no mussels
573	Yes	9/18/2015	614121	4787614	0	no mussels	no mussels	no mussels	no mussels
576	Yes	9/18/2015	614222	4787510	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/18/2015	614231	4787480	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/18/2015	614606	4787448	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/18/2015	614607	4787431	0	<i>Elliptio</i>	<i>complanata</i>	31.5	4
577	Yes	9/18/2015	614623	4787388	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/18/2015	614774	4787253	0	<i>Elliptio</i>	<i>complanata</i>	26.5	4
577	Yes	9/18/2015	614811	4787215	0	<i>Elliptio</i>	<i>complanata</i>	18.2	3
577	Yes	9/22/2015	614860	4787150	0	<i>Elliptio</i>	<i>complanata</i>	16.0	2
577	Yes	9/22/2015	614880	4787140	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614730	4787130	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614840	4787131	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614850	4787110	0	<i>Elliptio</i>	<i>complanata</i>	88.1	14
577	Yes	9/22/2015	614910	4787080	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614890	4787070	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614910	4787060	0	<i>Elliptio</i>	<i>complanata</i>	73.1	10
577	Yes	9/22/2015	614730	4787021	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614903	4787002	0	<i>Elliptio</i>	<i>complanata</i>	36.0	5
577	Yes	9/22/2015	614953	4786970	0	no mussels	no mussels	no mussels	no mussels
577	Yes	9/22/2015	614769	4786959	0	<i>Elliptio</i>	<i>complanata</i>	38.4	5
577	Yes	9/22/2015	614810	4786960	0	<i>Elliptio</i>	<i>complanata</i>	80.4	12
577	Yes	9/22/2015	614970	4786891	0	no mussels	no mussels	no mussels	no mussels
578	Yes	9/22/2015	614784	4786880	0	<i>Elliptio</i>	<i>complanata</i>	6.3	1
579	Yes	9/22/2015	614810	4786870	0	<i>Elliptio</i>	<i>complanata</i>	73.8	10
579	Yes	9/22/2015	615007	4786830	0	no mussels	no mussels	no mussels	no mussels
579	Yes	9/22/2015	614810	4786780	0	no mussels	no mussels	no mussels	no mussels
579	Yes	9/22/2015	614809	4786771	0	<i>Elliptio</i>	<i>complanata</i>	12.1	1
580	Yes	9/22/2015	614831	4786771	0	no mussels	no mussels	no mussels	no mussels
584	Yes	9/22/2015	614960	4786560	0	no mussels	no mussels	no mussels	no mussels
585	Yes	9/22/2015	615070	4786470	0	no mussels	no mussels	no mussels	no mussels
586	Yes	9/22/2015	615050	4786460	0	<i>Lampsilis</i>	<i>radiata</i>	30.2	5
587	Yes	9/23/2015	615080	4786380	0	<i>Elliptio</i>	<i>complanata</i>	18.6	2
588	Yes	9/23/2015	615140	4786300	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615160	4786292	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615180	4786285	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615150	4786240	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615181	4786210	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615319	4785960	0	<i>Elliptio</i>	<i>complanata</i>	17.6	2
588	Yes	9/23/2015	615323	4785950	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615125	4785940	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615290	4785940	0	no mussels	no mussels	no mussels	no mussels
588	Yes	9/23/2015	615300	4785921	0	no mussels	no mussels	no mussels	no mussels
589	Yes	9/23/2015	615150	4785750	0	<i>Elliptio</i>	<i>complanata</i>	85.6	12
589	Yes	9/23/2015	615090	4785730	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
589	Yes	9/23/2015	615310	4785659	0	no mussels	no mussels	no mussels	no mussels
589	Yes	10/1/2015	615060	4785610	0	no mussels	no mussels	no mussels	no mussels
590	Yes	10/1/2015	615061	4785502	0	no mussels	no mussels	no mussels	no mussels
591	Yes	9/15/2015	615170	4785459	0	<i>Elliptio</i>	<i>complanata</i>	5.1	1
591	Yes	10/1/2015	615040	4785420	0	no mussels	no mussels	no mussels	no mussels
591	Yes	10/1/2015	615120	4785415	0	no mussels	no mussels	no mussels	no mussels
592	Yes	9/15/2015	615320	4785394	0	<i>Elliptio</i>	<i>complanata</i>	17.5	3
593	Yes	9/15/2015	615353	4785330	0	<i>Elliptio</i>	<i>complanata</i>	15.6	3
595	Yes	10/1/2015	615025	4785250	0	no mussels	no mussels	no mussels	no mussels
596	Yes	10/1/2015	615050	4785240	0	no mussels	no mussels	no mussels	no mussels
597	Yes	9/15/2015	615250	4785230	0	<i>Elliptio</i>	<i>complanata</i>	85.0	13

599	Yes	9/15/2015	615440	4785222	0	no mussels	no mussels	no mussels	no mussels
600	Yes	9/15/2015	615451	4785190	0	<i>Elliptio</i>	<i>complanata</i>	14.0	2
602	Yes	9/15/2015	615470	4785169	0	<i>Elliptio</i>	<i>complanata</i>	69.0	12
604	Yes	9/15/2015	615480	4785159	0	<i>Elliptio</i>	<i>complanata</i>	16.1	2
606	Yes	9/15/2015	615470	4785152	0	no mussels	no mussels	no mussels	no mussels
607	Yes	10/1/2015	614969	4785121	0	no mussels	no mussels	no mussels	no mussels
608	Yes	9/23/2015	615530	4785010	0	no mussels	no mussels	no mussels	no mussels
610	Yes	9/23/2015	615480	4784990	0	<i>Elliptio</i>	<i>complanata</i>	13.4	1
611	Yes	10/1/2015	614921	4784980	0	no mussels	no mussels	no mussels	no mussels
612	Yes	10/1/2015	614910	4784940	0	no mussels	no mussels	no mussels	no mussels
613	Yes	10/1/2015	614960	4784939	0	no mussels	no mussels	no mussels	no mussels
614	Yes	10/1/2015	614980	4784940	0	no mussels	no mussels	no mussels	no mussels
615	Yes	10/1/2015	614920	4784910	0	no mussels	no mussels	no mussels	no mussels
617	Yes	9/23/2015	615510	4784890	0	no mussels	no mussels	no mussels	no mussels
617	Yes	9/23/2015	615500	4784881	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614919	4784871	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614939	4784860	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614881	4784760	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614940	4784741	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614921	4784690	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614940	4784690	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614930	4784661	0	no mussels	no mussels	no mussels	no mussels
617	Yes	10/1/2015	614920	4784561	0	no mussels	no mussels	no mussels	no mussels
619	Yes	10/1/2015	614950	4784540	0	no mussels	no mussels	no mussels	no mussels
620	Yes	10/1/2015	614950	4784530	0	no mussels	no mussels	no mussels	no mussels
621	Yes	10/1/2015	614943	4784490	0	no mussels	no mussels	no mussels	no mussels
621	Yes	9/24/2015	615147	4784484	0	<i>Elliptio</i>	<i>complanata</i>	73.2	12
624	Yes	10/1/2015	614959	4784399	0	no mussels	no mussels	no mussels	no mussels
625	Yes	10/1/2015	615011	4784381	0	no mussels	no mussels	no mussels	no mussels
626	Yes	9/24/2015	615075	4784338	0	<i>Elliptio</i>	<i>complanata</i>	21.8	3
631	Yes	9/24/2015	615133	4784081	0	no mussels	no mussels	no mussels	no mussels
633	Yes	9/24/2015	615181	4784010	0	<i>Elliptio</i>	<i>complanata</i>	13.2	1
633	Yes	9/24/2015	615170	4783916	0	<i>Elliptio</i>	<i>complanata</i>	74.5	12
633	Yes	9/24/2015	615008	4783873	0	<i>Elliptio</i>	<i>complanata</i>	9.9	1
633	Yes	9/24/2015	615148	4783807	0	no mussels	no mussels	no mussels	no mussels
633	Yes	9/24/2015	615163	4783810	0	no mussels	no mussels	no mussels	no mussels
635	Yes	9/24/2015	614993	4783786	0	no mussels	no mussels	no mussels	no mussels
636	Yes	9/24/2015	615140	4783774	0	no mussels	no mussels	no mussels	no mussels
638	Yes	9/24/2015	614968	4783660	0	no mussels	no mussels	no mussels	no mussels
665	Yes	9/17/2015	613790	4788819	0	<i>Elliptio</i>	<i>complanata</i>	9.4	1
672	Yes	9/22/2015	614860	4787150	0	<i>Elliptio</i>	<i>complanata</i>	20.8	3
675	Yes	9/22/2015	614910	4787060	0	<i>Elliptio</i>	<i>complanata</i>	12.0	1
677	Yes	9/22/2015	614903	4787002	0	<i>Elliptio</i>	<i>complanata</i>	78.4	12
686	Yes	9/22/2015	614810	4786870	0	<i>Elliptio</i>	<i>complanata</i>	79.4	13
692	Yes	9/22/2015	615050	4786460	0	<i>Elliptio</i>	<i>complanata</i>	9.9	1
692	Yes	9/22/2015	615050	4786460	0	<i>Elliptio</i>	<i>complanata</i>	12.0	1
692	Yes	9/23/2015	615319	4785960	0	<i>Elliptio</i>	<i>complanata</i>	32.2	5
696	Yes	9/23/2015	615150	4785750	0	<i>Elliptio</i>	<i>complanata</i>	79.6	12
725	Yes	9/15/2015	615480	4785159	0	<i>Elliptio</i>	<i>complanata</i>	75.9	12
725	Yes	9/15/2015	615480	4785159	0	<i>Elliptio</i>	<i>complanata</i>	70.9	11
727	Yes	9/23/2015	615480	4784990	0	<i>Elliptio</i>	<i>complanata</i>	16.9	2
747	Yes	9/24/2015	615147	4784484	0	<i>Elliptio</i>	<i>complanata</i>	11.5	1
747	Yes	9/24/2015	615147	4784484	0	<i>Elliptio</i>	<i>complanata</i>	10.5	1
748	Yes	9/24/2015	615075	4784338	0	<i>Elliptio</i>	<i>complanata</i>	80.1	12

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
762	Yes	9/24/2015	615170	4783916	0	<i>Elliptio</i>	<i>complanata</i>	16.9	3
763	Yes	9/24/2015	615170	4783916	0	<i>Elliptio</i>	<i>complanata</i>	14.7	2
764	Yes	9/24/2015	615170	4783916	0	<i>Elliptio</i>	<i>complanata</i>	10.7	1

Hudson River Natural Resource Trustees

Upper Hudson Freshwater Mussel Survey

Table 3. Fort Miller Pool Sampling Location and Field Mussel Data (2013 Pilot Study)

Hudson River - River Section 2 Fort Miller Pool

August-September 2013 ND = No data

Quad Number	Remedy Area	Date	Easting	Northing	Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
1	No	9/4/2013	4782750	614945	0	no mussels	no mussels	no mussels	no mussels
4	No	9/4/2013	4782700	614980	0	no mussels	no mussels	no mussels	no mussels
5	No	8/21/2013	4782670	615240	0	no mussels	no mussels	no mussels	no mussels
6	No	9/4/2013	4782616	614910	0	no mussels	no mussels	no mussels	no mussels
8	No	8/21/2013	4782612	615212	0	<i>Lampsilis</i>	<i>cariosa</i>	82.1	11
8	No	8/21/2013	4782612	615212	0	<i>Elliptio</i>	<i>complanata</i>	69.6	7
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	86.3	9
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	71.6	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	65.9	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	83.8	10
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	75.3	7
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	64.6	7
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	84.5	9
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	65.4	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	81.9	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	68.7	7
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	88.0	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	83.8	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	88.4	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	80.4	10
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	68.7	7
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	88.4	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	58.9	4
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	91.1	8
9	No	8/21/2013	4782571	615217	0	<i>Elliptio</i>	<i>complanata</i>	87.1	7
9	No	8/21/2013	4782571	615217	0	<i>Lampsilis</i>	<i>radiata</i>	53.6	6
10	No	8/21/2013	4782574	615268	0	<i>Elliptio</i>	<i>complanata</i>	85.6	9
10	No	8/21/2013	4782574	615268	0	<i>Elliptio</i>	<i>complanata</i>	87.0	9
10	No	8/21/2013	4782574	615268	0	<i>Elliptio</i>	<i>complanata</i>	79.9	6
10	No	8/21/2013	4782574	615268	0	<i>Elliptio</i>	<i>complanata</i>	39.9	2
11	No	8/21/2013	4782532	615267	0	<i>Elliptio</i>	<i>complanata</i>	90.1	10
11	No	8/21/2013	4782532	615267	0	<i>Elliptio</i>	<i>complanata</i>	57.3	6
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	93.6	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	73.0	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	60.6	7
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	92.0	9
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	78.4	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	66.8	7
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	24.1	3
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	80.2	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	84.7	7
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	74.0	9
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	78.3	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	83.8	10
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	85.5	10
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	77.5	10
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	75.9	10
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	95.8	9
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	87.1	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	78.5	7
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	80.5	9
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	70.7	8
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	80.9	10
13	No	8/21/2013	4782420	615209	0	<i>Elliptio</i>	<i>complanata</i>	77.0	9
15	No	8/21/2013	4782368	615177	0	<i>Elliptio</i>	<i>complanata</i>	71.6	8
15	No	8/21/2013	4782368	615177	0	<i>Elliptio</i>	<i>complanata</i>	35.3	3
15	No	8/21/2013	4782368	615177	0	<i>Elliptio</i>	<i>complanata</i>	27.6	2

16	No	8/21/2013	4782367	615218	0	<i>Elliptio</i>	<i>complanata</i>	73.7	7
16	No	8/21/2013	4782367	615218	0	<i>Elliptio</i>	<i>complanata</i>	61.4	7
16	No	8/21/2013	4782367	615218	0	<i>Elliptio</i>	<i>complanata</i>	72.7	8
16	No	8/21/2013	4782367	615218	0	<i>Elliptio</i>	<i>complanata</i>	83.4	10
16	No	8/21/2013	4782367	615218	0	<i>Elliptio</i>	<i>complanata</i>	85.2	11
17	No	9/4/2013	4782348	614959	0	<i>Elliptio</i>	<i>complanata</i>	58.0	5

Quad Number	Remedy Area	Date	Easting	Northing	Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
17	No	9/4/2013	4782348	614959	0	<i>Elliptio</i>	<i>complanata</i>	30.7	3
20	No	9/4/2013	4782331	614931	0	no mussels	no mussels	no mussels	no mussels
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	93.5	8
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	77.4	9
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	52.6	6
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	100.6	9
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	68.0	6
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	55.5	5
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	89.5	8
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	54.8	5
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	89.9	10
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	58.6	9
21	No	8/21/2013	4782337	615267	0	<i>Elliptio</i>	<i>complanata</i>	57.4	6
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	85.6	6
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	67.0	7
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	52.8	4
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	98.4	8
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	71.1	7
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	52.0	4
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	84.8	11
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	74.3	9
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	84.2	8
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	78.3	7
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	83.3	8
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	89.5	10
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	82.5	9
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	67.2	5
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	66.6	7
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	85.8	6
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	77.6	9
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	63.7	5
23	No	8/21/2013	4782285	615304	0	<i>Elliptio</i>	<i>complanata</i>	74.6	7
26	No	9/4/2013	4782241	614941	0	no mussels	no mussels	no mussels	no mussels
33	No	8/21/2013	4782175	615286	0	<i>Elliptio</i>	<i>complanata</i>	87.6	9
33	No	8/21/2013	4782175	615286	0	<i>Elliptio</i>	<i>complanata</i>	78.3	6
33	No	8/21/2013	4782175	615286	0	<i>Elliptio</i>	<i>complanata</i>	87.7	10
33	No	8/21/2013	4782175	615286	0	<i>Elliptio</i>	<i>complanata</i>	61.6	4
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	94.3	8
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	75.7	7
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	73.6	7
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	93.5	9
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	72.5	8
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	43.1	3
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	83.2	10
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	78.7	8
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	80.5	8
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	79.5	7
34	No	8/21/2013	4782155	615360	0	<i>Elliptio</i>	<i>complanata</i>	78.2	8
37	No	9/4/2013	4782139	615080	0	<i>Elliptio</i>	<i>complanata</i>	85.3	7
37	No	9/4/2013	4782139	615080	0	<i>Elliptio</i>	<i>complanata</i>	80.1	5

37	No	9/4/2013	4782139	615080	0	<i>Elliptio</i>	<i>complanata</i>	80.2	6
38	No	9/4/2013	4782111	615040	0	<i>Elliptio</i>	<i>complanata</i>	84.5	6
38	No	9/4/2013	4782111	615040	0	<i>Elliptio</i>	<i>complanata</i>	65.7	5
39	No	8/21/2013	4782115	615325	0	<i>Elliptio</i>	<i>complanata</i>	78.7	8
39	No	8/21/2013	4782115	615325	0	<i>Elliptio</i>	<i>complanata</i>	55.3	5
41	No	8/21/2013	4782081	615297	0	<i>Elliptio</i>	<i>complanata</i>	68.1	8
41	No	8/21/2013	4782081	615297	0	<i>Elliptio</i>	<i>complanata</i>	60.7	7
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	59.6	5
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	66.1	6
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	67.8	6
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	87.7	6
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	67.4	5
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	77.6	5
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	72.5	5
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	75.9	6
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	74.7	6
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	70.8	5
42	No	9/4/2013	4782060	615070	0	<i>Elliptio</i>	<i>complanata</i>	78.5	6

Hudson River Natural Resource Trustees

2015 Upper Hudson Freshwater Mussel Survey

Table 4. Northumberland Pool Sampling Location and Field Mussel Data (2015 Surveys)

Hudson River - River Section 2 Northumberland Pool

August-September 2015

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
249	No	9/8/2015	615319	4779502	0	no mussels	no mussels	no mussels	no mussels
250	No	8/26/2015	615402	4779491	0	no mussels	no mussels	no mussels	no mussels
265	No	9/8/2015	615200	4779320	0	no mussels	no mussels	no mussels	no mussels
266	No	8/27/2015	615338	4779320	0	no mussels	no mussels	no mussels	no mussels
268	No	8/27/2015	615281	4779271	0	no mussels	no mussels	no mussels	no mussels
273	No	8/27/2015	615230	4779221	0	no mussels	no mussels	no mussels	no mussels
287	No	8/27/2015	615279	4779133	0	no mussels	no mussels	no mussels	no mussels
288	No	8/27/2015	615372	4779132	0	no mussels	no mussels	no mussels	no mussels
323	No	8/28/2015	615610	4778853	0	no mussels	no mussels	no mussels	no mussels
328	No	9/10/2015	615250	4778737	0	no mussels	no mussels	no mussels	no mussels
353	No	9/9/2015	614980	4778110	0	no mussels	no mussels	no mussels	no mussels
355	No	9/9/2015	615038	4777990	0	no mussels	no mussels	no mussels	no mussels
385	No	9/3/2015	614711	4777123	0	no mussels	no mussels	no mussels	no mussels
461	No	9/2/2015	615029	4775980	0	no mussels	no mussels	no mussels	no mussels
472	No	9/2/2015	615111	4775785	0	no mussels	no mussels	no mussels	no mussels
489	No	9/3/2015	615585	4774336	0	no mussels	no mussels	no mussels	no mussels
254	Yes	8/26/2015	615511	4779448	0	no mussels	no mussels	no mussels	no mussels
271	Yes	8/26/2015	615510	4779250	0	no mussels	no mussels	no mussels	no mussels
275	Yes	8/26/2015	615540	4779210	0	no mussels	no mussels	no mussels	no mussels
279	Yes	8/26/2015	615546	4779190	0	no mussels	no mussels	no mussels	no mussels
281	Yes	8/26/2015	615550	4779180	0	no mussels	no mussels	no mussels	no mussels
289	Yes	8/27/2015	615580	4779126	0	no mussels	no mussels	no mussels	no mussels
290	Yes	8/27/2015	615628	4779128	0	no mussels	no mussels	no mussels	no mussels
291	Yes	8/27/2015	615478	4779110	0	no mussels	no mussels	no mussels	no mussels
292	Yes	8/27/2015	615580	4779110	0	no mussels	no mussels	no mussels	no mussels
294	Yes	8/27/2015	615580	4779100	0	no mussels	no mussels	no mussels	no mussels
298	Yes	8/27/2015	615511	4779082	0	no mussels	no mussels	no mussels	no mussels
301	Yes	8/28/2015	615520	4779060	0	no mussels	no mussels	no mussels	no mussels
302	Yes	8/28/2015	615642	4779060	0	no mussels	no mussels	no mussels	no mussels
306	Yes	8/28/2015	615580	4779050	0	no mussels	no mussels	no mussels	no mussels
307	Yes	8/28/2015	615590	4779050	0	no mussels	no mussels	no mussels	no mussels
309	Yes	8/28/2015	615645	4779040	0	no mussels	no mussels	no mussels	no mussels
313	Yes	8/28/2015	615580	4779030	0	no mussels	no mussels	no mussels	no mussels
314	Yes	8/28/2015	615508	4778992	0	no mussels	no mussels	no mussels	no mussels
316	Yes	8/28/2015	615491	4778971	0	no mussels	no mussels	no mussels	no mussels
317	Yes	8/28/2015	615520	4778969	0	no mussels	no mussels	no mussels	no mussels
319	Yes	8/28/2015	615590	4778881	0	no mussels	no mussels	no mussels	no mussels
320	Yes	8/28/2015	615530	4778870	0	no mussels	no mussels	no mussels	no mussels
335	Yes	9/10/2015	615447	4778573	0	no mussels	no mussels	no mussels	no mussels
345	Yes	9/10/2015	615392	4778410	0	no mussels	no mussels	no mussels	no mussels
347	Yes	9/10/2015	615380	4778376	0	no mussels	no mussels	no mussels	no mussels
356	Yes	9/9/2015	615049	4777991	0	no mussels	no mussels	no mussels	no mussels
361	Yes	9/9/2015	614990	4777857	0	no mussels	no mussels	no mussels	no mussels
367	Yes	9/9/2015	614850	4777640	0	no mussels	no mussels	no mussels	no mussels
374	Yes	9/9/2015	614709	4777290	0	no mussels	no mussels	no mussels	no mussels
375	Yes	9/9/2015	614691	4777280	0	no mussels	no mussels	no mussels	no mussels
378	Yes	9/9/2015	614710	4777260	0	no mussels	no mussels	no mussels	no mussels

387	Yes	9/3/2015	614681	4777091	0	no mussels	no mussels	no mussels	no mussels
388	Yes	9/3/2015	614708	4777080	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
393	Yes	9/3/2015	614700	4777009	0	no mussels	no mussels	no mussels	no mussels
400	Yes	8/31/2015	614692	4776870	0	no mussels	no mussels	no mussels	no mussels
402	Yes	8/31/2015	614648	4776841	0	no mussels	no mussels	no mussels	no mussels
406	Yes	8/31/2015	614698	4776771	0	no mussels	no mussels	no mussels	no mussels
407	Yes	8/31/2015	614610	4776743	0	no mussels	no mussels	no mussels	no mussels
409	Yes	8/31/2015	614725	4776692	0	no mussels	no mussels	no mussels	no mussels
410	Yes	8/31/2015	614676	4776680	0	no mussels	no mussels	no mussels	no mussels
417	Yes	8/31/2015	614751	4776498	0	no mussels	no mussels	no mussels	no mussels
418	Yes	8/31/2015	614785	4776498	0	no mussels	no mussels	no mussels	no mussels
419	Yes	8/31/2015	614700	4776474	0	no mussels	no mussels	no mussels	no mussels
420	Yes	8/31/2015	614680	4776428	0	no mussels	no mussels	no mussels	no mussels
421	Yes	8/31/2015	614764	4776420	0	no mussels	no mussels	no mussels	no mussels
423	Yes	8/31/2015	614854	4776383	0	no mussels	no mussels	no mussels	no mussels
425	Yes	8/31/2015	614840	4776373	0	no mussels	no mussels	no mussels	no mussels
429	Yes	9/1/2015	614743	4776339	0	no mussels	no mussels	no mussels	no mussels
432	Yes	9/1/2015	614811	4776301	0	no mussels	no mussels	no mussels	no mussels
433	Yes	9/1/2015	614818	4776297	0	no mussels	no mussels	no mussels	no mussels
435	Yes	9/1/2015	614823	4776260	0	no mussels	no mussels	no mussels	no mussels
442	Yes	9/1/2015	615044	4776162	0	no mussels	no mussels	no mussels	no mussels
443	Yes	9/1/2015	615055	4776157	0	no mussels	no mussels	no mussels	no mussels
445	Yes	9/1/2015	615076	4776133	0	no mussels	no mussels	no mussels	no mussels
448	Yes	9/1/2015	615071	4776110	0	no mussels	no mussels	no mussels	no mussels
450	Yes	9/1/2015	615048	4776097	0	no mussels	no mussels	no mussels	no mussels
452	Yes	9/1/2015	615087	4776088	0	no mussels	no mussels	no mussels	no mussels
457	Yes	9/2/2015	614990	4776034	0	no mussels	no mussels	no mussels	no mussels
458	Yes	9/2/2015	615000	4776022	0	no mussels	no mussels	no mussels	no mussels
462	Yes	9/2/2015	615061	4775979	0	no mussels	no mussels	no mussels	no mussels
463	Yes	9/2/2015	615060	4775958	0	no mussels	no mussels	no mussels	no mussels
465	Yes	9/2/2015	615090	4775901	0	no mussels	no mussels	no mussels	no mussels
467	Yes	9/2/2015	615092	4775871	0	no mussels	no mussels	no mussels	no mussels
468	Yes	9/2/2015	615100	4775862	0	no mussels	no mussels	no mussels	no mussels
469	Yes	9/2/2015	615122	4775860	0	no mussels	no mussels	no mussels	no mussels
473	Yes	9/2/2015	614928	4775778	0	no mussels	no mussels	no mussels	no mussels
475	Yes	9/2/2015	614928	4775710	0	no mussels	no mussels	no mussels	no mussels
476	Yes	9/2/2015	614911	4775711	0	no mussels	no mussels	no mussels	no mussels
482	Yes	9/3/2015	615539	4774477	0	no mussels	no mussels	no mussels	no mussels
483	Yes	9/3/2015	615508	4774474	0	no mussels	no mussels	no mussels	no mussels
484	Yes	9/3/2015	615544	4774466	0	no mussels	no mussels	no mussels	no mussels
243	No	9/8/2015	615360	4779584	0	<i>Elliptio</i>	<i>complanata</i>	18.8	3
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	90.5	13
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	80.5	11
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	88.5	13
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	76.2	10
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	76.3	11
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	75.0	10
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	69.1	8
244	No	9/8/2015	615350	4779572	0	<i>Elliptio</i>	<i>complanata</i>	62.0	7
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	49.1	6
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	59.6	7
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	74.9	9
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	75.1	9
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	76.9	10
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	73.3	9

246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	74.0	11
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	82.1	12

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	81.4	11
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	85.5	12
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	82.6	12
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	79.1	11
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	91.8	13
246	No	8/26/2015	615473	4779531	0	<i>Elliptio</i>	<i>complanata</i>	89.2	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	43.1	6
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	55.7	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	55.6	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	70.7	9
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	71.9	9
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	73.2	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	70.9	9
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	72.6	9
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	76.7	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	81.0	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	80.2	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	83.2	13
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	85.7	13
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	81.6	11
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	84.8	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	96.1	15
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	62.2	8
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	59.6	8
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	65.0	9
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	74.7	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	78.9	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	82.0	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	16.6	3
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	35.7	5
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	43.1	6
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	49.2	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	47.5	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	53.6	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	53.5	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	58.7	8
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	62.8	9
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	66.7	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	58.8	7
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	73.5	11
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	72.3	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	101.3	17
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	83.3	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	85.4	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	88.0	13
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	87.1	14
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	89.0	13
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	86.5	13
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	76.0	11
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	80.5	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	71.5	11
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	76.0	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	73.9	12

247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	74.8	11
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	73.4	11

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	74.7	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	73.8	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	66.9	10
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	78.1	11
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	77.2	12
247	No	8/26/2015	615471	4779508	0	<i>Elliptio</i>	<i>complanata</i>	76.8	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	19.6	3
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	20.3	3
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	32.1	5
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	39.4	5
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	43.7	7
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	49.0	7
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	50.2	8
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	53.2	8
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	67.4	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	62.9	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	67.7	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	72.1	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	68.8	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	65.5	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	74.6	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	63.9	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	66.0	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	69.0	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	67.4	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	70.2	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	75.2	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	70.8	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	61.5	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	66.9	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	73.1	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	69.7	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	59.4	7
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	72.8	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	61.6	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	64.4	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	60.0	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	85.6	13
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	81.3	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	87.9	13
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	92.9	13
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	85.1	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	79.3	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	77.0	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	77.5	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	78.0	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	71.7	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	64.3	8
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	66.5	9
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	64.2	8

248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	74.5	10
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	73.2	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	78.0	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	79.2	13

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	74.0	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	82.1	13
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	78.4	13
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	86.0	14
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	85.7	13
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	73.6	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	76.6	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	76.1	11
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	75.4	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	77.4	12
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	65.6	8
248	No	8/26/2015	615481	4779506	0	<i>Elliptio</i>	<i>complanata</i>	62.9	9
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	60.6	8
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	64.8	9
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	72.2	10
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	71.2	10
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	68.8	10
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	83.4	11
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	10.9	2
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	38.8	5
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	60.2	8
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	60.3	8
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	74.0	10
251	No	9/8/2015	615148	4779460	0	<i>Elliptio</i>	<i>complanata</i>	74.8	11
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	40.8	7
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	41.5	7
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	59.5	8
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	58.7	8
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	67.7	9
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	64.9	10
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	61.5	9
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	70.9	9
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	72.2	11
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	82.0	13
252	No	8/26/2015	615373	4779459	0	<i>Elliptio</i>	<i>complanata</i>	82.8	14
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	67.6	11
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	89.2	13
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	85.8	12
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	94.5	14
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	88.4	12
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	87.8	13
255	No	8/26/2015	615404	4779452	0	<i>Elliptio</i>	<i>complanata</i>	77.4	12
259	No	8/26/2015	615529	4779392	0	<i>Elliptio</i>	<i>complanata</i>	6.7	1
259	No	8/26/2015	615529	4779392	0	<i>Elliptio</i>	<i>complanata</i>	66.4	9
259	No	8/26/2015	615529	4779392	0	<i>Elliptio</i>	<i>complanata</i>	78.6	9
259	No	8/26/2015	615529	4779392	0	<i>Elliptio</i>	<i>complanata</i>	10.9	1
259	No	8/26/2015	615529	4779392	0	<i>Elliptio</i>	<i>complanata</i>	47.2	6
259	No	8/26/2015	615529	4779392	0	<i>Elliptio</i>	<i>complanata</i>	69.5	9
261	No	9/8/2015	615230	4779321	0	<i>Elliptio</i>	<i>complanata</i>	54.6	7
262	No	9/8/2015	615149	4779351	0	<i>Elliptio</i>	<i>complanata</i>	14.4	2
262	No	9/8/2015	615149	4779351	0	<i>Elliptio</i>	<i>complanata</i>	76.4	9

262	No	9/8/2015	615149	4779351	0	<i>Elliptio</i>	<i>complanata</i>	57.2	7
270	No	8/27/2015	615390	4779260	0	<i>Elliptio</i>	<i>complanata</i>	78.3	9
272	No	8/27/2015	615220	4779231	0	<i>Elliptio</i>	<i>complanata</i>	76.9	10
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	58.0	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	78.7	9
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	76.9	10
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	80.5	10
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	86.6	12
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	87.2	12
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	93.6	13
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	83.7	10
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	85.0	12
277	No	8/27/2015	615310	4779191	0	<i>Elliptio</i>	<i>complanata</i>	82.4	9
285	No	8/27/2015	615248	4779140	0	<i>Elliptio</i>	<i>complanata</i>	76.9	10
295	No	8/27/2015	615260	4779090	0	<i>Elliptio</i>	<i>complanata</i>	67.0	9
295	No	8/27/2015	615260	4779090	0	<i>Elliptio</i>	<i>complanata</i>	67.1	8
295	No	8/27/2015	615260	4779090	0	<i>Elliptio</i>	<i>complanata</i>	69.6	9
295	No	8/27/2015	615260	4779090	0	<i>Elliptio</i>	<i>complanata</i>	71.0	10
297	No	8/27/2015	615379	4779079	0	<i>Elliptio</i>	<i>complanata</i>	71.5	9
299	No	8/27/2015	615339	4779072	0	<i>Elliptio</i>	<i>complanata</i>	48.1	6
299	No	8/27/2015	615339	4779072	0	<i>Elliptio</i>	<i>complanata</i>	58.3	6
299	No	8/27/2015	615339	4779072	0	<i>Elliptio</i>	<i>complanata</i>	62.6	8
299	No	8/27/2015	615339	4779072	0	<i>Elliptio</i>	<i>complanata</i>	76.2	9
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	63.1	8
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	58.1	8
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	63.0	8
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	71.3	10
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	68.9	8
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	76.3	11
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	75.2	9
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	78.6	12
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	72.7	8
300	No	8/27/2015	615270	4779059	0	<i>Elliptio</i>	<i>complanata</i>	88.5	12
308	No	9/10/2015	615341	4779041	0	<i>Elliptio</i>	<i>complanata</i>	45.1	5
308	No	9/10/2015	615341	4779041	0	<i>Elliptio</i>	<i>complanata</i>	68.8	10
308	No	9/10/2015	615341	4779041	0	<i>Elliptio</i>	<i>complanata</i>	68.6	10
308	No	9/10/2015	615341	4779041	0	<i>Elliptio</i>	<i>complanata</i>	70.1	10
308	No	9/10/2015	615341	4779041	0	<i>Elliptio</i>	<i>complanata</i>	83.3	12
310	No	9/10/2015	615332	4779030	0	<i>Elliptio</i>	<i>complanata</i>	29.9	4
310	No	9/10/2015	615332	4779030	0	<i>Elliptio</i>	<i>complanata</i>	53.3	7
310	No	9/10/2015	615332	4779030	0	<i>Elliptio</i>	<i>complanata</i>	70.5	10
310	No	9/10/2015	615332	4779030	0	<i>Elliptio</i>	<i>complanata</i>	94.0	12
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	63.5	8
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	65.8	9
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	71.8	9
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	74.7	10
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	77.5	10
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	64.6	10
311	No	9/10/2015	615360	4779030	0	<i>Elliptio</i>	<i>complanata</i>	83.1	11
315	No	9/10/2015	615300	4778980	0	<i>Elliptio</i>	<i>complanata</i>	64.0	8
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	81.6	10
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	85.9	12
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	79.2	10
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	73.9	10

318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	73.4	10
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	63.2	9
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	50.3	6
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	45.1	6
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	62.9	10

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	58.5	9
318	No	9/10/2015	615310	4778910	0	<i>Elliptio</i>	<i>complanata</i>	67.4	10
321	No	8/28/2015	615550	4778870	0	<i>Elliptio</i>	<i>complanata</i>	59.9	7
324	No	8/28/2015	615501	4778840	0	<i>Elliptio</i>	<i>complanata</i>	11.7	1
324	No	8/28/2015	615501	4778840	0	<i>Elliptio</i>	<i>complanata</i>	57.0	8
324	No	8/28/2015	615501	4778840	0	<i>Elliptio</i>	<i>complanata</i>	60.5	9
324	No	8/28/2015	615501	4778840	0	<i>Elliptio</i>	<i>complanata</i>	78.4	9
325	No	8/28/2015	615490	4778830	0	<i>Elliptio</i>	<i>complanata</i>	61.6	9
325	No	8/28/2015	615490	4778830	0	<i>Elliptio</i>	<i>complanata</i>	66.2	10
325	No	8/28/2015	615490	4778830	0	<i>Elliptio</i>	<i>complanata</i>	72.2	11
325	No	8/28/2015	615490	4778830	0	<i>Elliptio</i>	<i>complanata</i>	69.3	10
325	No	8/28/2015	615490	4778830	0	<i>Elliptio</i>	<i>complanata</i>	68.7	12
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	32.6	5
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	39.2	6
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	41.3	6
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	64.5	8
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	68.2	10
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	64.0	8
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	70.1	10
326	No	8/28/2015	615618	4778834	0	<i>Elliptio</i>	<i>complanata</i>	96.0	13
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	47.7	7
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	50.9	8
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	58.5	9
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	63.0	9
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	73.4	10
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	76.6	10
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	71.3	9
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	76.3	11
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	76.4	11
327	No	9/10/2015	615440	4778780	0	<i>Elliptio</i>	<i>complanata</i>	89.2	13
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	31.5	4
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	46.5	7
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	46.5	7
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	54.7	9
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	52.7	8
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	60.3	9
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	65.1	9
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	61.4	9
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	61.0	9
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	70.6	10
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	79.9	11
329	No	9/10/2015	615271	4778731	0	<i>Elliptio</i>	<i>complanata</i>	78.0	11
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	37.4	5
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	53.8	8
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	58.9	9
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	68.2	10
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	79.5	12
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	82.9	13

330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	79.0	11
330	No	9/10/2015	615370	4778701	0	<i>Elliptio</i>	<i>complanata</i>	82.1	12
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	50.5	7
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	70.2	10
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	77.5	11
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	68.7	8
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	73.6	10

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	84.8	12
331	No	8/28/2015	615520	4778681	0	<i>Elliptio</i>	<i>complanata</i>	53.7	7
332	No	9/10/2015	615240	4778650	0	<i>Elliptio</i>	<i>complanata</i>	68.0	9
332	No	9/10/2015	615240	4778650	0	<i>Elliptio</i>	<i>complanata</i>	65.0	9
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	99.4	14
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	79.7	12
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	75.9	11
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	77.8	12
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	72.9	11
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	70.7	11
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	75.4	12
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	60.9	8
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	71.4	9
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	70.8	10
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	69.6	9
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	71.1	11
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	73.6	12
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	69.0	9
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	58.6	9
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	55.6	8
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	69.1	10
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	61.6	8
333	No	9/10/2015	615360	4778640	0	<i>Elliptio</i>	<i>complanata</i>	55.9	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	43.2	5
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	38.5	5
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	56.6	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	53.4	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	58.0	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	57.9	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	64.5	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	62.1	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	61.8	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	63.5	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	60.0	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	63.6	10
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	64.9	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	72.2	10
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	88.9	13
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	82.9	12
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	75.8	10
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	77.1	11
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	68.8	11
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	73.1	12
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	70.2	11
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	63.7	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	60.4	8

334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	71.7	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	73.7	10
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	69.9	10
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	72.9	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	65.6	6
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	63.0	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	58.9	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	57.8	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	81.0	10

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	79.9	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	75.4	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	63.9	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	69.7	10
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	65.3	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	67.3	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	72.5	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	61.5	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	56.6	5
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	63.5	9
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	58.6	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	61.4	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	68.0	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	64.8	8
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	53.8	7
334	No	9/10/2015	615450	4778587	0	<i>Elliptio</i>	<i>complanata</i>	59.5	8
336	No	9/10/2015	615430	4778560	0	<i>Elliptio</i>	<i>complanata</i>	24.1	3
336	No	9/10/2015	615430	4778560	0	<i>Elliptio</i>	<i>complanata</i>	69.2	9
336	No	9/10/2015	615430	4778560	0	<i>Elliptio</i>	<i>complanata</i>	75.9	10
336	No	9/10/2015	615430	4778560	0	<i>Elliptio</i>	<i>complanata</i>	85.2	14
337	No	9/10/2015	615361	4778541	0	<i>Elliptio</i>	<i>complanata</i>	22.9	3
337	No	9/10/2015	615361	4778541	0	<i>Elliptio</i>	<i>complanata</i>	59.3	9
337	No	9/10/2015	615361	4778541	0	<i>Elliptio</i>	<i>complanata</i>	66.7	9
337	No	9/10/2015	615361	4778541	0	<i>Elliptio</i>	<i>complanata</i>	68.5	10
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	39.5	6
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	51.7	6
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	47.0	4
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	61.4	7
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	73.1	8
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	65.2	8
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	67.8	8
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	72.8	9
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	75.3	10
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	76.8	11
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	67.4	9
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	77.7	11
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	68.0	9
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	71.6	11
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	70.4	10
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	62.4	10
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	65.2	8
338	No	9/10/2015	615390	4778540	0	<i>Elliptio</i>	<i>complanata</i>	64.9	11
339	No	9/10/2015	615200	4778508	0	<i>Elliptio</i>	<i>complanata</i>	67.5	11
339	No	9/10/2015	615200	4778508	0	<i>Elliptio</i>	<i>complanata</i>	78.2	12
339	No	9/10/2015	615200	4778508	0	<i>Elliptio</i>	<i>complanata</i>	71.0	10

339	No	9/10/2015	615200	4778508	0	<i>Elliptio</i>	<i>complanata</i>	71.1	10
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	34.7	5
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	46.4	7
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	56.8	8
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	51.0	7
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	66.9	8
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	76.3	11
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	75.4	11
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	81.3	12
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	70.3	11

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	71.3	11
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	61.1	11
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	65.1	12
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	61.0	10
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	63.9	9
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	67.7	11
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	58.7	9
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	61.9	10
340	No	9/10/2015	615182	4778500	0	<i>Elliptio</i>	<i>complanata</i>	61.7	10
341	No	9/10/2015	615350	4778599	0	<i>Elliptio</i>	<i>complanata</i>	10.3	1
341	No	9/10/2015	615350	4778599	0	<i>Elliptio</i>	<i>complanata</i>	23.0	4
341	No	9/10/2015	615350	4778599	0	<i>Elliptio</i>	<i>complanata</i>	30.8	5
341	No	9/10/2015	615350	4778599	0	<i>Elliptio</i>	<i>complanata</i>	34.5	5
341	No	9/10/2015	615350	4778599	0	<i>Elliptio</i>	<i>complanata</i>	57.2	10
341	No	9/10/2015	615350	4778599	0	<i>Elliptio</i>	<i>complanata</i>	78.0	12
342	No	9/10/2015	615320	4778492	0	<i>Elliptio</i>	<i>complanata</i>	23.3	3
342	No	9/10/2015	615320	4778492	0	<i>Elliptio</i>	<i>complanata</i>	68.8	9
342	No	9/10/2015	615320	4778492	0	<i>Elliptio</i>	<i>complanata</i>	71.3	10
342	No	9/10/2015	615320	4778492	0	<i>Elliptio</i>	<i>complanata</i>	62.0	9
342	No	9/10/2015	615320	4778492	0	<i>Elliptio</i>	<i>complanata</i>	65.4	8
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	43.5	6
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	53.5	6
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	52.8	7
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	56.3	8
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	55.5	8
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	59.1	9
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	58.9	9
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	79.4	12
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	77.0	11
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	68.3	11
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	68.6	9
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	66.0	11
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	72.3	11
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	67.2	10
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	59.7	9
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	61.6	10
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	61.4	8
343	No	9/10/2015	615348	4778428	0	<i>Elliptio</i>	<i>complanata</i>	56.3	8
344	No	9/10/2015	615420	4778420	0	<i>Elliptio</i>	<i>complanata</i>	15.1	3
346	No	9/10/2015	615240	4778402	0	<i>Elliptio</i>	<i>complanata</i>	49.7	7
346	No	9/10/2015	615240	4778402	0	<i>Elliptio</i>	<i>complanata</i>	51.3	6
346	No	9/10/2015	615139	4778369	0	<i>Elliptio</i>	<i>complanata</i>	69.9	10
348	No	9/10/2015	615139	4778369	0	<i>Elliptio</i>	<i>complanata</i>	80.5	11

348	No	9/10/2015	615139	4778369	0	<i>Elliptio</i>	<i>complanata</i>	82.1	14
350	No	9/10/2015	615102	4778290	0	<i>Elliptio</i>	<i>complanata</i>	62.4	8
350	No	9/10/2015	615102	4778290	0	<i>Elliptio</i>	<i>complanata</i>	77.6	12
350	No	9/10/2015	615102	4778290	0	<i>Elliptio</i>	<i>complanata</i>	72.8	11
350	No	9/10/2015	615102	4778290	0	<i>Elliptio</i>	<i>complanata</i>	73.9	9
350	No	9/10/2015	615102	4778290	0	<i>Elliptio</i>	<i>complanata</i>	60.8	9
351	No	9/10/2015	615050	4778200	0	<i>Elliptio</i>	<i>complanata</i>	92.6	13
351	No	9/10/2015	615050	4778200	0	<i>Elliptio</i>	<i>complanata</i>	75.2	11
351	No	9/10/2015	615050	4778200	0	<i>Elliptio</i>	<i>complanata</i>	69.4	11
351	No	9/10/2015	615050	4778200	0	<i>Elliptio</i>	<i>complanata</i>	21.0	3
352	No	9/10/2015	615100	4778128	0	<i>Elliptio</i>	<i>complanata</i>	29.5	4
352	No	9/10/2015	615100	4778128	0	<i>Elliptio</i>	<i>complanata</i>	59.8	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
352	No	9/10/2015	615100	4778128	0	<i>Elliptio</i>	<i>complanata</i>	56.9	8
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	61.7	9
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	80.3	11
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	72.5	9
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	68.7	10
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	59.0	9
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	52.2	8
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	67.1	10
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	70.9	10
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	72.8	12
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	71.8	9
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	65.3	10
354	No	9/9/2015	614980	4778050	0	<i>Elliptio</i>	<i>complanata</i>	67.3	12
359	No	9/9/2015	614900	4777920	0	<i>Elliptio</i>	<i>complanata</i>	79.2	11
359	No	9/9/2015	614900	4777920	0	<i>Elliptio</i>	<i>complanata</i>	73.8	10
359	No	9/9/2015	614900	4777920	0	<i>Elliptio</i>	<i>complanata</i>	67.8	10
360	No	9/9/2015	614870	4777881	0	<i>Elliptio</i>	<i>complanata</i>	63.9	9
360	No	9/9/2015	614870	4777881	0	<i>Elliptio</i>	<i>complanata</i>	67.0	9
360	No	9/9/2015	614870	4777881	0	<i>Elliptio</i>	<i>complanata</i>	71.4	10
360	No	9/9/2015	614870	4777881	0	<i>Elliptio</i>	<i>complanata</i>	73.4	11
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	89.6	13
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	82.6	12
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	77.9	9
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	73.1	11
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	74.1	10
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	71.2	10
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	75.0	11
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	73.5	11
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	64.4	9
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	63.4	10
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	63.0	10
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	56.2	9
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	58.2	8
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	54.7	9
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	41.7	6
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	46.0	7
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	36.5	5
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	41.8	7
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	43.9	6
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	39.5	5
364	No	9/9/2015	614890	4777743	0	<i>Elliptio</i>	<i>complanata</i>	30.0	4

366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	39.3	7
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	82.8	12
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	48.5	7
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	77.7	11
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	66.0	10
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	79.3	12
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	57.3	7
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	51.1	8
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	69.8	10
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	81.6	10
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	63.4	8
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	69.5	10
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	68.3	11
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	44.6	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	63.2	9
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	72.9	11
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	78.0	12
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	64.7	7
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	51.8	7
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	57.4	9
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	58.7	8
366	No	9/9/2015	614720	4777651	0	<i>Elliptio</i>	<i>complanata</i>	61.6	7
368	No	9/9/2015	614669	4777590	0	<i>Elliptio</i>	<i>complanata</i>	72.5	10
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	84.7	13
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	77.2	11
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	77.1	11
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	77.2	12
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	76.5	13
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	65.3	10
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	69.3	11
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	61.8	10
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	63.5	9
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	57.9	8
370	No	9/9/2015	614671	4777561	0	<i>Elliptio</i>	<i>complanata</i>	57.5	9
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	80.0	12
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	76.6	11
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	65.5	10
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	66.3	11
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	59.2	8
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	53.7	8
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	52.5	8
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	49.1	8
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	48.4	8
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	45.7	7
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	34.9	5
371	No	9/9/2015	614770	4777480	0	<i>Elliptio</i>	<i>complanata</i>	34.2	5
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	68.6	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	67.4	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	67.6	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	62.9	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	67.6	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	64.8	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	65.6	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	63.0	10

372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	58.1	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	60.6	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	60.4	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	59.2	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	69.5	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	57.2	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	60.0	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	59.5	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	63.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	54.9	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	54.9	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	56.5	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	54.6	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	53.1	7
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	47.9	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	54.3	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	49.2	7
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	46.4	7
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	51.4	7
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	50.2	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	50.3	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	45.1	6
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	41.3	5
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	42.3	6
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	33.3	4
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	37.8	5
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	34.8	6
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	30.7	5
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	64.2	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	69.8	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	65.6	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	70.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	76.2	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	69.2	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	68.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	72.5	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	72.6	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	59.5	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	70.0	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	63.9	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	61.8	7
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	66.2	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	69.2	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	67.6	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	63.7	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	68.8	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	62.6	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	72.3	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	78.7	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	73.1	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	76.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	85.8	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	82.1	9

372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	76.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	74.5	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	70.3	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	64.6	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	64.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	63.2	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	59.9	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	67.3	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	58.8	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	65.1	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	71.2	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	62.9	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	67.2	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	68.8	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	68.9	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	64.8	8
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	73.8	10

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	76.6	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	73.4	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	73.7	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	69.2	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	75.5	11
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	76.4	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	77.9	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	75.9	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	69.5	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	72.6	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	73.0	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	73.4	10
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	78.6	12
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	62.0	9
372	No	9/9/2015	614604	4777483	0	<i>Elliptio</i>	<i>complanata</i>	70.8	11
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	48.5	8
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	11.2	2
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	26.4	4
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	49.8	7
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	48.5	7
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	53.8	8
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	58.7	10
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	64.3	10
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	69.5	9
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	70.5	11
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	70.3	11
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	63.3	10
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	68.8	11
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	70.0	10
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	68.2	11
373	No	9/9/2015	614726	4777370	0	<i>Elliptio</i>	<i>complanata</i>	79.2	12
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	7.3	1
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	32.3	4
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	53.5	8
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	54.4	8
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	58.9	9
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	59.7	9

382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	66.6	10
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	57.1	8
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	64.8	10
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	64.5	9
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	62.7	9
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	66.2	10
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	65.4	10
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	65.1	9
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	60.5	9
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	61.1	9
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	70.7	10
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	80.1	12
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	77.8	12
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	79.4	11
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	83.5	13
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	73.1	11
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	75.2	12
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	76.9	12

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	82.1	12
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	80.3	13
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	72.7	11
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	74.2	11
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	76.3	11
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	83.4	14
382	No	9/9/2015	614661	4777150	0	<i>Elliptio</i>	<i>complanata</i>	77.5	11
383	No	9/9/2015	614630	4777130	0	<i>Elliptio</i>	<i>complanata</i>	85.1	12
384	No	9/9/2015	614620	4777120	0	<i>Elliptio</i>	<i>complanata</i>	76.4	11
384	No	9/9/2015	614620	4777120	0	<i>Elliptio</i>	<i>complanata</i>	16.4	2
386	No	9/9/2015	614638	4777090	0	<i>Elliptio</i>	<i>complanata</i>	70.4	10
386	No	9/9/2015	614638	4777090	0	<i>Elliptio</i>	<i>complanata</i>	74.2	12
390	No	9/3/2015	614619	4777058	0	<i>Elliptio</i>	<i>complanata</i>	78.2	9
390	No	9/3/2015	614619	4777058	0	<i>Elliptio</i>	<i>complanata</i>	77.1	10
392	No	9/3/2015	614623	4777024	0	<i>Elliptio</i>	<i>complanata</i>	80.9	9
392	No	9/3/2015	614623	4777024	0	<i>Elliptio</i>	<i>complanata</i>	84.7	12
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	61.4	7
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	59.4	8
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	65.2	9
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	73.4	10
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	78.6	11
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	77.5	11
394	No	9/3/2015	614600	4776998	0	<i>Elliptio</i>	<i>complanata</i>	86.9	12
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	76.0	9
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	75.3	8
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	68.9	8
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	63.1	7
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	63.7	8
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	69.7	7
395	No	9/3/2015	614511	4776950	0	<i>Elliptio</i>	<i>complanata</i>	62.0	6
397	No	9/3/2015	614620	4776944	0	<i>Elliptio</i>	<i>complanata</i>	63.1	8
397	No	9/3/2015	614620	4776944	0	<i>Elliptio</i>	<i>complanata</i>	78.2	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	13.9	2
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	20.5	3
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	36.7	5

399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	39.1	5
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	40.1	5
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	43.1	5
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	43.0	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	44.6	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	51.7	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	54.9	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	54.1	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	47.0	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	54.2	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	47.9	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	51.2	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	56.1	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	58.7	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	59.0	9
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	49.4	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	51.7	5
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	61.4	8
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	64.1	8
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	52.3	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	50.5	6
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	68.4	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	67.0	8
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	67.7	8
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	71.2	9
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	71.8	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	71.5	9
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	69.0	7
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	76.1	9
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	73.1	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	72.0	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	85.1	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	81.4	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	77.6	10
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	71.7	9
399	No	9/3/2015	614518	4776888	0	<i>Elliptio</i>	<i>complanata</i>	75.8	10
401	No	8/31/2015	614619	4776847	0	<i>Elliptio</i>	<i>complanata</i>	78.6	10
401	No	8/31/2015	614619	4776847	0	<i>Elliptio</i>	<i>complanata</i>	69.0	8
401	No	8/31/2015	614619	4776847	0	<i>Elliptio</i>	<i>complanata</i>	80.5	10
401	No	8/31/2015	614619	4776847	0	<i>Elliptio</i>	<i>complanata</i>	76.9	9
401	No	8/31/2015	614619	4776847	0	<i>Elliptio</i>	<i>complanata</i>	21.7	3
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	51.4	6
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	54.7	7
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	65.6	8
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	63.5	9
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	64.0	7
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	70.8	10
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	73.7	12
403	No	8/31/2015	614670	4776804	0	<i>Elliptio</i>	<i>complanata</i>	85.5	13
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	51.3	6
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	52.3	6
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	54.2	6
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	58.9	7

404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	64.5	8
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	62.8	8
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	62.9	7
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	71.6	9
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	66.2	8
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	75.0	10
404	No	8/31/2015	614666	4776797	0	<i>Elliptio</i>	<i>complanata</i>	75.0	10
405	No	8/31/2015	614650	4776790	0	<i>Elliptio</i>	<i>complanata</i>	83.7	13
405	No	8/31/2015	614650	4776790	0	<i>Elliptio</i>	<i>complanata</i>	60.9	6
405	No	8/31/2015	614650	4776790	0	<i>Elliptio</i>	<i>complanata</i>	51.8	6
405	No	8/31/2015	614650	4776790	0	<i>Elliptio</i>	<i>complanata</i>	47.8	6
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	77.8	11
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	61.2	7
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	74.8	9
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	62.3	9
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	55.2	8
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	23.9	3
408	No	8/31/2015	614533	4776692	0	<i>Elliptio</i>	<i>complanata</i>	21.8	2
413	No	8/31/2015	614721	4776591	0	<i>Elliptio</i>	<i>complanata</i>	58.0	9
413	No	8/31/2015	614721	4776591	0	<i>Elliptio</i>	<i>complanata</i>	63.5	10
413	No	8/31/2015	614721	4776591	0	<i>Elliptio</i>	<i>complanata</i>	57.3	9

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
415	No	8/31/2015	614730	4776581	0	<i>Elliptio</i>	<i>complanata</i>	52.0	8
415	No	8/31/2015	614730	4776581	0	<i>Elliptio</i>	<i>complanata</i>	58.4	8
415	No	8/31/2015	614730	4776581	0	<i>Elliptio</i>	<i>complanata</i>	63.2	10
415	No	8/31/2015	614730	4776581	0	<i>Elliptio</i>	<i>complanata</i>	68.1	9
415	No	8/31/2015	614730	4776581	0	<i>Elliptio</i>	<i>complanata</i>	68.5	10
424	No	8/31/2015	614619	4776372	0	<i>Elliptio</i>	<i>complanata</i>	63.2	9
424	No	8/31/2015	614619	4776372	0	<i>Elliptio</i>	<i>complanata</i>	65.6	10
424	No	8/31/2015	614619	4776372	0	<i>Elliptio</i>	<i>complanata</i>	68.3	9
424	No	8/31/2015	614619	4776372	0	<i>Elliptio</i>	<i>complanata</i>	66.4	9
424	No	8/31/2015	614619	4776372	0	<i>Elliptio</i>	<i>complanata</i>	67.6	9
424	No	8/31/2015	614619	4776372	0	<i>Elliptio</i>	<i>complanata</i>	65.5	9
426	No	8/31/2015	614624	4776364	0	<i>Elliptio</i>	<i>complanata</i>	98.1	15
426	No	8/31/2015	614624	4776364	0	<i>Elliptio</i>	<i>complanata</i>	82.6	12
426	No	8/31/2015	614624	4776364	0	<i>Elliptio</i>	<i>complanata</i>	73.2	10
428	No	8/31/2015	614870	4776350	0	<i>Elliptio</i>	<i>complanata</i>	76.7	11
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	40.4	5
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	57.8	8
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	60.1	8
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	66.3	8
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	73.1	10
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	68.6	10
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	65.2	8
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	70.1	8
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	73.8	9
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	83.9	11
430	No	9/1/2015	614753	4776325	0	<i>Elliptio</i>	<i>complanata</i>	85.7	12
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	81.7	12
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	76.8	11
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	73.4	11
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	68.1	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	65.6	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	60.6	8

431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	59.4	8
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	64.8	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	66.0	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	68.5	10
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	59.7	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	59.7	8
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	57.4	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	57.0	9
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	47.2	7
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	49.7	7
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	38.2	5
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	36.5	5
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	37.9	5
431	No	9/1/2015	614784	4776310	0	<i>Elliptio</i>	<i>complanata</i>	29.9	4
434	No	9/1/2015	614612	4776271	0	<i>Elliptio</i>	<i>complanata</i>	46.8	6
434	No	9/1/2015	614612	4776271	0	<i>Elliptio</i>	<i>complanata</i>	48.8	6
434	No	9/1/2015	614612	4776271	0	<i>Elliptio</i>	<i>complanata</i>	59.8	8
436	No	9/1/2015	614700	4776240	0	<i>Elliptio</i>	<i>complanata</i>	60.5	7
436	No	9/1/2015	614700	4776240	0	<i>Elliptio</i>	<i>complanata</i>	78.5	10
436	No	9/1/2015	614700	4776240	0	<i>Elliptio</i>	<i>complanata</i>	81.1	9
436	No	9/1/2015	614700	4776240	0	<i>Elliptio</i>	<i>complanata</i>	90.4	12
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	30.4	4
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	27.3	3

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	38.9	5
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	63.6	8
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	74.3	10
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	77.9	11
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	76.9	10
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	85.5	12
437	No	9/1/2015	614923	4776233	0	<i>Elliptio</i>	<i>complanata</i>	26.5	3
438	No	9/1/2015	614657	4776193	0	<i>Elliptio</i>	<i>complanata</i>	55.8	7
438	No	9/1/2015	614657	4776193	0	<i>Elliptio</i>	<i>complanata</i>	61.2	8
438	No	9/1/2015	614657	4776193	0	<i>Elliptio</i>	<i>complanata</i>	64.6	9
438	No	9/1/2015	614657	4776193	0	<i>Elliptio</i>	<i>complanata</i>	68.3	9
438	No	9/1/2015	614657	4776193	0	<i>Elliptio</i>	<i>complanata</i>	71.5	9
438	No	9/1/2015	614657	4776193	0	<i>Elliptio</i>	<i>complanata</i>	69.6	9
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	58.1	7
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	61.4	8
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	69.8	9
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	70.6	8
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	68.2	9
440	No	9/1/2015	614713	4776180	0	<i>Elliptio</i>	<i>complanata</i>	74.2	9
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	65.5	8
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	87.7	13
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	89.8	12
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	79.5	9
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	78.2	8
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	74.8	10
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	81.0	10
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	71.0	8
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	65.5	7
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	65.2	7

441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	63.1	7
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	57.5	7
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	52.7	6
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	43.1	5
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	45.2	5
441	No	9/1/2015	614738	4776172	0	<i>Elliptio</i>	<i>complanata</i>	37.4	5
444	No	9/1/2015	614960	4776126	0	<i>Elliptio</i>	<i>complanata</i>	55.3	7
444	No	9/1/2015	614960	4776126	0	<i>Elliptio</i>	<i>complanata</i>	77.0	10
444	No	9/1/2015	614960	4776126	0	<i>Elliptio</i>	<i>complanata</i>	77.2	11
444	No	9/1/2015	614960	4776126	0	<i>Elliptio</i>	<i>complanata</i>	81.9	12
444	No	9/1/2015	614960	4776126	0	<i>Elliptio</i>	<i>complanata</i>	73.4	10
444	No	9/1/2015	614960	4776126	0	<i>Elliptio</i>	<i>complanata</i>	81.7	12
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	86.0	10
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	77.1	8
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	84.9	11
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	77.1	9
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	77.0	11
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	77.3	10
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	71.7	10
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	66.9	9
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	61.4	7
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	57.5	7
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	71.5	9
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	68.3	8
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	65.3	8

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
447	No	9/1/2015	614781	4776121	0	<i>Elliptio</i>	<i>complanata</i>	75.5	11
451	No	9/1/2015	614824	4776091	0	<i>Elliptio</i>	<i>complanata</i>	88.2	12
451	No	9/1/2015	614824	4776091	0	<i>Elliptio</i>	<i>complanata</i>	70.3	10
451	No	9/1/2015	614824	4776091	0	<i>Elliptio</i>	<i>complanata</i>	73.8	11
451	No	9/1/2015	614824	4776091	0	<i>Elliptio</i>	<i>complanata</i>	70.1	11
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	29.3	4
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	43.8	6
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	56.9	7
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	69.5	9
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	81.9	11
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	76.4	10
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	73.4	9
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	75.3	10
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	78.9	11
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	77.2	10
453	No	9/2/2015	614960	4776079	0	<i>Elliptio</i>	<i>complanata</i>	74.9	10
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	73.1	8
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	70.9	9
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	78.5	9
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	74.9	10
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	82.0	11
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	70.3	9
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	60.7	8
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	63.6	8
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	55.1	7
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	65.2	7
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	64.5	8
454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	58.6	9

454	No	9/1/2015	614762	4776071	0	<i>Elliptio</i>	<i>complanata</i>	62.6	10
456	No	9/1/2015	614793	4776036	0	<i>Elliptio</i>	<i>complanata</i>	10.0	1
456	No	9/1/2015	614793	4776036	0	<i>Elliptio</i>	<i>complanata</i>	79.0	9
456	No	9/1/2015	614793	4776036	0	<i>Elliptio</i>	<i>complanata</i>	49.2	6
456	No	9/1/2015	614793	4776036	0	<i>Elliptio</i>	<i>complanata</i>	35.1	5
456	No	9/1/2015	614793	4776036	0	<i>Elliptio</i>	<i>complanata</i>	20.2	3
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	91.1	13
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	78.1	11
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	75.7	12
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	70.9	10
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	65.6	9
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	58.0	8
466	No	9/2/2015	615020	4775868	0	<i>Elliptio</i>	<i>complanata</i>	47.7	6
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	45.2	6
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	56.7	8
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	67.1	8
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	67.6	9
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	75.4	9
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	74.1	9
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	82.5	12
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	71.4	11
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	83.2	11
471	No	9/2/2015	615032	4775816	0	<i>Elliptio</i>	<i>complanata</i>	88.1	13
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	23.8	4
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	32.6	4
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	42.8	6
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	52.3	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	52.3	7
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	52.9	7
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	53.4	7
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	56.5	7
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	61.1	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	61.0	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	63.7	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	59.6	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	64.7	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	61.7	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	61.5	8
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	70.0	9
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	72.8	11
477	No	9/2/2015	614900	4775660	0	<i>Elliptio</i>	<i>complanata</i>	80.4	11
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	13.9	2
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	15.4	2
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	29.2	5
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	45.3	6
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	56.8	8
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	51.7	8
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	62.4	8
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	58.7	7
479	No	9/2/2015	614961	4775334	0	<i>Elliptio</i>	<i>complanata</i>	71.7	10
480	No	9/2/2015	615109	4775200	0	<i>Elliptio</i>	<i>complanata</i>	62.1	9
480	No	9/2/2015	615109	4775200	0	<i>Elliptio</i>	<i>complanata</i>	60.6	7

480	No	9/2/2015	615109	4775200	0	<i>Elliptio</i>	<i>complanata</i>	63.4	7
480	No	9/2/2015	615109	4775200	0	<i>Elliptio</i>	<i>complanata</i>	64.8	9
480	No	9/2/2015	615109	4775200	0	<i>Elliptio</i>	<i>complanata</i>	78.9	10
480	No	9/2/2015	615109	4775200	0	<i>Elliptio</i>	<i>complanata</i>	16.0	2
481	No	9/3/2015	615518	4774506	0	<i>Elliptio</i>	<i>complanata</i>	99.9	13
481	No	9/3/2015	615518	4774506	0	<i>Elliptio</i>	<i>complanata</i>	28.7	4
481	No	9/3/2015	615518	4774506	0	<i>Elliptio</i>	<i>complanata</i>	24.6	3
481	No	9/3/2015	615518	4774506	0	<i>Elliptio</i>	<i>complanata</i>	9.9	1
481	No	9/3/2015	615518	4774506	0	<i>Elliptio</i>	<i>complanata</i>	10.1	1
488	No	9/3/2015	615543	4774386	0	<i>Elliptio</i>	<i>complanata</i>	11.5	1
488	No	9/3/2015	615543	4774386	0	<i>Elliptio</i>	<i>complanata</i>	12.0	2
488	No	9/3/2015	615543	4774386	0	<i>Elliptio</i>	<i>complanata</i>	16.5	3
488	No	9/3/2015	615543	4774386	0	<i>Elliptio</i>	<i>complanata</i>	20.8	3
488	No	9/3/2015	615543	4774386	0	<i>Elliptio</i>	<i>complanata</i>	35.3	4
253	Yes	8/26/2015	615486	4779450	0	<i>Elliptio</i>	<i>complanata</i>	33.40	5
253	Yes	8/26/2015	615486	4779450	0	<i>Elliptio</i>	<i>complanata</i>	81.20	11
253	Yes	8/26/2015	615486	4779450	0	<i>Elliptio</i>	<i>complanata</i>	92.20	13
256	Yes	8/26/2015	615544	4779443	0	<i>Elliptio</i>	<i>complanata</i>	74.9	11
258	Yes	8/26/2015	615501	4779411	0	<i>Elliptio</i>	<i>complanata</i>	9.8	1
258	Yes	8/26/2015	615501	4779411	0	<i>Elliptio</i>	<i>complanata</i>	25.6	3
258	Yes	8/26/2015	615501	4779411	0	<i>Elliptio</i>	<i>complanata</i>	67.8	9
258	Yes	8/26/2015	615501	4779411	0	<i>Elliptio</i>	<i>complanata</i>	72.4	11
263	Yes	8/26/2015	615480	4779339	0	<i>Elliptio</i>	<i>complanata</i>	46.5	7
263	Yes	8/26/2015	615480	4779339	0	<i>Elliptio</i>	<i>complanata</i>	31.4	4
264	Yes	8/26/2015	615510	4779340	0	<i>Elliptio</i>	<i>complanata</i>	29.1	4
264	Yes	8/26/2015	615510	4779340	0	<i>Elliptio</i>	<i>complanata</i>	28.6	4
264	Yes	8/26/2015	615510	4779340	0	<i>Elliptio</i>	<i>complanata</i>	58.4	7
264	Yes	8/26/2015	615510	4779340	0	<i>Elliptio</i>	<i>complanata</i>	75.0	10
264	Yes	8/26/2015	615510	4779340	0	<i>Elliptio</i>	<i>complanata</i>	28.8	4

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
264	Yes	8/26/2015	615510	4779340	0	<i>Elliptio</i>	<i>complanata</i>	34.1	5
267	Yes	8/26/2015	615501	4779280	0	<i>Elliptio</i>	<i>complanata</i>	8.3	1
269	Yes	8/26/2015	615508	4779270	0	<i>Elliptio</i>	<i>complanata</i>	9.9	1
274	Yes	8/26/2015	615523	4779208	0	<i>Elliptio</i>	<i>complanata</i>	11.3	1
276	Yes	8/26/2015	615499	4779204	0	<i>Elliptio</i>	<i>complanata</i>	16.8	2
278	Yes	8/27/2015	615410	4779190	0	<i>Elliptio</i>	<i>complanata</i>	15.8	2
278	Yes	8/27/2015	615410	4779190	0	<i>Elliptio</i>	<i>complanata</i>	32.4	5
278	Yes	8/27/2015	615410	4779190	0	<i>Elliptio</i>	<i>complanata</i>	39.2	5
278	Yes	8/27/2015	615410	4779190	0	<i>Elliptio</i>	<i>complanata</i>	51.8	6
278	Yes	8/27/2015	615410	4779190	0	<i>Elliptio</i>	<i>complanata</i>	80.9	9
280	Yes	8/27/2015	615478	4779178	0	<i>Elliptio</i>	<i>complanata</i>	13.6	2
282	Yes	8/27/2015	615408	4779169	0	<i>Elliptio</i>	<i>complanata</i>	49.3	6
283	Yes	8/26/2015	615520	4779175	0	<i>Elliptio</i>	<i>complanata</i>	16.4	2
284	Yes	8/27/2015	615598	4779160	0	<i>Elliptio</i>	<i>complanata</i>	17.7	2
293	Yes	8/27/2015	615592	4779100	0	<i>Elliptio</i>	<i>complanata</i>	25.7	4
296	Yes	8/27/2015	615650	4779090	0	<i>Elliptio</i>	<i>complanata</i>	14.8	2
303	Yes	8/28/2015	615651	4779060	0	<i>Elliptio</i>	<i>complanata</i>	21.9	3
303	Yes	8/28/2015	615651	4779060	0	<i>Elliptio</i>	<i>complanata</i>	22.0	3
304	Yes	8/28/2015	615471	4779049	0	<i>Elliptio</i>	<i>complanata</i>	74.7	9
304	Yes	8/28/2015	615471	4779049	0	<i>Elliptio</i>	<i>complanata</i>	84.9	11
312	Yes	8/28/2015	615540	4779030	0	<i>Elliptio</i>	<i>complanata</i>	19.6	2
322	Yes	8/28/2015	615510	4778860	0	<i>Elliptio</i>	<i>complanata</i>	12.1	1
349	Yes	9/10/2015	615324	4778360	0	<i>Elliptio</i>	<i>complanata</i>	74.4	9
349	Yes	9/10/2015	615324	4778360	0	<i>Elliptio</i>	<i>complanata</i>	74.5	9

349	Yes	9/10/2015	615324	4778360	0	<i>Elliptio</i>	<i>complanata</i>	60.8	8
349	Yes	9/10/2015	615324	4778360	0	<i>Elliptio</i>	<i>complanata</i>	63.9	10
349	Yes	9/10/2015	615324	4778360	0	<i>Elliptio</i>	<i>complanata</i>	64.8	11
349	Yes	9/10/2015	615324	4778360	0	<i>Elliptio</i>	<i>complanata</i>	68.0	12
357	Yes	9/9/2015	614909	4777930	0	<i>Elliptio</i>	<i>complanata</i>	70.5	9
358	Yes	9/9/2015	614880	4777922	0	<i>Elliptio</i>	<i>complanata</i>	79.2	12
362	Yes	9/9/2015	614810	4777792	0	<i>Elliptio</i>	<i>complanata</i>	86.0	12
363	Yes	9/9/2015	614820	4777790	0	<i>Elliptio</i>	<i>complanata</i>	68.9	10
365	Yes	9/9/2015	614780	4777726	0	<i>Elliptio</i>	<i>complanata</i>	48.8	7
376	Yes	9/9/2015	614710	4777272	0	<i>Elliptio</i>	<i>complanata</i>	84.8	13
377	Yes	9/9/2015	614691	4777261	0	<i>Elliptio</i>	<i>complanata</i>	65.1	10
379	Yes	9/9/2015	614690	4777251	0	<i>Elliptio</i>	<i>complanata</i>	55.2	8
380	Yes	9/9/2015	614710	4777248	0	<i>Elliptio</i>	<i>complanata</i>	10.2	2
381	Yes	9/3/2015	614680	4777160	0	<i>Elliptio</i>	<i>complanata</i>	65.1	8
381	Yes	9/3/2015	614680	4777160	0	<i>Elliptio</i>	<i>complanata</i>	74.1	10
381	Yes	9/3/2015	614680	4777160	0	<i>Elliptio</i>	<i>complanata</i>	12.1	2
381	Yes	9/3/2015	614680	4777160	0	<i>Elliptio</i>	<i>complanata</i>	8.0	1
389	Yes	9/3/2015	614657	4777070	0	<i>Elliptio</i>	<i>complanata</i>	43.9	5
391	Yes	9/3/2015	614660	4777058	0	<i>Elliptio</i>	<i>complanata</i>	57.1	8
396	Yes	9/3/2015	614660	4776950	0	<i>Elliptio</i>	<i>complanata</i>	81.6	11
412	Yes	8/31/2015	614731	4776601	0	<i>Elliptio</i>	<i>complanata</i>	50.1	6
414	Yes	8/31/2015	614730	4776591	0	<i>Elliptio</i>	<i>complanata</i>	39.2	4
414	Yes	8/31/2015	614730	4776591	0	<i>Elliptio</i>	<i>complanata</i>	41.6	6
414	Yes	8/31/2015	614730	4776591	0	<i>Elliptio</i>	<i>complanata</i>	50.6	6
414	Yes	8/31/2015	614730	4776591	0	<i>Elliptio</i>	<i>complanata</i>	63.5	9
414	Yes	8/31/2015	614730	4776591	0	<i>Elliptio</i>	<i>complanata</i>	65.7	10
414	Yes	8/31/2015	614730	4776591	0	<i>Elliptio</i>	<i>complanata</i>	67.6	10
416	Yes	8/31/2015	614651	4776562	0	<i>Elliptio</i>	<i>complanata</i>	79.2	11
422	Yes	8/31/2015	614702	4776411	0	<i>Elliptio</i>	<i>complanata</i>	20.3	3
427	Yes	8/31/2015	614841	4776362	0	<i>Elliptio</i>	<i>complanata</i>	67.1	8
439	Yes	9/1/2015	614972	4776202	0	<i>Elliptio</i>	<i>complanata</i>	44.9	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
449	Yes	9/1/2015	614985	4776095	0	<i>Elliptio</i>	<i>complanata</i>	74.9	9
455	Yes	9/1/2015	615004	4776057	0	<i>Elliptio</i>	<i>complanata</i>	8.5	1
455	Yes	9/1/2015	615004	4776057	0	<i>Elliptio</i>	<i>complanata</i>	43.0	6
455	Yes	9/1/2015	615004	4776057	0	<i>Elliptio</i>	<i>complanata</i>	61.2	8
455	Yes	9/1/2015	615004	4776057	0	<i>Elliptio</i>	<i>complanata</i>	25.0	3
459	Yes	9/2/2015	614982	4776012	0	<i>Elliptio</i>	<i>complanata</i>	6.2	1
459	Yes	9/2/2015	614982	4776012	0	<i>Elliptio</i>	<i>complanata</i>	8.1	1
464	Yes	9/2/2015	615104	4775914	0	<i>Elliptio</i>	<i>complanata</i>	17.9	2
470	Yes	9/2/2015	615111	4775842	0	<i>Elliptio</i>	<i>complanata</i>	14.4	2
470	Yes	9/2/2015	615111	4775842	0	<i>Elliptio</i>	<i>complanata</i>	10.6	1
474	Yes	9/2/2015	614915	4775770	0	<i>Elliptio</i>	<i>complanata</i>	17.8	3
485	Yes	9/3/2015	615590	4774445	0	<i>Elliptio</i>	<i>complanata</i>	50.9	6
485	Yes	9/3/2015	615590	4774445	0	<i>Elliptio</i>	<i>complanata</i>	51.4	7
485	Yes	9/3/2015	615590	4774445	0	<i>Elliptio</i>	<i>complanata</i>	59.2	8
486	Yes	9/3/2015	615549	4774442	0	<i>Elliptio</i>	<i>complanata</i>	14.6	2
486	Yes	9/3/2015	615549	4774442	0	<i>Elliptio</i>	<i>complanata</i>	31.3	4
487	Yes	9/3/2015	615548	4774432	0	<i>Elliptio</i>	<i>complanata</i>	22.3	3
247	No	8/26/2015	615471	4779508	0	<i>Lampsilis</i>	<i>radiata</i>	62.1	8
247	No	8/26/2015	615471	4779508	0	<i>Lampsilis</i>	<i>radiata</i>	48.9	6
247	No	8/26/2015	615471	4779508	0	<i>Lampsilis</i>	<i>radiata</i>	23.3	3
248	No	8/26/2015	615481	4779506	0	<i>Lampsilis</i>	<i>radiata</i>	60.8	9
259	No	8/26/2015	615529	4779392	0	<i>Lampsilis</i>	<i>radiata</i>	64.9	10

259	No	8/26/2015	615529	4779392	0	<i>Lampsilis</i>	<i>radiata</i>	27.8	6
259	No	8/26/2015	615529	4779392	0	<i>Lampsilis</i>	<i>radiata</i>	23.4	4
327	No	9/10/2015	615440	4778780	0	<i>Lampsilis</i>	<i>radiata</i>	23.4	3
327	No	9/10/2015	615440	4778780	0	<i>Lampsilis</i>	<i>radiata</i>	45.0	7
330	No	9/10/2015	615370	4778701	0	<i>Lampsilis</i>	<i>radiata</i>	31.1	5
330	No	9/10/2015	615370	4778701	0	<i>Lampsilis</i>	<i>radiata</i>	61.8	9
331	No	8/28/2015	615520	4778681	0	<i>Lampsilis</i>	<i>radiata</i>	58.3	8
334	No	9/10/2015	615450	4778587	0	<i>Lampsilis</i>	<i>radiata</i>	44.8	7
343	No	9/10/2015	615348	4778428	0	<i>Lampsilis</i>	<i>radiata</i>	34.0	4
354	No	9/9/2015	614980	4778050	0	<i>Lampsilis</i>	<i>radiata</i>	63.8	9
354	No	9/9/2015	614980	4778050	0	<i>Lampsilis</i>	<i>radiata</i>	64.4	10
370	No	9/9/2015	614671	4777561	0	<i>Lampsilis</i>	<i>radiata</i>	43.9	6
370	No	9/9/2015	614671	4777561	0	<i>Lampsilis</i>	<i>radiata</i>	60.6	8
382	No	9/9/2015	614661	4777150	0	<i>Lampsilis</i>	<i>radiata</i>	47.7	7
382	No	9/9/2015	614661	4777150	0	<i>Lampsilis</i>	<i>radiata</i>	54.0	9
382	No	9/9/2015	614661	4777150	0	<i>Lampsilis</i>	<i>radiata</i>	59.3	10
395	No	9/3/2015	614511	4776950	0	<i>Lampsilis</i>	<i>radiata</i>	42.4	5
440	No	9/1/2015	614713	4776180	0	<i>Lampsilis</i>	<i>radiata</i>	71.1	10
447	No	9/1/2015	614781	4776121	0	<i>Lampsilis</i>	<i>radiata</i>	67.5	10
477	No	9/2/2015	614900	4775660	0	<i>Lampsilis</i>	<i>radiata</i>	55.0	8
479	No	9/2/2015	614961	4775334	0	<i>Lampsilis</i>	<i>radiata</i>	46.4	6
269	Yes	8/26/2015	615508	4779270	0	<i>Lampsilis</i>	<i>radiata</i>	30.3	4
278	Yes	8/27/2015	615410	4779190	0	<i>Lampsilis</i>	<i>radiata</i>	24.5	4
248	No	8/26/2015	615481	4779506	0	<i>Ligumia</i>	<i>nasuta</i>	31.9	5
270	No	8/27/2015	615390	4779260	0	<i>Ligumia</i>	<i>nasuta</i>	20.8	3
331	No	8/28/2015	615520	4778681	0	<i>Ligumia</i>	<i>nasuta</i>	58.0	8
354	No	9/9/2015	614980	4778050	0	<i>Ligumia</i>	<i>nasuta</i>	68.4	8
263	Yes	8/26/2015	615480	4779339	0	<i>Ligumia</i>	<i>nasuta</i>	74.0	9
269	Yes	8/26/2015	615508	4779270	0	<i>Ligumia</i>	<i>nasuta</i>	33.1	3
305	Yes	8/28/2015	615490	4779050	0	<i>Ligumia</i>	<i>nasuta</i>	28.5	4
312	Yes	8/28/2015	615540	4779030	0	<i>Ligumia</i>	<i>nasuta</i>	42.1	6
242	No	9/8/2015	615292	4779593	0	no mussels	no mussels	no mussels	no mussels
245	No	9/8/2015	615320	4779550	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
350	No	9/10/2015	615102	4778290	0	<i>Strophitus</i>	<i>undulatus</i>	59.3	9
404	No	8/31/2015	614666	4776797	0	<i>Strophitus</i>	<i>undulatus</i>	20.0	3
424	No	8/31/2015	614619	4776372	0	<i>Strophitus</i>	<i>undulatus</i>	49.1	7
444	No	9/1/2015	614960	4776126	0	<i>Strophitus</i>	<i>undulatus</i>	13.1	2
446	Yes	9/1/2015	615120	4776126	0	<i>Strophitus</i>	<i>undulatus</i>	11.8	2
286	No	8/27/2015	615332	4779140	0	no mussels	no mussels	no mussels	no mussels
338	No	9/10/2015	615390	4778540	0	no mussels	no mussels	no mussels	no mussels
372	No	9/9/2015	614604	4777483	0	no mussels	no mussels	no mussels	no mussels
372	No	9/9/2015	614604	4777483	0	no mussels	no mussels	no mussels	no mussels
399	No	9/3/2015	614518	4776888	0	no mussels	no mussels	no mussels	no mussels
399	No	9/3/2015	614518	4776888	0	no mussels	no mussels	no mussels	no mussels
424	No	8/31/2015	614619	4776372	0	no mussels	no mussels	no mussels	no mussels
460	No	9/2/2015	614960	4775990	0	no mussels	no mussels	no mussels	no mussels
398	Yes	9/3/2015	614700	4776930	0	no mussels	no mussels	no mussels	no mussels

Hudson River Natural Resource Trustees

Upper Hudson Freshwater Mussel Survey

Table 5. Stillwater Pool Sampling Location and Field Mussel Data (2013 Pilot Study)

Hudson River - River Section 3 Stillwater Pool

August-September 2013

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
4	No	10/15/2013	4775238	615571	0	<i>Elliptio</i>	<i>complanata</i>	35.1	3
4	No	10/15/2013	4775238	615571	0	<i>Elliptio</i>	<i>complanata</i>	60.2	6
4	No	10/15/2013	4775238	615571	0	<i>Elliptio</i>	<i>complanata</i>	73.1	7
4	No	10/15/2013	4775238	615571	0	<i>Elliptio</i>	<i>complanata</i>	74.0	8
5	No	10/15/2013	4775238	615564	0	no mussels	no mussels	no mussels	no mussels
11	No	10/15/2013	4775079	615509	0	no mussels	no mussels	no mussels	no mussels
14	No	10/15/2013	4774968	615687	0	no mussels	no mussels	no mussels	no mussels
15	No	10/15/2013	4774879	615815	0	<i>Elliptio</i>	<i>complanata</i>	83.0	9
16	No	10/15/2013	4774802	615898	0	<i>Elliptio</i>	<i>complanata</i>	81.8	8
19	No	10/15/2013	4774580	615892	0	no mussels	no mussels	no mussels	no mussels
20	No	10/15/2013	4774569	615961	0	no mussels	no mussels	no mussels	no mussels
21	No	10/15/2013	4774433	615879	0	no mussels	no mussels	no mussels	no mussels
22	No	10/15/2013	4774397	615830	0	<i>Elliptio</i>	<i>complanata</i>	54.8	6
22	No	10/15/2013	4774397	615830	0	<i>Elliptio</i>	<i>complanata</i>	66.7	7
22	No	10/15/2013	4774397	615830	0	<i>Elliptio</i>	<i>complanata</i>	81.1	ND
22	No	10/15/2013	4774397	615830	0	<i>Elliptio</i>	<i>complanata</i>	81.2	8
23	No	9/17/2013	4774261	615902	0	<i>Elliptio</i>	<i>complanata</i>	50.1	6
24	No	9/17/2013	4774211	615834	0	<i>Elliptio</i>	<i>complanata</i>	47.2	4
24	No	9/17/2013	4774211	615834	0	<i>Elliptio</i>	<i>complanata</i>	55.7	4
24	No	9/17/2013	4774211	615834	0	<i>Elliptio</i>	<i>complanata</i>	66.2	5
24	No	9/17/2013	4774211	615834	0	<i>Elliptio</i>	<i>complanata</i>	72.7	6
24	No	9/17/2013	4774211	615834	0	<i>Elliptio</i>	<i>complanata</i>	83.5	7
24	No	9/17/2013	4774211	615834	0	<i>Elliptio</i>	<i>complanata</i>	99.5	8
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	46.8	6
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	54.7	5
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	58.6	5
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	62.0	7
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	63.2	6
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	76.2	6
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	77.8	6
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	84.4	8
25	No	9/17/2013	4774164	615818	0	<i>Elliptio</i>	<i>complanata</i>	90.0	6
27	No	9/17/2013	4774087	615840	0	no mussels	no mussels	no mussels	no mussels
28	No	9/17/2013	4773768	615868	0	no mussels	no mussels	no mussels	no mussels
30	No	9/17/2013	4773239	616096	0	<i>Elliptio</i>	<i>complanata</i>	57.5	5
30	No	9/17/2013	4773239	616096	0	<i>Elliptio</i>	<i>complanata</i>	57.5	5
30	No	9/17/2013	4773239	616096	0	<i>Elliptio</i>	<i>complanata</i>	73.5	6
30	No	9/17/2013	4773239	616096	0	<i>Elliptio</i>	<i>complanata</i>	79.6	7
31	No	9/17/2013	4773232	615968	0	<i>Elliptio</i>	<i>complanata</i>	41.3	3
31	No	9/17/2013	4773232	615968	0	<i>Elliptio</i>	<i>complanata</i>	50.1	6
31	No	9/17/2013	4773232	615968	0	<i>Elliptio</i>	<i>complanata</i>	56.3	6
32	No	9/17/2013	4773135	615945	0	<i>Ligumia</i>	<i>nasuta</i>	44.1	5
33	No	9/17/2013	4773080	615980	0	<i>Elliptio</i>	<i>complanata</i>	51.5	6
33	No	9/17/2013	4773080	615980	0	<i>Elliptio</i>	<i>complanata</i>	60.0	4
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	67.8	7
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	70.5	7
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	71.0	6
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	71.1	7
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	78.1	7
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	79.3	7
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	80.2	8

34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	84.8	7
34	No	9/17/2013	4773081	615987	0	<i>Elliptio</i>	<i>complanata</i>	84.8	9

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
35	No	9/17/2013	4772878	615930	0	<i>Elliptio</i>	<i>complanata</i>	42.7	3
35	No	9/17/2013	4772878	615930	0	<i>Elliptio</i>	<i>complanata</i>	63.0	6
36	No	9/17/2013	4772851	615920	0	<i>Elliptio</i>	<i>complanata</i>	31.2	3
36	No	9/17/2013	4772851	615920	0	<i>Elliptio</i>	<i>complanata</i>	84.0	8
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	51.1	5
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	54.7	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	56.4	5
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	57.2	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	57.2	5
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	58.3	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	58.5	7
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	66.1	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	66.7	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	73.2	6
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	74.7	8
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	78.7	8
37	No	9/17/2013	4772823	615941	0	<i>Elliptio</i>	<i>complanata</i>	86.4	7
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	54.6	4
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	66.0	7
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	68.3	7
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	68.6	7
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	69.2	6
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	77.5	8
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	83.5	9
38	No	9/17/2013	4772799	616069	0	<i>Elliptio</i>	<i>complanata</i>	88.3	8
40	No	9/17/2013	4772580	615849	0	<i>Elliptio</i>	<i>complanata</i>	39.8	3
40	No	9/17/2013	4772580	615849	0	<i>Elliptio</i>	<i>complanata</i>	59.7	5
41	No	9/17/2013	4772570	615849	0	<i>Elliptio</i>	<i>complanata</i>	63.4	5
41	No	9/17/2013	4772570	615849	0	<i>Elliptio</i>	<i>complanata</i>	71.4	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	56.0	5
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	58.3	5
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	64.1	5
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	65.6	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	65.6	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	66.1	6
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	66.8	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	70.0	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	70.1	6
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	72.9	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	76.2	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	78.3	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	78.7	7
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	82.1	8
43	No	9/17/2013	4772431	615912	0	<i>Elliptio</i>	<i>complanata</i>	92.0	8
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	56.3	6
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	60.1	5
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	67.3	6
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	74.6	6
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	77.3	8
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	77.8	6
44	No	9/17/2013	4772377	615991	0	<i>Elliptio</i>	<i>complanata</i>	78.8	6
45	No	9/17/2013	4772240	615770	0	<i>Elliptio</i>	<i>complanata</i>	66.1	6
45	No	9/17/2013	4772240	615770	0	<i>Elliptio</i>	<i>complanata</i>	67.0	6

45	No	9/17/2013	4772240	615770	0	<i>Elliptio</i>	<i>complanata</i>	67.2	6
46	No	9/17/2013	4772228	615780	0	<i>Elliptio</i>	<i>complanata</i>	61.7	7
46	No	9/17/2013	4772228	615780	0	<i>Elliptio</i>	<i>complanata</i>	69.9	7
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	58.2	5

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	58.3	5
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	59.5	6
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	65.0	6
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	65.0	6
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	75.3	8
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	78.1	8
47	No	9/17/2013	4772162	615740	0	<i>Elliptio</i>	<i>complanata</i>	79.6	8
48	No	9/17/2013	4772098	615840	0	<i>Elliptio</i>	<i>complanata</i>	40.7	5
48	No	9/17/2013	4772098	615840	0	<i>Elliptio</i>	<i>complanata</i>	49.1	6
48	No	9/17/2013	4772098	615840	0	<i>Elliptio</i>	<i>complanata</i>	95.5	10
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	29.6	3
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	59.9	6
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	67.4	6
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	69.2	7
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	69.9	7
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	69.9	6
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	70.0	6
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	73.0	8
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	74.3	6
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	79.5	6
49	No	9/17/2013	4772021	615721	0	<i>Elliptio</i>	<i>complanata</i>	87.2	8
49	No	9/17/2013	4772021	615721	0	<i>Lampsilis</i>	<i>radiata</i>	32.2	4
50	No	9/17/2013	4771828	615700	0	no mussels	no mussels	no mussels	no mussels
51	No	9/17/2013	4771800	615618	0	<i>Elliptio</i>	<i>complanata</i>	67.9	6
52	No	9/17/2013	4771790	615630	0	<i>Elliptio</i>	<i>complanata</i>	61.7	6
53	No	9/17/2013	4771760	615649	0	no mussels	no mussels	no mussels	no mussels
54	No	9/19/2013	4771372	615827	0	<i>Elliptio</i>	<i>complanata</i>	59.4	5
54	No	9/19/2013	4771372	615827	0	<i>Elliptio</i>	<i>complanata</i>	71.2	6
54	No	9/19/2013	4771372	615827	0	<i>Elliptio</i>	<i>complanata</i>	74.7	7
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	24.1	2
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	48.6	4
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	57.5	5
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	66.8	6
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	70.8	6
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	71.8	6
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	72.1	6
55	No	9/19/2013	4771290	615809	0	<i>Elliptio</i>	<i>complanata</i>	77.1	7
56	No	9/19/2013	4771260	615771	0	<i>Elliptio</i>	<i>complanata</i>	56.8	6
56	No	9/19/2013	4771260	615771	0	<i>Elliptio</i>	<i>complanata</i>	65.2	6
56	No	9/19/2013	4771260	615771	0	<i>Lampsilis</i>	<i>radiata</i>	52.9	5
57	No	9/19/2013	4771168	615920	0	<i>Elliptio</i>	<i>complanata</i>	52.1	4
57	No	9/19/2013	4771168	615920	0	<i>Elliptio</i>	<i>complanata</i>	57.8	5
57	No	9/19/2013	4771168	615920	0	<i>Elliptio</i>	<i>complanata</i>	60.3	5
57	No	9/19/2013	4771168	615920	0	<i>Elliptio</i>	<i>complanata</i>	64.0	7
57	No	9/19/2013	4771168	615920	0	<i>Elliptio</i>	<i>complanata</i>	72.2	7
57	No	9/19/2013	4771168	615920	0	<i>Elliptio</i>	<i>complanata</i>	72.8	7
58	No	9/19/2013	4771161	615751	0	<i>Elliptio</i>	<i>complanata</i>	52.4	4
58	No	9/19/2013	4771161	615751	0	<i>Elliptio</i>	<i>complanata</i>	60.1	7
58	No	9/19/2013	4771161	615751	0	<i>Elliptio</i>	<i>complanata</i>	81.5	8
58	No	9/19/2013	4771161	615751	0	<i>Elliptio</i>	<i>complanata</i>	82.2	8
59	No	9/19/2013	4771098	615914	0	no mussels	no mussels	no mussels	no mussels
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	50.5	5
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	51.6	5

60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	53.2	5
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	53.6	5
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	54.1	5
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	62.7	7
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	66.3	8

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	67.5	7
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	67.5	7
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	68.4	8
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	68.9	7
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	73.9	8
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	74.9	8
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	80.6	8
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	81.3	9
60	No	9/19/2013	4771097	615949	0	<i>Elliptio</i>	<i>complanata</i>	84.4	9
62	No	9/19/2013	4770960	615918	0	no mussels	no mussels	no mussels	no mussels
63	No	9/19/2013	4770949	615929	0	<i>Elliptio</i>	<i>complanata</i>	54.6	5
64	No	9/19/2013	4770929	615778	0	<i>Elliptio</i>	<i>complanata</i>	47.1	5
64	No	9/19/2013	4770929	615778	0	<i>Elliptio</i>	<i>complanata</i>	78.1	8
68	No	9/19/2013	4770632	615792	0	<i>Elliptio</i>	<i>complanata</i>	21.8	2
68	No	9/19/2013	4770632	615792	0	<i>Elliptio</i>	<i>complanata</i>	47.3	5
68	No	9/19/2013	4770632	615792	0	<i>Elliptio</i>	<i>complanata</i>	52.5	5
68	No	9/19/2013	4770632	615792	0	<i>Elliptio</i>	<i>complanata</i>	53.4	6
68	No	9/19/2013	4770632	615792	0	<i>Elliptio</i>	<i>complanata</i>	64.4	7
68	No	9/19/2013	4770632	615792	0	<i>Elliptio</i>	<i>complanata</i>	69.9	7
69	No	9/19/2013	4770591	615778	0	<i>Elliptio</i>	<i>complanata</i>	12.9	1
69	No	9/19/2013	4770591	615778	0	<i>Elliptio</i>	<i>complanata</i>	23.9	2
69	No	9/19/2013	4770591	615778	0	<i>Elliptio</i>	<i>complanata</i>	52.2	5
69	No	9/19/2013	4770591	615778	0	<i>Elliptio</i>	<i>complanata</i>	67.2	6
69	No	9/19/2013	4770591	615778	0	<i>Elliptio</i>	<i>complanata</i>	71.3	7
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	44.0	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	46.5	4
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	54.0	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	55.4	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	56.6	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	57.7	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	59.3	6
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	60.4	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	61.5	5
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	68.4	6
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	74.0	7
70	No	9/19/2013	4770533	615922	0	<i>Elliptio</i>	<i>complanata</i>	76.2	8
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	62.7	6
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	64.3	6
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	64.6	7
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	68.5	7
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	69.2	7
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	71.1	7
71	No	9/19/2013	4770466	615733	0	<i>Elliptio</i>	<i>complanata</i>	85.2	8
72	No	9/19/2013	4770380	615837	0	<i>Elliptio</i>	<i>complanata</i>	66.5	7
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	49.9	5
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	53.7	5
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	57.5	6
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	59.8	6
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	61.5	7
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	61.5	6
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	63.4	6

73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	69.5	7
73	No	9/19/2013	4770322	615642	0	<i>Elliptio</i>	<i>complanata</i>	79.6	7
74	No	9/19/2013	4770279	615573	0	no mussels	no mussels	no mussels	no mussels
75	No	9/19/2013	4770142	615491	0	no mussels	no mussels	no mussels	no mussels
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	54.2	5
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	57.8	4
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	58.6	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	67.7	6
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	68.3	6
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	69.2	7
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	69.2	6
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	72.1	7
76	No	9/19/2013	4770100	615489	0	<i>Elliptio</i>	<i>complanata</i>	84.3	7
77	No	9/19/2013	4769909	615419	0	no mussels	no mussels	no mussels	no mussels
78	No	9/19/2013	4769860	615610	0	<i>Ligumia</i>	<i>nasuta</i>	68.9	5
79	No	9/19/2013	4769728	615554	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
80	No	9/19/2013	4769724	615477	0	<i>Elliptio</i>	<i>complanata</i>	62.0	6
80	No	9/19/2013	4769724	615477	0	<i>Elliptio</i>	<i>complanata</i>	80.0	9
81	No	9/19/2013	4769700	615489	0	<i>Elliptio</i>	<i>complanata</i>	79.7	7
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	17.6	1
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	25.2	2
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	50.3	4
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	51.5	4
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	51.6	5
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	51.6	4
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	57.7	6
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	61.1	5
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	62.9	6
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	64.7	6
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	65.7	6
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	66.6	7
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	68.6	7
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	69.0	7
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	72.6	6
82	No	9/19/2013	4769700	615511	0	<i>Elliptio</i>	<i>complanata</i>	80.9	7
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	34.2	3
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	40.0	4
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	50.4	5
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	56.8	5
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	61.5	6
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	63.6	6
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	66.7	7
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	68.3	7
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	75.5	7
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	80.1	8
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	84.5	9
83	No	9/20/2013	4769579	615501	0	<i>Elliptio</i>	<i>complanata</i>	85.9	8
84	No	9/20/2013	4769518	615399	0	<i>Elliptio</i>	<i>complanata</i>	42.6	4
84	No	9/20/2013	4769518	615399	0	<i>Elliptio</i>	<i>complanata</i>	58.8	6
84	No	9/20/2013	4769518	615399	0	<i>Elliptio</i>	<i>complanata</i>	61.6	7
84	No	9/20/2013	4769518	615399	0	<i>Elliptio</i>	<i>complanata</i>	63.3	6
84	No	9/20/2013	4769518	615399	0	<i>Elliptio</i>	<i>complanata</i>	81.6	7
85	No	9/20/2013	4769471	615391	0	no mussels	no mussels	no mussels	no mussels
86	No	9/20/2013	4769443	615529	0	no mussels	no mussels	no mussels	no mussels

87	No	9/20/2013	4769429	615413	0	<i>Elliptio</i>	<i>complanata</i>	48.1	5
87	No	9/20/2013	4769429	615413	0	<i>Elliptio</i>	<i>complanata</i>	63.9	7
87	No	9/20/2013	4769429	615413	0	<i>Elliptio</i>	<i>complanata</i>	80.5	8
88	No	9/20/2013	4769349	615520	0	no mussels	no mussels	no mussels	no mussels
89	No	9/20/2013	4769340	615451	0	<i>Elliptio</i>	<i>complanata</i>	63.0	7
89	No	9/20/2013	4769340	615451	0	<i>Elliptio</i>	<i>complanata</i>	93.8	10
90	No	9/20/2013	4769270	615559	0	no mussels	no mussels	no mussels	no mussels
91	No	9/20/2013	4768953	615649	0	<i>Elliptio</i>	<i>complanata</i>	57.5	6
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	12.9	1

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	14.9	2
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	15.8	2
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	18.4	2
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	18.5	2
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	64.1	7
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	64.9	7
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	67.5	8
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	71.2	8
92	No	9/20/2013	4768779	615691	0	<i>Elliptio</i>	<i>complanata</i>	80.7	8
93	No	9/20/2013	4768756	615721	0	<i>Elliptio</i>	<i>complanata</i>	62.0	6
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	45.8	4
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	51.8	5
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	54.5	5
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	57.1	6
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	68.8	7
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	73.7	7
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	76.5	8
94	No	9/20/2013	4768598	615750	0	<i>Elliptio</i>	<i>complanata</i>	77.9	8
96	No	9/20/2013	4768588	615619	0	<i>Elliptio</i>	<i>complanata</i>	54.7	4
97	No	9/20/2013	4768519	615828	0	<i>Elliptio</i>	<i>complanata</i>	21.7	2
97	No	9/20/2013	4768519	615828	0	<i>Elliptio</i>	<i>complanata</i>	29.1	2
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	54.4	5
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	58.7	5
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	60.4	6
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	65.0	7
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	65.3	7
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	65.5	5
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	68.7	6
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	70.2	7
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	71.0	7
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	72.4	7
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	76.0	8
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	76.1	8
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	76.6	8
101	No	9/20/2013	4768361	615739	0	<i>Elliptio</i>	<i>complanata</i>	81.8	7
104	No	9/20/2013	4768318	615910	0	no mussels	no mussels	no mussels	no mussels
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	41.1	3
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	43.1	4
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	57.2	5
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	61.1	6
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	61.6	5
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	63.3	6
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	71.1	6
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	73.1	7
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	74.3	7
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	74.7	6
105	No	9/20/2013	4768310	615881	0	<i>Elliptio</i>	<i>complanata</i>	82.6	7

106	No	9/20/2013	4768301	615934	0	no mussels	no mussels	no mussels	no mussels
107	No	9/20/2013	4768260	615771	0	<i>Elliptio</i>	<i>complanata</i>	49.5	5
107	No	9/20/2013	4768260	615771	0	<i>Elliptio</i>	<i>complanata</i>	51.8	5
107	No	9/20/2013	4768260	615771	0	<i>Elliptio</i>	<i>complanata</i>	54.1	5
107	No	9/20/2013	4768260	615771	0	<i>Elliptio</i>	<i>complanata</i>	67.6	6
107	No	9/20/2013	4768260	615771	0	<i>Elliptio</i>	<i>complanata</i>	79.0	7
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	58.2	5
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	63.7	6
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	69.4	7
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	71.5	7
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	75.2	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	77.3	8
109	No	9/20/2013	4768219	615753	0	<i>Elliptio</i>	<i>complanata</i>	79.2	6
113	No	9/20/2013	4768171	615881	0	<i>Elliptio</i>	<i>complanata</i>	32.4	3
113	No	9/20/2013	4768171	615881	0	<i>Elliptio</i>	<i>complanata</i>	58.3	6
113	No	9/20/2013	4768171	615881	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
113	No	9/20/2013	4768171	615881	0	<i>Elliptio</i>	<i>complanata</i>	89.7	6
113	No	9/20/2013	4768171	615881	0	<i>Elliptio</i>	<i>complanata</i>	89.8	7
113	No	9/20/2013	4768171	615881	0	<i>Lampsilis</i>	<i>radiata</i>	50.6	6
114	No	10/31/2013	4768150	614570	0	no mussels	no mussels	no mussels	no mussels
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	52.6	6
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	52.9	6
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	55.9	6
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	56.6	7
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	59.9	6
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	63.6	6
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	69.2	7
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	73.9	7
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	80.6	8
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	82.8	9
115	No	9/20/2013	4768138	615883	0	<i>Elliptio</i>	<i>complanata</i>	91.7	9
115	No	9/20/2013	4768138	615883	0	<i>Lampsilis</i>	<i>radiata</i>	62.9	7
115	No	9/20/2013	4768138	615883	0	<i>Lampsilis</i>	<i>radiata</i>	63.9	7
115	No	9/20/2013	4768138	615883	0	<i>Lampsilis</i>	<i>radiata</i>	64.9	7
118	No	9/20/2013	4768025	615745	0	<i>Elliptio</i>	<i>complanata</i>	13.9	1
118	No	9/20/2013	4768025	615745	0	<i>Elliptio</i>	<i>complanata</i>	63.3	7
118	No	9/20/2013	4768025	615745	0	<i>Elliptio</i>	<i>complanata</i>	83.0	9
123	No	10/31/2013	4767796	614647	0	no mussels	no mussels	no mussels	no mussels
124	No	10/31/2013	4767690	614689	0	no mussels	no mussels	no mussels	no mussels
125	No	10/31/2013	4767670	614640	0	no mussels	no mussels	no mussels	no mussels
126	No	10/31/2013	4767600	614790	0	no mussels	no mussels	no mussels	no mussels
127	No	10/31/2013	4767520	614990	0	no mussels	no mussels	no mussels	no mussels
130	No	9/20/2013	4767472	615492	0	no mussels	no mussels	no mussels	no mussels
133	No	10/31/2013	4767441	615111	0	no mussels	no mussels	no mussels	no mussels
143	No	9/20/2013	4767170	615109	0	<i>Elliptio</i>	<i>complanata</i>	66.5	7
144	No	9/20/2013	4766820	615110	0	<i>Elliptio</i>	<i>complanata</i>	41.4	4
145	No	9/20/2013	4766709	615009	0	<i>Elliptio</i>	<i>complanata</i>	70.8	7
145	No	9/20/2013	4766709	615009	0	<i>Elliptio</i>	<i>complanata</i>	82.1	7
146	No	9/20/2013	4766705	615169	0	<i>Elliptio</i>	<i>complanata</i>	26.9	3
148	No	9/20/2013	4766634	615197	0	no mussels	no mussels	no mussels	no mussels
151	No	9/24/2013	4766410	615145	0	<i>Elliptio</i>	<i>complanata</i>	22.1	2
156	No	9/24/2013	4766199	615042	0	<i>Elliptio</i>	<i>complanata</i>	59.2	6
158	No	9/24/2013	4766129	614899	0	<i>Elliptio</i>	<i>complanata</i>	71.3	7
159	No	9/24/2013	4766090	614960	0	no mussels	no mussels	no mussels	no mussels
161	No	9/24/2013	4765951	614901	0	no mussels	no mussels	no mussels	no mussels
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	17.0	2
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	51.7	6

162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	55.8	6
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	56.7	6
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	61.5	7
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	63.4	7
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	66.7	6
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	72.0	7
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	73.3	7
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	77.8	7
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	82.0	7
162	No	9/24/2013	4765921	614771	0	<i>Elliptio</i>	<i>complanata</i>	95.5	9
162	No	9/24/2013	4765921	614771	0	<i>Lampsilis</i>	<i>radiata</i>	49.5	5
164	No	9/24/2013	4765899	614858	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
165	No	9/24/2013	4765892	614892	0	<i>Elliptio</i>	<i>complanata</i>	58.2	6
167	No	9/24/2013	4765680	614830	0	<i>Elliptio</i>	<i>complanata</i>	64.5	7
168	No	9/24/2013	4765660	614831	0	no mussels	no mussels	no mussels	no mussels
169	No	9/24/2013	4765600	614790	0	no mussels	no mussels	no mussels	no mussels
170	No	9/24/2013	4765421	614740	0	<i>Elliptio</i>	<i>complanata</i>	34.2	3
170	No	9/24/2013	4765421	614740	0	<i>Elliptio</i>	<i>complanata</i>	57.9	6
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	67.9	7
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	68.1	6
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	69.8	7
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	70.9	7
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	82.9	7
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	85.5	8
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	88.9	9
171	No	9/24/2013	4765379	614760	0	<i>Elliptio</i>	<i>complanata</i>	93.3	9
172	No	9/24/2013	4765370	614622	0	<i>Elliptio</i>	<i>complanata</i>	69.2	8
173	No	9/24/2013	4765180	614760	0	no mussels	no mussels	no mussels	no mussels
174	No	9/24/2013	4765150	614760	0	no mussels	no mussels	no mussels	no mussels
175	No	9/24/2013	4765109	614750	0	<i>Elliptio</i>	<i>complanata</i>	14.8	1
175	No	9/24/2013	4765109	614750	0	<i>Elliptio</i>	<i>complanata</i>	78.6	7
175	No	9/24/2013	4765109	614750	0	<i>Elliptio</i>	<i>complanata</i>	82.0	7
176	No	9/24/2013	4765102	614642	0	<i>Elliptio</i>	<i>complanata</i>	73.5	7
177	No	9/24/2013	4765028	614677	0	<i>Elliptio</i>	<i>complanata</i>	70.8	7
178	No	9/24/2013	4764930	614770	0	no mussels	no mussels	no mussels	no mussels
179	No	9/24/2013	4764793	614832	0	<i>Elliptio</i>	<i>complanata</i>	54.5	6
179	No	9/24/2013	4764793	614832	0	<i>Elliptio</i>	<i>complanata</i>	78.0	7
181	No	9/24/2013	4764699	614720	0	no mussels	no mussels	no mussels	no mussels
185	No	9/26/2013	4764319	614750	0	<i>Elliptio</i>	<i>complanata</i>	9.1	1
186	No	9/26/2013	4763961	614679	0	no mussels	no mussels	no mussels	no mussels
187	No	9/26/2013	4763951	614670	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
188	No	9/26/2013	4763777	614749	0	<i>Elliptio</i>	<i>complanata</i>	26.6	3
189	No	9/26/2013	4763609	614742	0	<i>Elliptio</i>	<i>complanata</i>	43.3	5
190	No	9/26/2013	4763549	614741	0	<i>Elliptio</i>	<i>complanata</i>	43.1	5
190	No	9/26/2013	4763549	614741	0	<i>Elliptio</i>	<i>complanata</i>	44.7	5
190	No	9/26/2013	4763549	614741	0	<i>Elliptio</i>	<i>complanata</i>	52.7	5
191	No	9/26/2013	4763533	614593	0	no mussels	no mussels	no mussels	no mussels
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	50.9	5
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	52.4	6
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	53.1	5
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	56.6	6
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	61.0	6
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	79.0	8
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	82.2	7
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	83.7	7
192	No	9/26/2013	4763429	614530	0	<i>Elliptio</i>	<i>complanata</i>	88.1	8

196	No	9/26/2013	4763200	614501	0	no mussels	no mussels	no mussels	no mussels
197	No	9/26/2013	4763181	614582	0	no mussels	no mussels	no mussels	no mussels
198	No	9/26/2013	4763141	614463	0	<i>Elliptio</i>	<i>complanata</i>	56.1	6
198	No	9/26/2013	4763141	614463	0	<i>Lampsilis</i>	<i>radiata</i>	65.0	7
199	No	9/26/2013	4763072	614547	0	<i>Elliptio</i>	<i>complanata</i>	32.6	4
199	No	9/26/2013	4763072	614547	0	<i>Elliptio</i>	<i>complanata</i>	84.9	8
200	No	9/26/2013	4762991	614519	0	<i>Elliptio</i>	<i>complanata</i>	46.6	5
200	No	9/26/2013	4762991	614519	0	<i>Elliptio</i>	<i>complanata</i>	53.8	6
200	No	9/26/2013	4762991	614519	0	<i>Elliptio</i>	<i>complanata</i>	68.6	7
201	No	9/26/2013	4762839	614526	0	<i>Elliptio</i>	<i>complanata</i>	61.3	6
202	No	9/26/2013	4762821	614482	0	<i>Elliptio</i>	<i>complanata</i>	63.2	7
202	No	9/26/2013	4762821	614482	0	<i>Elliptio</i>	<i>complanata</i>	66.1	7
202	No	9/26/2013	4762821	614482	0	<i>Elliptio</i>	<i>complanata</i>	70.0	7
202	No	9/26/2013	4762821	614482	0	<i>Elliptio</i>	<i>complanata</i>	79.5	8

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
202	No	9/26/2013	4762821	614482	0	<i>Elliptio</i>	<i>complanata</i>	83.5	8
203	No	9/26/2013	4762780	614442	0	no mussels	no mussels	no mussels	no mussels
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	24.4	2
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	53.8	5
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	54.1	6
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	72.0	7
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	82.9	7
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	83.7	9
204	No	9/26/2013	4762759	614468	0	<i>Elliptio</i>	<i>complanata</i>	84.4	8
205	No	9/26/2013	4762063	613793	0	no mussels	no mussels	no mussels	no mussels
206	No	9/26/2013	4762019	613769	0	no mussels	no mussels	no mussels	no mussels
207	No	9/26/2013	4762020	613790	0	<i>Elliptio</i>	<i>complanata</i>	36.8	4
207	No	9/26/2013	4762020	613790	0	<i>Elliptio</i>	<i>complanata</i>	52.9	6
207	No	9/26/2013	4762020	613790	0	<i>Elliptio</i>	<i>complanata</i>	53.2	6
207	No	9/26/2013	4762020	613790	0	<i>Elliptio</i>	<i>complanata</i>	54.9	5
207	No	9/26/2013	4762020	613790	0	<i>Elliptio</i>	<i>complanata</i>	55.6	5
207	No	9/26/2013	4762020	613790	0	<i>Elliptio</i>	<i>complanata</i>	60.1	7
207	No	9/26/2013	4762020	613790	0	<i>Lampsilis</i>	<i>radiata</i>	58.4	6
208	No	9/26/2013	4761859	613689	0	no mussels	no mussels	no mussels	no mussels
209	No	9/26/2013	4761630	613639	0	<i>Elliptio</i>	<i>complanata</i>	84.7	8
209	No	9/26/2013	4761630	613639	0	<i>Elliptio</i>	<i>complanata</i>	85.6	8
210	No	9/26/2013	4761598	613578	0	no mussels	no mussels	no mussels	no mussels
211	No	9/26/2013	4761550	613430	0	no mussels	no mussels	no mussels	no mussels
212	No	9/26/2013	4761460	613570	0	no mussels	no mussels	no mussels	no mussels
213	No	9/26/2013	4761371	613399	0	<i>Elliptio</i>	<i>complanata</i>	18.0	2
213	No	9/26/2013	4761371	613399	0	<i>Elliptio</i>	<i>complanata</i>	46.9	5
213	No	9/26/2013	4761371	613399	0	<i>Elliptio</i>	<i>complanata</i>	49.7	5
213	No	9/26/2013	4761371	613399	0	<i>Elliptio</i>	<i>complanata</i>	68.8	7
214	No	9/26/2013	4761358	613490	0	no mussels	no mussels	no mussels	no mussels
215	No	9/26/2013	4761169	613489	0	no mussels	no mussels	no mussels	no mussels
216	No	9/26/2013	4760999	613500	0	no mussels	no mussels	no mussels	no mussels
217	No	9/26/2013	4760959	613549	0	<i>Elliptio</i>	<i>complanata</i>	14.6	1
218	No	9/26/2013	4760920	613458	0	no mussels	no mussels	no mussels	no mussels
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	42.9	5
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	43.9	5
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	49.1	6
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	49.3	5
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	49.9	6
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	52.9	6
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	58.0	5
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	58.5	6
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	62.2	6

219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	67.5	7
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	68.9	5
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	70.9	6
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	71.7	7
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	72.1	6
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	74.4	7
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	74.5	7
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	75.6	7
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	77.0	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	77.8	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	77.9	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	79.5	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	80.0	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	83.2	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	96.7	8
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	99.9	9

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
219	No	9/26/2013	4760900	613378	0	<i>Elliptio</i>	<i>complanata</i>	101.4	10
219	No	9/26/2013	4760900	613378	0	<i>Lampsilis</i>	<i>radiata</i>	46.8	6
221	No	9/26/2013	4760730	613520	0	no mussels	no mussels	no mussels	no mussels
222	No	9/26/2013	4760600	613532	0	no mussels	no mussels	no mussels	no mussels
223	No	9/26/2013	4760590	613460	0	<i>Elliptio</i>	<i>complanata</i>	79.5	8
225	No	9/27/2013	4760282	613459	0	no mussels	no mussels	no mussels	no mussels
226	No	9/27/2013	4760269	613520	0	no mussels	no mussels	no mussels	no mussels
228	No	9/27/2013	4760089	613520	0	no mussels	no mussels	no mussels	no mussels
229	No	9/27/2013	4760000	613568	0	no mussels	no mussels	no mussels	no mussels
230	No	9/27/2013	4759630	613320	0	<i>Elliptio</i>	<i>complanata</i>	25.2	2
230	No	9/27/2013	4759630	613320	0	<i>Elliptio</i>	<i>complanata</i>	54.7	6
230	No	9/27/2013	4759630	613320	0	<i>Elliptio</i>	<i>complanata</i>	70.0	7
231	No	9/27/2013	4759629	613380	0	<i>Elliptio</i>	<i>complanata</i>	74.8	7
231	No	9/27/2013	4759629	613380	0	<i>Elliptio</i>	<i>complanata</i>	78.3	7
232	No	9/27/2013	4759580	613050	0	no mussels	no mussels	no mussels	no mussels
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	27.0	2
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	36.0	3
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	43.1	4
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	46.5	5
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	57.4	6
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	61.7	7
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	65.9	6
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	68.3	7
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	70.8	6
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	71.7	7
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	77.3	8
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	78.6	8
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	78.9	7
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	88.1	8
233	No	9/27/2013	4759560	613280	0	<i>Elliptio</i>	<i>complanata</i>	89.5	8
235	No	9/27/2013	4759398	612990	0	no mussels	no mussels	no mussels	no mussels
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	35.2	3
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	58.2	6
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	60.6	6
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	63.5	5
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	64.8	5
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	65.5	5
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	70.7	7
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	81.6	8
236	No	9/27/2013	4759381	612941	0	<i>Elliptio</i>	<i>complanata</i>	82.7	7

237	No	9/27/2013	4759221	612779	0	<i>Elliptio</i>	<i>complanata</i>	66.7	6
237	No	9/27/2013	4759221	612779	0	<i>Elliptio</i>	<i>complanata</i>	68.0	6
237	No	9/27/2013	4759221	612779	0	<i>Lampsilis</i>	<i>radiata</i>	59.2	7
238	No	9/27/2013	4759186	612447	0	<i>Elliptio</i>	<i>complanata</i>	44.7	5
238	No	9/27/2013	4759186	612447	0	<i>Elliptio</i>	<i>complanata</i>	48.2	5
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	33.3	3
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	50.6	5
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	57.3	6
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	59.0	6
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	59.7	6
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	61.5	6
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	70.0	6
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	70.2	7
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	71.6	6
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	77.0	7
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	77.7	7
239	No	9/27/2013	4759180	612721	0	<i>Elliptio</i>	<i>complanata</i>	80.7	7
240	No	9/27/2013	4759117	612333	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	57.5	7
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	62.3	7
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	63.5	7
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	72.4	7
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	78.1	7
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	81.1	7
270	No	10/1/2013	4757540	611800	0	<i>Elliptio</i>	<i>complanata</i>	81.5	7
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	36.3	3
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	39.0	4
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	40.6	4
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	45.5	4
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	62.3	5
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	72.0	7
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	83.9	8
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	88.5	8
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	88.9	8
272	No	10/1/2013	4757530	611680	0	<i>Elliptio</i>	<i>complanata</i>	93.9	8
274	No	10/1/2013	4757360	611718	0	<i>Elliptio</i>	<i>complanata</i>	26.5	2
274	No	10/1/2013	4757360	611718	0	<i>Elliptio</i>	<i>complanata</i>	31.5	3
274	No	10/1/2013	4757360	611718	0	<i>Elliptio</i>	<i>complanata</i>	68.2	6
274	No	10/1/2013	4757360	611718	0	<i>Elliptio</i>	<i>complanata</i>	74.0	7
274	No	10/1/2013	4757360	611718	0	<i>Elliptio</i>	<i>complanata</i>	77.1	7
274	No	10/1/2013	4757360	611718	0	<i>Elliptio</i>	<i>complanata</i>	79.0	8
275	No	10/1/2013	4757310	611839	0	<i>Elliptio</i>	<i>complanata</i>	64.6	5
275	No	10/1/2013	4757310	611839	0	<i>Elliptio</i>	<i>complanata</i>	69.1	6
275	No	10/1/2013	4757310	611839	0	<i>Elliptio</i>	<i>complanata</i>	76.0	6
275	No	10/1/2013	4757310	611839	0	<i>Elliptio</i>	<i>complanata</i>	81.2	7
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	42.6	4
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	46.3	5
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	63.5	6
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	63.9	6
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	67.6	6
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	67.8	7
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	68.1	7
277	No	10/1/2013	4757249	611709	0	<i>Elliptio</i>	<i>complanata</i>	79.4	8
277	No	10/1/2013	4757249	611709	1	<i>Elliptio</i>	<i>complanata</i>	79.9	8
285	No	10/1/2013	4756731	611720	0	<i>Elliptio</i>	<i>complanata</i>	25.5	2
285	No	10/1/2013	4756731	611720	0	<i>Elliptio</i>	<i>complanata</i>	29.2	2

286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	43.7	4
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	50.2	4
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	60.5	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	60.6	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	68.7	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	68.9	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	71.9	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	73.2	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	74.6	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	77.9	9
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	79.2	7
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	82.3	9
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	85.4	9
286	No	10/29/2013	4756731	611900	0	<i>Elliptio</i>	<i>complanata</i>	90.9	11
286	No	10/29/2013	4756731	611900	0	<i>Lampsilis</i>	<i>radiata</i>	51.2	5
286	No	10/29/2013	4756731	611900	0	<i>Lampsilis</i>	<i>radiata</i>	51.4	6
286	No	10/29/2013	4756731	611900	0	<i>Lampsilis</i>	<i>radiata</i>	51.6	6
286	No	10/29/2013	4756731	611900	0	<i>Lampsilis</i>	<i>radiata</i>	56.6	7
286	No	10/29/2013	4756731	611900	0	<i>Lampsilis</i>	<i>radiata</i>	57.5	7
286	No	10/29/2013	4756731	611900	0	<i>Lampsilis</i>	<i>radiata</i>	59.5	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	23.4	2
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	42.1	5
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	61.6	7
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	65.1	6
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	68.7	7
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	69.7	6
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	76.2	8
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	78.1	8
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	81.8	8
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	85.4	9
289	No	10/1/2013	4756691	611880	0	<i>Elliptio</i>	<i>complanata</i>	91.1	9
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	29.9	3
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	48.0	5
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	49.5	5
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	54.7	6
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	54.8	6
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	56.8	6
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	63.8	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	64.6	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	67.7	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	68.9	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	69.0	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	70.4	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	71.1	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	72.3	8
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	72.6	8
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	72.9	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	75.4	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	76.6	8
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	79.3	7
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	80.4	7
291	No	10/1/2013	4756619	611900	1	<i>Elliptio</i>	<i>complanata</i>	82.1	8
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	86.4	9
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	87.1	8
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	93.4	9
291	No	10/1/2013	4756619	611900	0	<i>Elliptio</i>	<i>complanata</i>	96.2	10

291	No	10/1/2013	4756619	611900	0	<i>Lampsilis</i>	<i>radiata</i>	49.1	5
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	50.7	5
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	58.0	6
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	58.8	5
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	63.0	7
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	69.5	6
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	78.2	8
292	No	10/1/2013	4756609	611840	0	<i>Elliptio</i>	<i>complanata</i>	82.8	8
292	No	10/1/2013	4756609	611840	0	<i>Lampsilis</i>	<i>radiata</i>	66.4	6
293	No	10/1/2013	4756579	611681	0	<i>Elliptio</i>	<i>complanata</i>	64.4	7
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	59.0	6
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	60.8	6
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	64.3	6
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	65.4	6
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	65.7	6
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	69.7	6
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	72.5	8
294	No	10/1/2013	4756580	611918	0	<i>Elliptio</i>	<i>complanata</i>	81.1	8
297	No	10/1/2013	4756342	611790	0	<i>Elliptio</i>	<i>complanata</i>	57.5	6
297	No	10/1/2013	4756342	611790	0	<i>Elliptio</i>	<i>complanata</i>	60.3	7
297	No	10/1/2013	4756342	611790	0	<i>Elliptio</i>	<i>complanata</i>	65.6	6
297	No	10/1/2013	4756342	611790	0	<i>Elliptio</i>	<i>complanata</i>	72.3	7

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
297	No	10/1/2013	4756342	611790	0	<i>Elliptio</i>	<i>complanata</i>	77.7	7
297	No	10/1/2013	4756342	611790	0	<i>Elliptio</i>	<i>complanata</i>	93.3	9
297	No	10/1/2013	4756342	611790	0	<i>Lampsilis</i>	<i>radiata</i>	38.6	3
298	No	10/1/2013	4756180	611711	0	<i>Lampsilis</i>	<i>radiata</i>	25.1	3
300	No	10/1/2013	4756030	611692	0	<i>Elliptio</i>	<i>complanata</i>	73.6	7
300	No	10/1/2013	4756030	611692	0	<i>Elliptio</i>	<i>complanata</i>	74.6	6
300	No	10/1/2013	4756030	611692	0	<i>Elliptio</i>	<i>complanata</i>	87.0	8
301	No	10/1/2013	4756018	611668	0	<i>Elliptio</i>	<i>complanata</i>	73.7	8
301	No	10/1/2013	4756018	611668	0	<i>Elliptio</i>	<i>complanata</i>	82.0	9
302	No	10/1/2013	4755961	611680	0	no mussels	no mussels	no mussels	no mussels
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	29.2	3
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	50.7	5
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	50.9	6
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	59.3	6
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	68.3	6
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	69.8	7
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	72.0	7
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	74.7	7
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	78.4	7
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	79.4	9
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	80.4	8
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	82.3	7
304	No	10/1/2013	4755930	611580	0	<i>Elliptio</i>	<i>complanata</i>	85.8	7
304	No	10/1/2013	4755930	611580	0	<i>Lampsilis</i>	<i>radiata</i>	60.1	6
306	No	10/1/2013	4755780	611650	0	<i>Elliptio</i>	<i>complanata</i>	66.4	6
306	No	10/1/2013	4755780	611650	0	<i>Elliptio</i>	<i>complanata</i>	73.2	7
306	No	10/1/2013	4755780	611650	0	<i>Elliptio</i>	<i>complanata</i>	82.2	9
308	No	10/1/2013	4755721	611600	0	<i>Elliptio</i>	<i>complanata</i>	48.7	4
308	No	10/1/2013	4755721	611600	0	<i>Elliptio</i>	<i>complanata</i>	78.6	8
308	No	10/1/2013	4755721	611600	0	<i>Elliptio</i>	<i>complanata</i>	86.7	9
308	No	10/1/2013	4755721	611600	0	<i>Elliptio</i>	<i>complanata</i>	96.8	11
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	23.5	2
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	37.4	4
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	53.1	5
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	62.5	6

309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	66.8	7
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	68.0	7
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	70.7	7
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	73.8	6
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	77.6	8
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	83.0	8
309	No	10/1/2013	4755720	611750	0	<i>Elliptio</i>	<i>complanata</i>	87.2	9
317	No	10/1/2013	4755561	611461	0	<i>Elliptio</i>	<i>complanata</i>	21.2	2
317	No	10/1/2013	4755561	611461	0	<i>Elliptio</i>	<i>complanata</i>	47.4	6
317	No	10/1/2013	4755561	611461	0	<i>Elliptio</i>	<i>complanata</i>	73.7	8
317	No	10/1/2013	4755561	611461	0	<i>Elliptio</i>	<i>complanata</i>	76.5	7
317	No	10/1/2013	4755561	611461	0	<i>Elliptio</i>	<i>complanata</i>	83.8	7
317	No	10/1/2013	4755561	611461	0	<i>Elliptio</i>	<i>complanata</i>	84.7	8
317	No	10/1/2013	4755561	611461	0	<i>Lampsilis</i>	<i>radiata</i>	49.9	5
318	No	10/1/2013	4755559	611479	0	<i>Elliptio</i>	<i>complanata</i>	75.5	7
318	No	10/1/2013	4755559	611479	0	<i>Elliptio</i>	<i>complanata</i>	77.1	8
318	No	10/1/2013	4755559	611479	0	<i>Elliptio</i>	<i>complanata</i>	83.0	9
318	No	10/1/2013	4755559	611479	0	<i>Elliptio</i>	<i>complanata</i>	83.7	8
318	No	10/1/2013	4755559	611479	0	<i>Elliptio</i>	<i>complanata</i>	84.6	8
318	No	10/1/2013	4755559	611479	0	<i>Elliptio</i>	<i>complanata</i>	108.1	10
322	No	10/3/2013	4755430	611567	0	<i>Elliptio</i>	<i>complanata</i>	85.8	7
324	No	10/3/2013	4755389	611471	0	<i>Elliptio</i>	<i>complanata</i>	34.9	3
324	No	10/3/2013	4755389	611471	0	<i>Elliptio</i>	<i>complanata</i>	47.0	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
324	No	10/3/2013	4755389	611471	0	<i>Elliptio</i>	<i>complanata</i>	58.2	6
324	No	10/3/2013	4755389	611471	0	<i>Elliptio</i>	<i>complanata</i>	71.1	7
324	No	10/3/2013	4755389	611471	0	<i>Elliptio</i>	<i>complanata</i>	91.1	8
324	No	10/3/2013	4755389	611471	0	<i>Elliptio</i>	<i>complanata</i>	91.3	9
324	No	10/3/2013	4755389	611471	0	<i>Lampsilis</i>	<i>radiata</i>	56.1	6
325	No	10/3/2013	4755321	611538	0	no mussels	no mussels	no mussels	no mussels
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	52.0	5
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	63.4	6
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	63.7	6
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	66.3	7
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	76.3	7
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	77.4	8
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	78.5	9
326	No	10/3/2013	4755280	611490	0	<i>Elliptio</i>	<i>complanata</i>	85.4	9
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	34.2	4
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	43.1	4
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	49.4	5
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	52.1	5
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	53.4	5
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	54.0	6
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	63.0	6
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	66.6	8
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	70.9	7
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	70.9	8
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	71.2	8
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	73.0	8
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	73.4	7
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	74.7	7
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	75.0	7
327	No	10/3/2013	4755247	611440	0	<i>Elliptio</i>	<i>complanata</i>	76.7	8
327	No	10/3/2013	4755247	611440	0	<i>Lampsilis</i>	<i>radiata</i>	62.6	6
330	No	10/3/2013	4755150	611131	0	<i>Elliptio</i>	<i>complanata</i>	46.9	5
338	No	10/29/2013	4755010	611324	0	no mussels	no mussels	no mussels	no mussels
339	No	10/3/2013	4755001	610220	0	no mussels	no mussels	no mussels	no mussels

340	No	10/3/2013	4754979	610649	0	<i>Elliptio</i>	<i>complanata</i>	71.0	7
340	No	10/3/2013	4754979	610649	0	<i>Elliptio</i>	<i>complanata</i>	77.0	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	39.6	3
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	55.7	5
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	56.0	5
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	58.3	6
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	58.8	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	63.4	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	66.4	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	67.3	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	69.5	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	82.4	8
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	83.6	8
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	84.0	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	85.3	7
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	86.3	9
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	88.1	8
341	No	10/3/2013	4754971	610470	0	<i>Elliptio</i>	<i>complanata</i>	88.2	8
341	No	10/3/2013	4754971	610470	0	<i>Lampsilis</i>	<i>radiata</i>	55.1	7
343	No	10/3/2013	4754951	610452	0	<i>Elliptio</i>	<i>complanata</i>	85.6	8
344	No	10/3/2013	4754933	610071	0	no mussels	no mussels	no mussels	no mussels
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	56.5	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	59.1	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	60.0	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	60.1	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	61.7	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	62.0	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	62.8	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	65.1	7
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	65.7	5
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	72.5	6
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	73.6	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	74.5	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	74.5	7
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	75.6	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	77.3	7
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	79.7	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	79.9	7
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	81.7	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	82.7	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	83.1	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	83.6	7
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	86.0	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	88.2	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	89.5	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	90.0	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	91.8	8
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	93.6	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	96.0	9
345	No	10/3/2013	4754912	610229	0	<i>Elliptio</i>	<i>complanata</i>	97.1	9
346	No	10/3/2013	4754909	610530	0	<i>Elliptio</i>	<i>complanata</i>	14.6	1
346	No	10/3/2013	4754909	610530	0	<i>Elliptio</i>	<i>complanata</i>	72.7	7
346	No	10/3/2013	4754909	610530	0	<i>Elliptio</i>	<i>complanata</i>	80.0	7
346	No	10/3/2013	4754909	610530	0	<i>Elliptio</i>	<i>complanata</i>	92.4	9
347	No	10/3/2013	4754890	610430	0	<i>Elliptio</i>	<i>complanata</i>	95.0	9
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	20.1	1
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	26.1	2

348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	47.0	5
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	54.6	5
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	55.5	5
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	60.2	6
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	67.9	6
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	68.9	7
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	73.7	6
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	75.0	7
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	77.2	8
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	78.0	8
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	78.3	7
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	83.2	8
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	84.1	8
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	87.0	8
348	No	10/3/2013	4754820	610661	0	<i>Elliptio</i>	<i>complanata</i>	88.8	8
349	No	10/3/2013	4754811	610230	0	no mussels	no mussels	no mussels	no mussels
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	34.7	5
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	49.5	5
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	60.1	6
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	60.7	5
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	74.8	8
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	76.1	6
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	77.0	8
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	77.9	9
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	78.5	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	80.0	9
29	Yes	9/17/2013	4773662	615891	0	<i>Elliptio</i>	<i>complanata</i>	88.1	8
61	Yes	9/19/2013	4771022	615800	0	no mussels	no mussels	no mussels	no mussels
65	Yes	9/19/2013	4770921	615808	0	<i>Elliptio</i>	<i>complanata</i>	21.1	2
65	Yes	9/19/2013	4770921	615808	0	<i>Elliptio</i>	<i>complanata</i>	24.5	2
66	Yes	9/19/2013	4770841	615832	0	no mussels	no mussels	no mussels	no mussels
67	Yes	9/19/2013	4770827	615911	0	<i>Elliptio</i>	<i>complanata</i>	33.7	3
67	Yes	9/19/2013	4770827	615911	0	<i>Elliptio</i>	<i>complanata</i>	60.5	7
67	Yes	9/19/2013	4770827	615911	0	<i>Elliptio</i>	<i>complanata</i>	63.1	6
67	Yes	9/19/2013	4770827	615911	0	<i>Elliptio</i>	<i>complanata</i>	63.6	6
67	Yes	9/19/2013	4770827	615911	0	<i>Elliptio</i>	<i>complanata</i>	68.5	6
67	Yes	9/19/2013	4770827	615911	0	<i>Elliptio</i>	<i>complanata</i>	75.9	7
95	Yes	9/20/2013	4768601	615789	0	<i>Elliptio</i>	<i>complanata</i>	17.9	2
95	Yes	9/20/2013	4768601	615789	0	<i>Elliptio</i>	<i>complanata</i>	29.2	3
95	Yes	9/20/2013	4768601	615789	0	<i>Elliptio</i>	<i>complanata</i>	54.4	5
95	Yes	9/20/2013	4768601	615789	0	<i>Elliptio</i>	<i>complanata</i>	57.5	5
103	Yes	9/20/2013	4768322	615900	0	<i>Lampsilis</i>	<i>radiata</i>	52.8	5
110	Yes	9/20/2013	4768221	615938	0	no mussels	no mussels	no mussels	no mussels
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	26.6	3
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	39.4	4
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	49.8	4
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	51.2	5
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	51.8	5
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	54.1	6
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	54.6	6
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	56.5	6
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	60.0	6
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	62.6	6
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	64.1	7
111	Yes	9/20/2013	4768201	615920	0	<i>Elliptio</i>	<i>complanata</i>	84.5	8
112	Yes	9/20/2013	4768188	615930	0	<i>Elliptio</i>	<i>complanata</i>	20.3	3

112	Yes	9/20/2013	4768188	615930	0	<i>Elliptio</i>	<i>complanata</i>	61.7	6
116	Yes	9/20/2013	4768100	615735	0	<i>Elliptio</i>	<i>complanata</i>	29.8	3
116	Yes	9/20/2013	4768100	615735	0	<i>Elliptio</i>	<i>complanata</i>	30.5	3
116	Yes	9/20/2013	4768100	615735	0	<i>Elliptio</i>	<i>complanata</i>	44.7	4
128	Yes	9/20/2013	4767520	615380	0	no mussels	no mussels	no mussels	no mussels
129	Yes	10/31/2013	4767499	615070	0	no mussels	no mussels	no mussels	no mussels
131	Yes	9/24/2013	4767436	615046	0	no mussels	no mussels	no mussels	no mussels
132	Yes	9/24/2013	4767440	615010	0	no mussels	no mussels	no mussels	no mussels
134	Yes	9/20/2013	4767434	615207	0	<i>Elliptio</i>	<i>complanata</i>	18.4	2
134	Yes	9/20/2013	4767434	615207	0	<i>Elliptio</i>	<i>complanata</i>	23.0	3
135	Yes	9/24/2013	4767431	615031	0	no mussels	no mussels	no mussels	no mussels
136	Yes	9/20/2013	4767430	615181	0	no mussels	no mussels	no mussels	no mussels
137	Yes	9/20/2013	4767429	615189	0	<i>Elliptio</i>	<i>complanata</i>	68.3	7
138	Yes	10/31/2013	4767420	614970	0	no mussels	no mussels	no mussels	no mussels
139	Yes	10/31/2013	4767411	614990	0	no mussels	no mussels	no mussels	no mussels
140	Yes	9/20/2013	4767399	615188	0	<i>Elliptio</i>	<i>complanata</i>	62.9	6
140	Yes	9/20/2013	4767399	615188	0	<i>Lampsilis</i>	<i>radiata</i>	61.2	7
141	Yes	10/31/2013	4767390	615010	0	no mussels	no mussels	no mussels	no mussels
142	Yes	10/31/2013	4767379	615049	0	no mussels	no mussels	no mussels	no mussels
149	Yes	9/24/2013	4766532	615110	0	no mussels	no mussels	no mussels	no mussels
150	Yes	9/24/2013	4766520	615122	0	no mussels	no mussels	no mussels	no mussels
152	Yes	9/24/2013	4766260	614942	0	<i>Elliptio</i>	<i>complanata</i>	11.7	1
152	Yes	9/24/2013	4766260	614942	0	<i>Elliptio</i>	<i>complanata</i>	19.5	2
152	Yes	9/24/2013	4766260	614942	0	<i>Elliptio</i>	<i>complanata</i>	37.1	4
152	Yes	9/24/2013	4766260	614942	0	<i>Elliptio</i>	<i>complanata</i>	65.4	6
152	Yes	9/24/2013	4766260	614942	0	<i>Elliptio</i>	<i>complanata</i>	65.8	7
152	Yes	9/24/2013	4766260	614942	0	<i>Elliptio</i>	<i>complanata</i>	70.3	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
153	Yes	9/24/2013	4766229	614919	0	<i>Elliptio</i>	<i>complanata</i>	38.7	4
153	Yes	9/24/2013	4766229	614919	0	<i>Elliptio</i>	<i>complanata</i>	74.4	6
154	Yes	9/24/2013	4766220	614917	0	<i>Elliptio</i>	<i>complanata</i>	51.6	5
154	Yes	9/24/2013	4766220	614917	0	<i>Elliptio</i>	<i>complanata</i>	52.1	5
154	Yes	9/24/2013	4766220	614917	0	<i>Elliptio</i>	<i>complanata</i>	61.5	6
154	Yes	9/24/2013	4766220	614917	0	<i>Elliptio</i>	<i>complanata</i>	65.8	6
154	Yes	9/24/2013	4766220	614917	0	<i>Elliptio</i>	<i>complanata</i>	80.5	7
154	Yes	9/24/2013	4766220	614917	0	<i>Elliptio</i>	<i>complanata</i>	82.8	7
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	52.9	5
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	56.2	5
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	63.7	5
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	65.4	6
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	65.6	7
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	68.2	7
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	69.8	6
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	76.7	6
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	79.4	7
155	Yes	9/24/2013	4766208	614918	0	<i>Elliptio</i>	<i>complanata</i>	81.7	8
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	17.5	2
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	31.6	3
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	41.0	4
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	52.3	5
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	57.0	6
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	57.1	6
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	59.4	6
157	Yes	9/24/2013	4766090	614960	0	<i>Elliptio</i>	<i>complanata</i>	60.9	6
157	Yes	9/24/2013	4766170	614890	0	<i>Elliptio</i>	<i>complanata</i>	63.5	6
157	Yes	9/24/2013	4766090	614960	0	<i>Ligumia</i>	<i>nasuta</i>	36.7	4
160	Yes	9/24/2013	4765962	614740	0	<i>Elliptio</i>	<i>complanata</i>	49.3	5

163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	53.2	6
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	53.5	6
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	59.6	6
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	68.0	6
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	68.5	7
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	70.5	7
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	75.3	8
163	Yes	9/24/2013	4765901	614747	0	<i>Elliptio</i>	<i>complanata</i>	79.0	8
163	Yes	9/24/2013	4765901	614747	0	<i>Lampsilis</i>	<i>radiata</i>	48.8	5
166	Yes	9/24/2013	4765871	614719	0	<i>Elliptio</i>	<i>complanata</i>	39.6	4
166	Yes	9/24/2013	4765871	614719	0	<i>Elliptio</i>	<i>complanata</i>	54.5	5
166	Yes	9/24/2013	4765871	614719	0	<i>Elliptio</i>	<i>complanata</i>	55.5	5
166	Yes	9/24/2013	4765871	614719	0	<i>Elliptio</i>	<i>complanata</i>	57.0	6
166	Yes	9/24/2013	4765871	614719	0	<i>Elliptio</i>	<i>complanata</i>	63.0	7
166	Yes	9/24/2013	4765871	614719	0	<i>Elliptio</i>	<i>complanata</i>	70.0	7
180	Yes	9/24/2013	4764770	614839	0	<i>Elliptio</i>	<i>complanata</i>	27.2	3
180	Yes	9/24/2013	4764770	614839	0	<i>Elliptio</i>	<i>complanata</i>	33.0	3
180	Yes	9/24/2013	4764770	614839	0	<i>Elliptio</i>	<i>complanata</i>	52.9	5
180	Yes	9/24/2013	4764770	614839	0	<i>Elliptio</i>	<i>complanata</i>	54.2	5
180	Yes	9/24/2013	4764770	614839	0	<i>Lampsilis</i>	<i>radiata</i>	54.9	6
182	Yes	9/24/2013	4764604	614878	0	no mussels	no mussels	no mussels	no mussels
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	60.3	6
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	63.3	7
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	64.3	7
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	65.5	6
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	66.3	7
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	70.2	7
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	73.1	7
183	Yes	9/24/2013	4764568	614871	0	<i>Elliptio</i>	<i>complanata</i>	88.4	9

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
184	Yes	9/26/2013	4764491	614882	0	<i>Elliptio</i>	<i>complanata</i>	29.7	2
184	Yes	9/26/2013	4764491	614882	0	<i>Elliptio</i>	<i>complanata</i>	49.8	4
184	Yes	9/26/2013	4764491	614882	0	<i>Elliptio</i>	<i>complanata</i>	64.0	6
184	Yes	9/26/2013	4764491	614882	0	<i>Elliptio</i>	<i>complanata</i>	71.7	6
193	Yes	9/26/2013	4763410	614510	0	<i>Elliptio</i>	<i>complanata</i>	31.2	3
193	Yes	9/26/2013	4763410	614510	0	<i>Elliptio</i>	<i>complanata</i>	53.7	5
193	Yes	9/26/2013	4763410	614510	0	<i>Elliptio</i>	<i>complanata</i>	64.7	7
193	Yes	9/26/2013	4763410	614510	0	<i>Elliptio</i>	<i>complanata</i>	74.5	7
194	Yes	9/26/2013	4763341	614490	0	<i>Elliptio</i>	<i>complanata</i>	40.9	5
194	Yes	9/26/2013	4763341	614490	0	<i>Elliptio</i>	<i>complanata</i>	45.3	5
194	Yes	9/26/2013	4763341	614490	0	<i>Elliptio</i>	<i>complanata</i>	52.4	6
194	Yes	9/26/2013	4763341	614490	0	<i>Elliptio</i>	<i>complanata</i>	53.3	5
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	33.5	3
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	37.0	4
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	43.0	5
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	48.0	5
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	60.2	6
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	62.9	7
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	62.9	7
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	67.8	7
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	70.1	7
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	75.1	8
195	Yes	9/26/2013	4763319	614492	0	<i>Elliptio</i>	<i>complanata</i>	76.6	8
220	Yes	9/26/2013	4760820	613574	0	<i>Elliptio</i>	<i>complanata</i>	55.2	6
220	Yes	9/26/2013	4760820	613574	0	<i>Elliptio</i>	<i>complanata</i>	67.1	6
227	Yes	9/27/2013	4760209	613558	0	<i>Elliptio</i>	<i>complanata</i>	54.2	5
234	Yes	9/27/2013	4759502	612920	0	<i>Elliptio</i>	<i>complanata</i>	86.1	8

234	Yes	9/27/2013	4759502	612920	0	<i>Elliptio</i>	<i>complanata</i>	89.7	9
234	Yes	9/27/2013	4759502	612920	0	<i>Elliptio</i>	<i>complanata</i>	91.7	9
234	Yes	9/27/2013	4759502	612920	0	<i>Elliptio</i>	<i>complanata</i>	95.2	8
243	Yes	9/27/2013	4759020	612150	0	no mussels	no mussels	no mussels	no mussels
249	Yes	9/27/2013	4758840	611839	0	<i>Elliptio</i>	<i>complanata</i>	41.2	4
250	Yes	9/27/2013	4758830	611820	0	no mussels	no mussels	no mussels	no mussels
252	Yes	10/29/2013	4758730	611702	0	no mussels	no mussels	no mussels	no mussels
254	Yes	10/29/2013	4758720	611680	0	no mussels	no mussels	no mussels	no mussels
256	Yes	10/29/2013	4758678	611668	0	<i>Elliptio</i>	<i>complanata</i>	49.1	5
258	Yes	10/29/2013	4758660	611610	0	no mussels	no mussels	no mussels	no mussels
259	Yes	9/27/2013	4758509	611539	0	<i>Elliptio</i>	<i>complanata</i>	50.4	5
259	Yes	9/27/2013	4758509	611539	0	<i>Elliptio</i>	<i>complanata</i>	67.4	7
259	Yes	9/27/2013	4758509	611539	0	<i>Elliptio</i>	<i>complanata</i>	76.6	8
259	Yes	9/27/2013	4758509	611539	0	<i>Elliptio</i>	<i>complanata</i>	79.7	8
259	Yes	9/27/2013	4758509	611539	0	<i>Lampsilis</i>	<i>radiata</i>	28.2	3
262	Yes	10/1/2013	4758107	611700	0	<i>Elliptio</i>	<i>complanata</i>	59.4	6
262	Yes	10/1/2013	4758107	611700	0	<i>Elliptio</i>	<i>complanata</i>	67.8	7
263	Yes	10/1/2013	4757980	611678	0	no mussels	no mussels	no mussels	no mussels
265	Yes	10/1/2013	4757830	611711	0	no mussels	no mussels	no mussels	no mussels
266	Yes	10/1/2013	4757810	611740	0	no mussels	no mussels	no mussels	no mussels
267	Yes	10/1/2013	4757760	611750	0	<i>Elliptio</i>	<i>complanata</i>	30.1	3
267	Yes	10/1/2013	4757760	611750	0	<i>Elliptio</i>	<i>complanata</i>	34.4	3
267	Yes	10/1/2013	4757760	611750	0	<i>Elliptio</i>	<i>complanata</i>	34.5	3
267	Yes	10/1/2013	4757760	611750	0	<i>Elliptio</i>	<i>complanata</i>	74.2	7
269	Yes	10/1/2013	4757629	611790	0	<i>Elliptio</i>	<i>complanata</i>	21.6	3
269	Yes	10/1/2013	4757629	611790	0	<i>Elliptio</i>	<i>complanata</i>	83.7	9
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	58.1	6
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	59.8	6
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	69.2	6
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	71.2	6
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	72.7	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	76.9	7
271	Yes	10/1/2013	4757539	611810	0	<i>Elliptio</i>	<i>complanata</i>	81.6	7
273	Yes	10/1/2013	4757450	611852	0	<i>Elliptio</i>	<i>complanata</i>	25.5	2
273	Yes	10/1/2013	4757450	611852	0	<i>Elliptio</i>	<i>complanata</i>	52.9	5
273	Yes	10/1/2013	4757450	611852	0	<i>Elliptio</i>	<i>complanata</i>	66.3	7
273	Yes	10/1/2013	4757450	611852	0	<i>Elliptio</i>	<i>complanata</i>	74.6	7
273	Yes	10/1/2013	4757450	611852	0	<i>Elliptio</i>	<i>complanata</i>	75.0	7
273	Yes	10/1/2013	4757450	611852	0	<i>Elliptio</i>	<i>complanata</i>	78.4	7
273	Yes	10/1/2013	4757450	611852	0	<i>Lampsilis</i>	<i>radiata</i>	30.1	2
276	Yes	10/1/2013	4757292	611892	0	<i>Elliptio</i>	<i>complanata</i>	55.7	6
276	Yes	10/1/2013	4757292	611892	0	<i>Elliptio</i>	<i>complanata</i>	59.8	6
276	Yes	10/1/2013	4757292	611892	0	<i>Elliptio</i>	<i>complanata</i>	67.1	7
276	Yes	10/1/2013	4757292	611892	0	<i>Elliptio</i>	<i>complanata</i>	83.0	8
278	Yes	10/29/2013	4756941	611900	0	no mussels	no mussels	no mussels	no mussels
279	Yes	10/29/2013	4756881	611909	0	no mussels	no mussels	no mussels	no mussels
280	Yes	10/29/2013	4756870	611911	0	no mussels	no mussels	no mussels	no mussels
281	Yes	10/29/2013	4756871	611920	0	no mussels	no mussels	no mussels	no mussels
282	Yes	10/29/2013	4756850	611901	0	<i>Elliptio</i>	<i>complanata</i>	74.6	8
283	Yes	10/29/2013	4756811	611909	0	no mussels	no mussels	no mussels	no mussels
287	Yes	10/29/2013	4756710	611937	0	no mussels	no mussels	no mussels	no mussels
288	Yes	10/29/2013	4756700	611919	0	<i>Elliptio</i>	<i>complanata</i>	38.2	5
288	Yes	10/29/2013	4756700	611919	0	<i>Elliptio</i>	<i>complanata</i>	43.5	5
288	Yes	10/29/2013	4756700	611919	0	<i>Elliptio</i>	<i>complanata</i>	50.1	5
288	Yes	10/29/2013	4756700	611919	0	<i>Elliptio</i>	<i>complanata</i>	55.4	7
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	45.9	5

290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	49.6	5
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	51.4	5
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	55.0	5
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	61.2	6
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	62.4	6
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	65.0	7
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	68.7	7
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	73.6	7
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	78.1	7
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	86.5	8
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	90.8	8
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	90.9	10
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	95.3	10
290	Yes	10/1/2013	4756659	611920	0	<i>Elliptio</i>	<i>complanata</i>	96.3	9
295	Yes	10/29/2013	4756460	611860	0	<i>Elliptio</i>	<i>complanata</i>	66.4	8
295	Yes	10/29/2013	4756460	611860	0	<i>Elliptio</i>	<i>complanata</i>	67.1	8
295	Yes	10/29/2013	4756460	611860	0	<i>Elliptio</i>	<i>complanata</i>	74.8	8
296	Yes	10/1/2013	4756379	611889	0	<i>Elliptio</i>	<i>complanata</i>	58.8	6
296	Yes	10/1/2013	4756379	611889	0	<i>Elliptio</i>	<i>complanata</i>	72.8	7
296	Yes	10/1/2013	4756379	611889	0	<i>Elliptio</i>	<i>complanata</i>	74.9	7
296	Yes	10/1/2013	4756379	611889	0	<i>Elliptio</i>	<i>complanata</i>	94.9	8
299	Yes	10/29/2013	4756179	611810	0	no mussels	no mussels	no mussels	no mussels
303	Yes	10/29/2013	4755949	611771	0	no mussels	no mussels	no mussels	no mussels
305	Yes	10/29/2013	4755829	611759	0	<i>Lampsilis</i>	<i>radiata</i>	42.8	5
307	Yes	10/1/2013	4755752	611769	0	<i>Elliptio</i>	<i>complanata</i>	64.5	6
310	Yes	10/1/2013	4755670	611710	0	<i>Elliptio</i>	<i>complanata</i>	20.7	2
310	Yes	10/1/2013	4755670	611710	0	<i>Lampsilis</i>	<i>radiata</i>	64.9	6
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	23.5	2
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	25.4	3
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	31.0	3
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	46.6	4
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	52.4	5
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	62.4	6

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	64.5	6
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	76.0	7
311	Yes	10/1/2013	4755661	611741	0	<i>Elliptio</i>	<i>complanata</i>	90.3	8
312	Yes	10/29/2013	4755600	611759	0	<i>Elliptio</i>	<i>complanata</i>	65.4	7
313	Yes	10/1/2013	4755581	611659	0	<i>Elliptio</i>	<i>complanata</i>	43.5	3
313	Yes	10/1/2013	4755581	611659	0	<i>Elliptio</i>	<i>complanata</i>	69.9	6
314	Yes	10/29/2013	4755581	611761	0	no mussels	no mussels	no mussels	no mussels
315	Yes	10/1/2013	4755571	611681	0	<i>Elliptio</i>	<i>complanata</i>	63.5	6
315	Yes	10/1/2013	4755571	611681	0	<i>Elliptio</i>	<i>complanata</i>	72.2	8
315	Yes	10/1/2013	4755571	611681	0	<i>Ligumia</i>	<i>nasuta</i>	55.6	5
316	Yes	10/29/2013	4755572	611760	0	no mussels	no mussels	no mussels	no mussels
319	Yes	10/1/2013	4755552	611600	0	<i>Elliptio</i>	<i>complanata</i>	21.0	2
320	Yes	10/29/2013	4755491	611622	0	no mussels	no mussels	no mussels	no mussels
321	Yes	10/1/2013	4755490	611629	0	<i>Elliptio</i>	<i>complanata</i>	69.8	7
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	27.4	3
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	44.4	5
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	55.6	6
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	60.0	6
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	69.9	6
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	70.3	7
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	78.2	7
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	81.3	8
323	Yes	10/3/2013	4755420	611549	0	<i>Elliptio</i>	<i>complanata</i>	82.7	9

323	Yes	10/3/2013	4755420	611549	0	<i>Lampsilis</i>	<i>radiata</i>	52.6	7
328	Yes	10/29/2013	4755210	611450	0	no mussels	no mussels	no mussels	no mussels
329	Yes	10/29/2013	4755170	611471	0	no mussels	no mussels	no mussels	no mussels
331	Yes	10/3/2013	4755100	611040	0	<i>Elliptio</i>	<i>complanata</i>	18.4	2
331	Yes	10/3/2013	4755100	611040	0	<i>Elliptio</i>	<i>complanata</i>	57.1	6
332	Yes	10/3/2013	4755070	610960	0	<i>Elliptio</i>	<i>complanata</i>	60.4	6
332	Yes	10/3/2013	4755070	610960	0	<i>Elliptio</i>	<i>complanata</i>	79.6	7
333	Yes	10/3/2013	4755050	610910	0	<i>Elliptio</i>	<i>complanata</i>	54.0	5
333	Yes	10/3/2013	4755050	610910	0	<i>Elliptio</i>	<i>complanata</i>	59.4	6
334	Yes	10/3/2013	4755030	610800	0	<i>Elliptio</i>	<i>complanata</i>	34.3	4
334	Yes	10/3/2013	4755030	610800	0	<i>Elliptio</i>	<i>complanata</i>	75.0	7
334	Yes	10/3/2013	4755030	610800	0	<i>Elliptio</i>	<i>complanata</i>	75.2	7
334	Yes	10/3/2013	4755030	610800	0	<i>Elliptio</i>	<i>complanata</i>	86.2	7
335	Yes	10/29/2013	4755030	611291	0	no mussels	no mussels	no mussels	no mussels
336	Yes	10/3/2013	4755019	610760	0	<i>Elliptio</i>	<i>complanata</i>	75.0	7
337	Yes	10/29/2013	4755010	611240	0	no mussels	no mussels	no mussels	no mussels
342	Yes	10/29/2013	4754971	611275	0	no mussels	no mussels	no mussels	no mussels
350	Yes	10/3/2013	4754780	610311	0	<i>Elliptio</i>	<i>complanata</i>	39.4	4

Hudson River Natural Resource Trustees

2015 Upper Hudson Freshwater Mussel Survey

Table 6. Upper Mechanicville Pool Sampling Location and Field Mussel Data (2015 Surveys)

Hudson River - River Section 3 Upper Mechanicville Pool

August 2015

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels		Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
3	No	8/24/2015	609795	4754618	0	no mussels	no mussels	no mussels	no mussels	no mussels
4	No	8/24/2015	609567	4754576	0	no mussels	no mussels	no mussels	no mussels	no mussels
5	No	8/24/2015	609733	4754565	0	no mussels	no mussels	no mussels	no mussels	no mussels
6	No	8/24/2015	609656	4754572	0	no mussels	no mussels	no mussels	no mussels	no mussels
7	No	8/24/2015	609945	4754560	0	no mussels	no mussels	no mussels	no mussels	no mussels
8	No	8/24/2015	609609	4754538	0	no mussels	no mussels	no mussels	no mussels	no mussels
9	No	8/24/2015	609576	4754509	0	no mussels	no mussels	no mussels	no mussels	no mussels
10	No	8/24/2015	609799	4754472	0	no mussels	no mussels	no mussels	no mussels	no mussels
11	No	8/24/2015	609851	4754526	0	no mussels	no mussels	no mussels	no mussels	no mussels
12	No	8/24/2015	609755	4754485	0	no mussels	no mussels	no mussels	no mussels	no mussels
13	No	8/24/2015	609538	4754475	0	no mussels	no mussels	no mussels	no mussels	no mussels
14	No	8/24/2015	609206	4754455	0	no mussels	no mussels	no mussels	no mussels	no mussels
15	No	8/24/2015	609294	4754455	0	no mussels	no mussels	no mussels	no mussels	no mussels
16	No	8/24/2015	609389	4754442	0	no mussels	no mussels	no mussels	no mussels	no mussels
17	No	8/24/2015	609591	4754437	0	no mussels	no mussels	no mussels	no mussels	no mussels
18	No	8/24/2015	609473	4754415	0	<i>Elliptio</i>	<i>complanata</i>		70.8	10
19	No	8/24/2015	609643	4754399	0	no mussels	no mussels	no mussels	no mussels	no mussels
20	No	8/24/2015	609337	4754368	0	no mussels	no mussels	no mussels	no mussels	no mussels
21	No	8/24/2015	609260	4754360	0	no mussels	no mussels	no mussels	no mussels	no mussels
22	No	8/24/2015	609188	4754292	0	no mussels	no mussels	no mussels	no mussels	no mussels
23	No	8/24/2015	609214	4754284	0	no mussels	no mussels	no mussels	no mussels	no mussels
24	No	8/24/2015	609315	4754272	0	no mussels	no mussels	no mussels	no mussels	no mussels
25	No	8/24/2015	609173	4754268	0	no mussels	no mussels	no mussels	no mussels	no mussels
26	No	8/24/2015	609216	4754236	0	<i>Elliptio</i>	<i>complanata</i>		60.6	9
27	No	8/24/2015	609215	4754224	0	no mussels	no mussels	no mussels	no mussels	no mussels
28	No	8/24/2015	609216	4754196	0	no mussels	no mussels	no mussels	no mussels	no mussels
29	No	8/20/2015	609095	4754113	0	no mussels	no mussels	no mussels	no mussels	no mussels
30	No	8/3/2015	609655	4754076	0	no mussels	no mussels	no mussels	no mussels	no mussels
31	No	8/20/2015	609226	4754063	0	no mussels	no mussels	no mussels	no mussels	no mussels
32	No	8/20/2015	609085	4754055	0	no mussels	no mussels	no mussels	no mussels	no mussels
33	No	8/20/2015	609036	4754044	0	no mussels	no mussels	no mussels	no mussels	no mussels
34	No	8/3/2015	609635	4754035	0	no mussels	no mussels	no mussels	no mussels	no mussels
35	No	8/3/2015	609575	4753987	0	no mussels	no mussels	no mussels	no mussels	no mussels
36	No	8/20/2015	609093	4753974	0	no mussels	no mussels	no mussels	no mussels	no mussels
37	No	8/20/2015	608885	4753963	0	no mussels	no mussels	no mussels	no mussels	no mussels
38	No	8/20/2015	609031	4753965	0	no mussels	no mussels	no mussels	no mussels	no mussels
39	No	8/20/2015	609112	4753855	0	<i>Elliptio</i>	<i>complanata</i>		72.5	9
40	No	8/20/2015	608929	4753829	0	no mussels	no mussels	no mussels	no mussels	no mussels
41	No	8/20/2015	608859	4753755	0	no mussels	no mussels	no mussels	no mussels	no mussels
42	No	8/20/2015	608755	4753716	0	no mussels	no mussels	no mussels	no mussels	no mussels
43	No	8/20/2015	608834	4753715	0	no mussels	no mussels	no mussels	no mussels	no mussels
44	No	8/3/2015	609086	4753724	0	no mussels	no mussels	no mussels	no mussels	no mussels
45	No	8/20/2015	608895	4753658	0	no mussels	no mussels	no mussels	no mussels	no mussels
46	No	8/3/2015	609080	4753664	0	no mussels	no mussels	no mussels	no mussels	no mussels

47	No	8/3/2015	609097	4753644	0	no mussels	no mussels	no mussels	no mussels
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Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
48	No	8/3/2015	609287	4753645	0	no mussels	no mussels	no mussels	no mussels
49	No	8/3/2015	609225	4753586	0	no mussels	no mussels	no mussels	no mussels
50	No	8/3/2015	609103	4753505	0	no mussels	no mussels	no mussels	no mussels
51	No	8/20/2015	608745	4753530	0	no mussels	no mussels	no mussels	no mussels
52	No	8/20/2015	608764	4753533	0	no mussels	no mussels	no mussels	no mussels
53	No	8/3/2015	609093	4753535	0	no mussels	no mussels	no mussels	no mussels
54	No	8/5/2015	609035	4753506	0	no mussels	no mussels	no mussels	no mussels
55	No	8/20/2015	608810	4753475	0	no mussels	no mussels	no mussels	no mussels
56	No	8/3/2015	609295	4753475	0	no mussels	no mussels	no mussels	no mussels
57	No	8/5/2015	609000	4753455	0	no mussels	no mussels	no mussels	no mussels
58	No	8/5/2015	609065	4753415	0	no mussels	no mussels	no mussels	no mussels
59	No	8/3/2015	609236	4753414	0	no mussels	no mussels	no mussels	no mussels
60	No	8/5/2015	608944	4753375	0	no mussels	no mussels	no mussels	no mussels
61	No	8/5/2015	608995	4753365	0	no mussels	no mussels	no mussels	no mussels
62	No	8/5/2015	608967	4753335	0	no mussels	no mussels	no mussels	no mussels
63	No	8/18/2015	608645	4753270	0	no mussels	no mussels	no mussels	no mussels
64	No	8/5/2015	608845	4753206	0	no mussels	no mussels	no mussels	no mussels
65	No	8/5/2015	608877	4753205	0	no mussels	no mussels	no mussels	no mussels
66	No	8/5/2015	609043	4753205	0	no mussels	no mussels	no mussels	no mussels
67	No	8/5/2015	608595	4753185	0	no mussels	no mussels	no mussels	no mussels
68	No	8/5/2015	609125	4753175	0	no mussels	no mussels	no mussels	no mussels
69	No	8/18/2015	608565	4753155	0	no mussels	no mussels	no mussels	no mussels
70	No	8/5/2015	608615	4753155	0	no mussels	no mussels	no mussels	no mussels
71	No	8/5/2015	608957	4753136	0	no mussels	no mussels	no mussels	no mussels
72	No	8/5/2015	608615	4753126	0	no mussels	no mussels	no mussels	no mussels
73	No	8/5/2015	608755	4753075	0	no mussels	no mussels	no mussels	no mussels
74	No	8/18/2015	608441	4753065	0	no mussels	no mussels	no mussels	no mussels
75	No	8/5/2015	608715	4753037	0	no mussels	no mussels	no mussels	no mussels
76	No	8/5/2015	608955	4753016	0	no mussels	no mussels	no mussels	no mussels
77	No	8/5/2015	608702	4752985	0	no mussels	no mussels	no mussels	no mussels
78	No	8/5/2015	608585	4752975	0	no mussels	no mussels	no mussels	no mussels
79	No	8/5/2015	608534	4752955	0	no mussels	no mussels	no mussels	no mussels
80	No	8/18/2015	608645	4752926	0	no mussels	no mussels	no mussels	no mussels
81	No	8/5/2015	608825	4752924	0	no mussels	no mussels	no mussels	no mussels
82	No	8/18/2015	608594	4752874	0	no mussels	no mussels	no mussels	no mussels
83	No	8/5/2015	608838	4752872	0	no mussels	no mussels	no mussels	no mussels
84	No	8/18/2015	608344	4752856	0	no mussels	no mussels	no mussels	no mussels
85	No	8/18/2015	608554	4752851	0	<i>Elliptio</i>	<i>complanata</i>	11	2
86	No	8/18/2015	608335	4752835	0	no mussels	no mussels	no mussels	no mussels
87	No	8/18/2015	608545	4752791	0	<i>Elliptio</i>	<i>complanata</i>	80.1	11
88	No	8/18/2015	608265	4752772	0	no mussels	no mussels	no mussels	no mussels
89	No	8/18/2015	608705	4752774	0	no mussels	no mussels	no mussels	no mussels
90	No	8/18/2015	608435	4752745	0	<i>Elliptio</i>	<i>complanata</i>	95.1	13
91	No	8/18/2015	608175	4752694	0	no mussels	no mussels	no mussels	no mussels
92	No	8/18/2015	608345	4752675	0	no mussels	no mussels	no mussels	no mussels
93	No	8/18/2015	608345	4752665	0	no mussels	no mussels	no mussels	no mussels
94	No	8/18/2015	608375	4752664	0	no mussels	no mussels	no mussels	no mussels

95	No	8/18/2015	608595	4752666	0	<i>Elliptio</i>	<i>complanata</i>	14.2	3
96	No	8/18/2015	608557	4752645	0	no mussels	no mussels	no mussels	no mussels
97	No	8/18/2015	608345	4752602	0	no mussels	no mussels	no mussels	no mussels
98	No	8/18/2015	608369	4752595	0	no mussels	no mussels	no mussels	no mussels

Sample Quad Number	Remedy Area	Date	Easting	Northing	Fresh Dead Mussels	Mussel Genus	Mussel Species	Mussel Length (mm)	Mussel Age (external annuli)
99	No	8/18/2015	608095	4752585	0	no mussels	no mussels	no mussels	no mussels
100	No	8/18/2015	608466	4752574	0	no mussels	no mussels	no mussels	no mussels
101	No	8/18/2015	608285	4752560	0	no mussels	no mussels	no mussels	no mussels
102	No	8/18/2015	608455	4752500	0	no mussels	no mussels	no mussels	no mussels
103	No	8/18/2015	608195	4752494	0	<i>Elliptio</i>	<i>complanata</i>	87.4	11
104	No	8/18/2015	608285	4752465	0	no mussels	no mussels	no mussels	no mussels
105	No	8/18/2015	608095	4752438	0	<i>Elliptio</i>	<i>complanata</i>	75	10
106	No	8/18/2015	608115	4752421	0	no mussels	no mussels	no mussels	no mussels
107	No	8/18/2015	608114	4752365	0	no mussels	no mussels	no mussels	no mussels
108	No	8/18/2015	608135	4752335	0	no mussels	no mussels	no mussels	no mussels
109	No	8/18/2015	607915	4752315	0	no mussels	no mussels	no mussels	no mussels
110	No	8/18/2015	608225	4752291	0	no mussels	no mussels	no mussels	no mussels
111	No	8/18/2015	608045	4752278	0	<i>Elliptio</i>	<i>complanata</i>	101.7	14
112	No	8/18/2015	607815	4752233	0	no mussels	no mussels	no mussels	no mussels
114	No	8/18/2015	608008	4752143	0	no mussels	no mussels	no mussels	no mussels

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APPENDIX B:

IMAGES OF MUSSEL SPECIES

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Elliptio complanata (Lightfoot, 1786) Eastern Elliptio



Lampsilis cariosa (Say, 1817) Yellow
Lampmussel



Lampsilis radiata (Gmelin, 1791)
Eastern Lampmussel



Lasmigona costata (Rafinesque, 1820)
Fluted Shell



Ligumia nasuta (Say, 1817)
Eastern Pondmussel



Leptodea fragilis (Rafinesque, 1820)
Fragile Papershell



Pyganodon cataracta (Say, 1817)
Eastern Floater



Strophitus undulatus (Say, 1817)
Creeper



Utterbackiana implicata (Say, 1829)
Alewife floater

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APPENDIX C:

NOTES ON SPECIES VALIDATION

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2015 Hudson River Mussel Species Validation

Mussel Number*	Genus	Species	Length (mm)	Height (mm)	Species validation notes
01893	<i>Pyganodon</i> # <i>Strophitus</i>	<i>grandis</i> <i>undulatus</i>	20.1	12.4	2016/11/14 Mahar and Landry: Beak sculpture not double-looped and coarse, vestigal tooth (slight hint or dip) thickening, slight orange color in beak cavity. <i>Strophitus undulatus</i> (very confident). CHANGE TO S. UNDULATUS .
01936	<i>Strophitus</i>	<i>undulatus</i>	49.4	29.0	2016/11/14 Mahar and Landry: Beak sculpture not double-looped and coarse, vestigal tooth, thickening. <i>Strophitus undulatus</i> (very confident, but not quite as typical).
02327	<i>Strophitus</i>	<i>undulatus</i>	59.5	35.2	2016/11/14 Mahar and Landry: <i>Strophitus undulatus</i> (very confident).
02413	<i>Strophitus</i>	<i>undulatus</i>	12.0	7.1	2016/11/14 Mahar and Landry: Beak sculpture not double-looped and coarse, vestigal tooth, thickening. <i>Strophitus undulatus</i> (very confident).
03404	<i>Anodonta</i> * <i>implicata</i>		85.9	44.3	2016/11/14 Mahar and Landry: <i>Anodonta implicata</i> (very confident). 2017/11/28 Confirmed by Kurt Jirka after examination of emailed photographs. 2017/11/29 Confirmed by David Strayer after examination of emailed photographs.
03415	<i>Strophitus</i>	<i>undulatus</i>	29.8	16.7	2016/11/14 Mahar and Landry: Beak sculpture not double-looped and coarse, vestigal tooth, thickening. <i>Strophitus undulatus</i> (very confident).

* *Anodonta implicata* is synonymous with *Utterbackiana implicata*



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