Quality Assurance Project Plan

Title and Approval Page

Stopping Trash Where it Starts

Effective Date of Plan: August 15, 2018

Plan prepared by the Hudson River Foundation/NY-NJ Harbor & Estuary Program (HEP)

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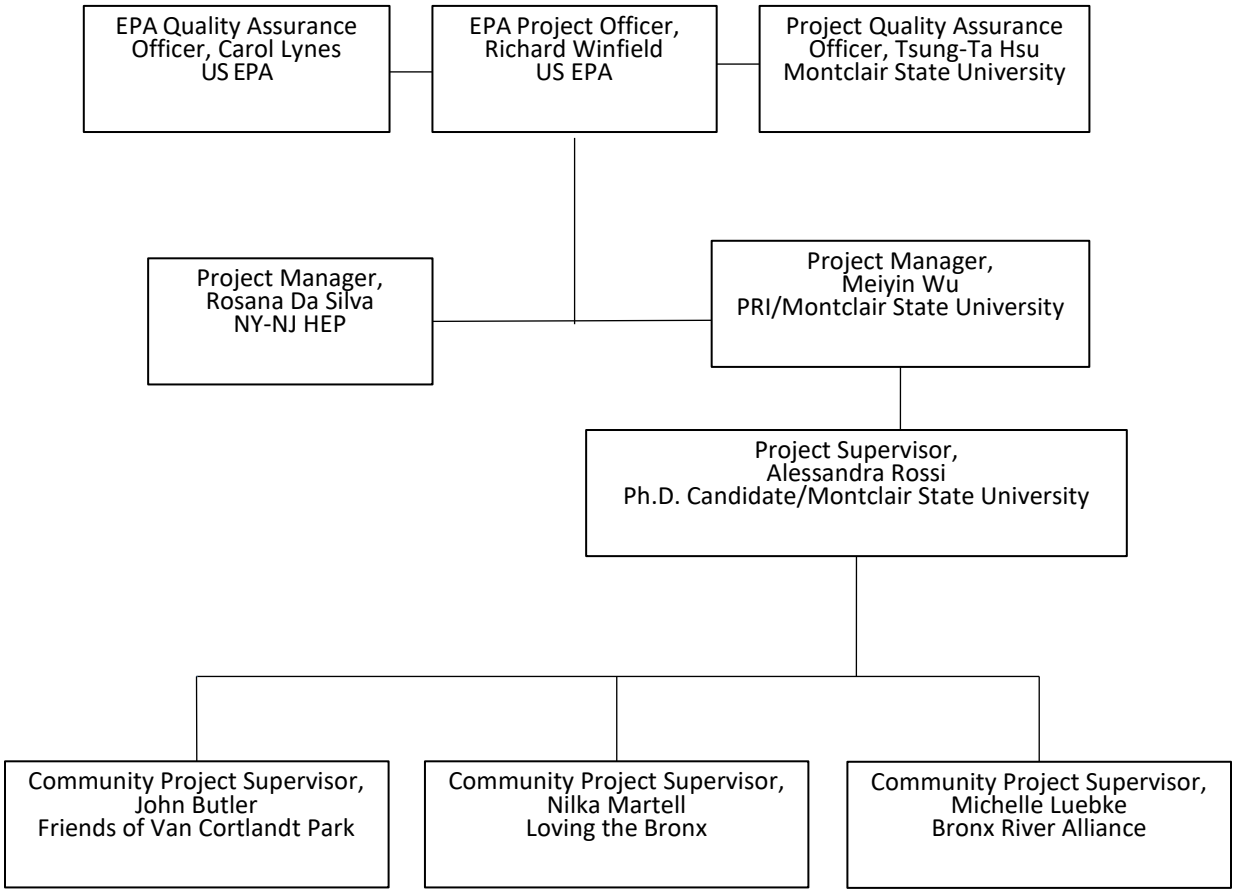
In addition, any agencies, organizations, and individuals no listed here may obtain a copy of this Quality Assurance Project Plan upon request.

Project/Task Organization

Name	Title	Organizational Affiliation	Responsibilities (specific to this project)
Rosana Da Silva	Project Manager	NY-NJ HEP	Coordinate with contractors and partners; prepare QAPP; provide grant oversight; assist with data collection method development and implementation; hire community groups and conduct outreach; present results to groups and engage Trash-Free Waters Partnership
Meiyin Wu	Project Manager	PRI/Montclair State University	Review and assist with QAPP; direct development of data collection methodologies and field work; oversee Ph.D. candidate; direct data analysis and reporting
Alessandra Rossi	Project Supervisor/Ph.D. Candidate	Montclair State University	Develop/refine data collection protocol and training materials; identify sites for data collection; support community group data collection; conduct data analysis and reporting
Tsung-Ta Hsu	Project QA Manager	Montclair State University	Review QAPP; review data for completeness and accuracy; address data deficiency issues with HEP and PRI project managers
Carol Lynes	QA Officer	EPA	Review QAPP
Richard Winfield	Project Officer	EPA	Review QAPP
John Butler	Community Project Supervisor	Friends of Van Cortlandt Park	Supervise community data collection; submit data to PRI
Nilka Martell	Community Project Supervisor	Loving the Bronx	Supervise community data collection; submit data to PRI
Michelle Luebke	Community Project Supervisor	Bronx River Alliance	Supervise community data collection; submit data to PRI

Project Organization Chart:



Problem Definition/Background

Problem Definition:

The Bronx River and Harlem River watersheds' natural habitat has been largely displaced by urban development. The communities in these watersheds continue to be overburdened by legacy pollutants, New York City's solid waste, sewage treatment, and electrical generation facilities, and nearly all the communities are considered environmental justice communities. With some of the poorest residents across the nation, these underserved communities are working through the Urban Waters Federal Partnership (UWFP) to address challenges and reconnect to their waterways.[1]

Floatable Debris or garbage in our estuary waters and shorelines affects the ability to swim and fish in our waters. Floating trash can enter the waterways by flowing out of sewer and stormwater drains, being dumped on shorelines, or being blown to the water by the wind. Efforts to reduce the accumulation of trash include the Sanctuary Act (a.k.a. Ocean Dumping Act) and the Marine Plastic Pollution Research and Control Act. The New York City Department of Environmental Protection (NYC DEP) has a well-established program to capture and remove marine debris through floating barriers, skimmer vessels, underflow baffles and screens, as well as source control programs such as street sweeping, clean streets-clean beaches, adopt-a-basket, water-on-the-go, adopt-a-catch-basin and a B.Y.O campaign. NYC DEP also initiated an interim media campaign in 2016 for reducing street litter at the source and to amplify the existing relevant programs.

Despite the progress achieved, floatable debris continues to negatively impact our region, and current efforts mostly deal with debris after the fact (aerial surveillance to spot slicks, skimmer vessels to collect the debris, shoreline cleanup programs, and booms and nets to contain debris from outfalls) rather than attacking the root of the problem. In 2014, an estimated total of $59M was spent on marine debris waste management activities in the Hudson-Raritan Estuary.[2] While efforts to clean up floatable debris will continue to be necessary for the foreseeable future, there is a growing interest among a wide range of stakeholders in exploring pollution prevention options as a more sustainable and rational manner of tackling the issue. In particular, it is important not to neglect that approximately 80% of the marine litter around the world has originated on land.[3]

This project will build upon the framework of the 2017 Stopping Trash Where It Starts (NEI Job Code: 0323-0003, Project Code: 2016-024) completed in the Passaic River Watershed as well as Columbia University's 2016 litter survey across the five New York boroughs. To allow HEP to further fill data and information gaps on floatables, the Bronx River and Harlem River watersheds were selected as it is an Urban Waters Federal Partnership focus area since 2011 and will aid HEP in identifying prominent sources and types of litter in the greater Harbor Estuary.

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[1] US EPA (2018). *Urban Waters and the Bronx and Harlem River Watersheds (New York)*. Retrieved from https://www.epa.gov/urbanwaterspartners/urban-waters-and-bronx-and-harlem-river-watersheds-new-york.

[2] Kim, B., Wepsala, W., Dassano, M., Chen, M., Ding, G., Furr, C., Gao, T., Sun, S., and Tang, H. (2015). *Quantifying the Financial Costs to Communities of Managing Trash in the Hudson-Raritan Estuary.* New York: Columbia University Earth Institute.

[3] Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP). (1991). *The State of the Marine Environment*. London: Blackwell Scientific Publications.

Project Objectives:

The project will enable citizen scientists to generate high quality data to gain knowledge of how trash becomes floatable debris through data collection. The project will engage three community groups and volunteers to conduct litter surveys within the Bronx and Harlem River watersheds. The goals of the project are to:

1. Characterize and identify sources of trash focusing on floatables entering local waterways and local conditions contributing to trash dispersal in order to target specific actions for reducing trash at the source.
2. Build on Columbia University's 2016 data collection efforts in NYC (funded by NYC DEP) and Passaic River Institute's 2017 data collection efforts along the Passaic River in New Jersey (funded by NEIWPCC). Implementing the protocol in additional areas will fill data and information gaps to better characterize types and potential sources of floatable debris to the greater NY-NJ Harbor Estuary.
3. Utilize the data collected at each location to help identify the most effective source reduction actions, including voluntary source control, preventative and reactive policy options, and targeted public awareness and education campaigns.
4. Create and evaluate a model for engaging citizens and stewardship organizations in identifying sources of litter.
5. Showcase this project to educate local businesses and residents about trash impacts and solutions to encourage responsible vendor and consumer behavior and stewardship.

Data Users:

The primary data users for this project are the public/communities, Passaic River Institute/Montclair State University, the Harbor Estuary Program, and the US EPA Region 2. Secondary potential users of the data would be the New York City Department of Environmental Protection and the New York State Department of Environmental Conservation. The departments can contain valuable datasets that could serve to fill in data gaps, allow for more focused and targeted efforts to reduce floatables, and guide future initiatives and outreach.

Project/Task Description

Project Location:

The project will be conducted at publicly accessible locations of the Bronx and Harlem River Watershed in New York within the area highlighted in Figure 1. A first general list of possible locations was initially compiled along the Bronx and Harlem Rivers by community groups with knowledge of the areas' accessibility and safety. The list will be narrowed down to a final selection of 20 locations along the Bronx and Harlem Rivers. Acceptable survey locations are likely to be sites within areas that are highly impacted by foot-traffic, near public shorelines and other environmentally sensitive areas, as well as other areas with special considerations. The final list of sites will include a representatively varied list of sites which will be helpful later in terms of data analysis and understanding of the local reality at this selected watershed. Each site will be visited at least twice during the data collection phase.

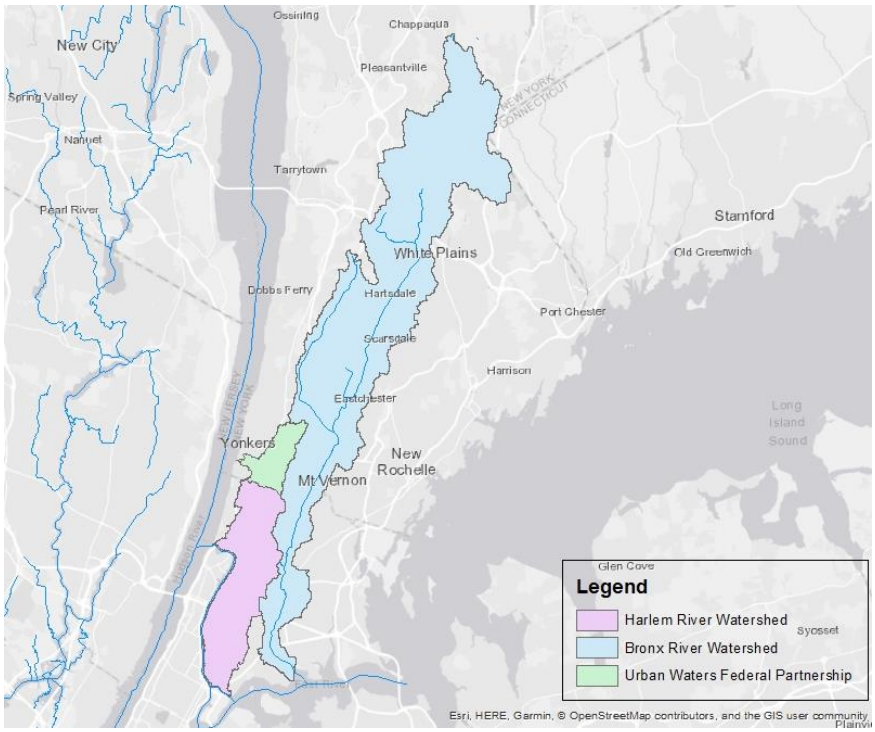

Figure 1: Bronx River and Harlem River Watersheds along with the additional area of the Bronx-Harlem River Urban Waters Federal Partnership area outside of the watersheds.

Project Description:

The Hudson River Foundation/NY-NJ Harbor & Estuary Program (HEP) and Montclair State University's Passaic River Institute (PRI) developed a survey protocol in 2017 comparable to the litter survey protocol developed and used by Columbia University[4] students in NYC during the summer of 2016. The protocol will be implemented by conducting street litter surveys to track trash to specific points of sale, to identify brand items and to record visual observations of conditions that could influence transport of trash to storm drains. HEP will engage three community groups to conduct surveys at 20 sites. PRI will provide a

[4] See https://sipa.columbia.edu/academics/capstone-workshops/stopping-trash-where-it-starts-data-collection-and-analysis-project for more information regarding Columbia University's survey protocol.

training on the protocol, mandatory for community project supervisors to attend prior to any survey. All data from the community group surveys will be collated and analyzed. The field data analysis and results will be described in a final report. The final report will include recommendations for how to best eliminate or reduce local and/or regional sources of floatable debris.

Project Schedule:

Activities	Organization/Group Responsible for Activity Completion	Timeframe Work Will Be Done
QAPP preparation and approval	EPA Quality Assurance Officer	August 2018
Basemap development	PRI	August 2018
Develop/refine data collection protocols and site selection	PRI/HEP	June-August 2018
Community engagement for surveys	HEP	June-August 2018
Protocol testing and training	PRI/Community Groups	August 2018
Litter surveys	Community Groups	September-November 2018
Data upload	Community Groups	December 2018- January 2019
Data analysis and quality control	PRI	February-April 2019
Submission of final report	PRI/HEP	May-June 2019

Existing Data:

Existing Data	Data Source	How Data Will Be Used	Acceptable Criteria
Trash pick-up and street sweeping schedules	Municipal offices/NYCDEP	To help schedule site visits	N/A
2017 Stopping Trash Where It Starts	PRI/HEP/NEIWPCC	To conduct analysis to compare floatables in the estuary	N/A

Quality Objectives and Criteria

Litter amount, type and site conditions will be recorded using the datasheets found in Appendices 1 and 2 and submitted electronically using an excel template spreadsheet form. Teams will record datasheets on waterproof paper while conducting field work and submit paper versions with the electronic spreadsheet to PRI. Sites have been selected following the criteria in Appendix 3. Each litter survey team must be composed of at least 2 individuals (preferably 3) for safety reasons and to ensure an additional level of data verification (to remove any uncertainty in the identification of litter material, type or brand for example).

Precision

The GPS unit (Garmin etrex 10) that will be used in this project has a precision of less than 4m.

Bias

The geographic area where the surveys will take place in this project is influenced by a number of factors, including distance to the waterway, pedestrian traffic, litter quantity, among other factors. Sites with known litter issues are being targeted in order to collect sufficient data to determine pollution prevention measures and there is inherent bias in this approach.

It is possible that there is a seasonal influence on types and sources of litter that would not be captured during this project as all field work will be conducted from September-November.

During the 10-minute counting timeframes to obtain estimates of passing pedestrians and vehicles, double counting is a possibility if the same person walks back in the other direction or if a car that had previously passed comes back the other way.

Representativeness

These surveys will be conducted in the Bronx River Watershed and the Harlem River Watershed within urbanized areas (see Appendix 3 for all site selection criteria). The results of the surveys may be broadly applicable to other urbanized areas with similar site characteristics (for example proportions of plastic bottles or Styrofoam coffee cups relative to other types of litter), but many factors can influence this including local/regional/state legislation (plastic bag bans, bottle deposit fees), demographics, infrastructure and personal behaviors.

In order to ensure that an accurate representation of the litter at the site is being recorded, street sweeping and trash pickup schedules will be obtained for each municipality. Surveys will occur before sweeping and trash pickups and not during major storm events.

Comparability

All surveys will be conducted using the same methodology and will record data using the same datasheets, ensuring a high degree of comparability between sites. However, one of the goals of this project is to determine which factors may influence litter accumulation and distribution, and this may vary from site to site. Meticulous data records, including final site selection criteria used for each site and site photographs, will be kept by the project managers.

The data collected through this effort can be compared to the data collected in the 2017 Passaic River Watershed project in NJ as well as the 2016 NYC project by Columbia University. The data sets will provide a better picture of the prominent sources and types of litter for the greater Harbor Estuary region.

Completeness

This project aims to conduct a total of 40 litter surveys during the survey period (20 sites surveyed twice each). The goal is to conduct 100% of these surveys in order to have a robust dataset that will enable conclusions to be drawn on the most appropriate source reductions methods for the local area. However, it is anticipated that weather and other issues may affect data collection. Conclusions will still be able to be drawn with a smaller dataset as the data will still be representative for that particular location. For the purposes of this project, conducting 50% of the surveys (either at a reduced number of sites or only once at certain sites), would still be acceptable, although not ideal.

Sensitivity

Sensitivity for the GPS units (Garmin etrex® 10) is less than 4 meters in radius.

Data Collection Methods

Project Design:

Survey Schedule

Surveys will occur from September through November 2018. Two survey events will be conducted at each site. There is no particular day of the week on which the surveys will be conducted. This will depend on availability of community project supervisor and local volunteers as well as weather conditions, trash pickup and street sweeping schedules for each segment. Surveys will not be conducted immediately following heavy rainfall, as there likely could be conditions of surface runoff with consequence of displacing of litter from the investigated site. Surveys will also be conducted 48 hours before a scheduled trash pickup and street sweeping.

Survey Locations

A total of 20 survey locations will be selected within the Bronx River Watershed and the Harlem River Watershed using the criteria in Appendix 3. Community input will be solicited by speaking with the three community groups that will be collecting data to capitalize on local knowledge of known areas impacted by floatable debris. The PRI project manager and Montclair project supervisor will speak with the groups to clarify survey locations. Sites will be visited in person prior to the surveys by the community project supervisor to ensure accessibility and suitability of the location. If a survey location becomes inaccessible, there will be two options depending on the circumstances: select another location or accept the missed data collection event. The community project supervisor will consult with the HEP project manager and PRI project manager to make this determination. If the decision is made to select another site, the site will be entered into the datasheet. If the data collection event does not happen, this will be noted in the midterm progress report. The preferred option will depend on how much data has been collected thus far, how far along the project is and whether the site is temporarily inaccessible (short-term construction such as road repair) or inaccessible for a longer duration (bridge replacement for example).

All survey locations will consist of a 400 m stretch of road and only on one side of the street. The starting point for the survey will be a particular cross-street identified on Google Maps and provided to the three community groups, along with coordinates. The ending point will be identified through an address/landmark and coordinates. The three community groups will also be provided with site maps and instructions. Maps/images will display the starting and ending points of each site to be surveyed. Coordinates will be taken with the Garmin GPS and reported in decimal degrees with at least 5 decimal places.

Survey Methodology

The datasheet and tally matrix forms found in Appendices 1 and 2 have been adapted from the forms used by Montclair State University in the 2017 Passaic River Watershed survey and the Columbia University survey conducted in NYC during the summer of 2016. The original forms were created with input from NYCDEP and HEP, and took into consideration methodologies used in a number of litter surveys across the country. Additional surveys that were reviewed are included in the literature section on page 21. Survey protocol instructions will also be distributed to the three community groups (see Appendix 4). This will include definitions for all criteria and a photo guide for certain parameters that may be more subjective than others.

Field Collection Handling and Custody Procedures

The field teams (three community groups) will walk their 400 m survey site (on one sides of the street) and one foot into the street, and collect the trash encountered along the way. Which side of the street will be chosen by the survey coordinator and marked on the map of each site.

The SURVEY FORM will be filled with the information which describes the site in general. Numbered points from 1 through 25 can be filled in by an individual person. On the other side, the chart in the first page needs to be completed by two of the field surveyors, being it relative to more subjective information. Each of the two surveyors will have to assign an evaluation number to each of the four assessment parameters ("Trash level first glance", "Access to the waterbody from the site", "Floatability of litter found", and Large items).

The volume and weight of the collected trash will be recorded (in the SITE DESCRIPTION FORM – Appendix 1). The volume of the bagged trash can be estimated multiplying the three dimensions (height, length and width using metric system units) of the bin used when the bin is full. In cases in which the bin is not filled up to the brim, the height reached by the trash inside the same bin will be the new height dimension to be multiplied by. Each item collected (equally or bigger than a cigarette butt) has to be qualified and tallied and right after disposed into a proper trash (every not-recyclable item) or recycle (e.g. plastic items, aluminum cans, glass bottles) bags. In the interest of time, surveyors will not be required to tally small fragments that are less than one inch in size (approximately the size of a cigarette butt), but may choose to if there are no time constraints and will be applied to all survey sites led by the community partner. The trash collected at each site will be weighed in the field using a digital scale (recording by one decimal place) and the weight has to be recorded in the SITE DESCRIPTION FORM (Appendix 1). Instructions for both weight and volume measurement procedures are explained at the end of the same SITE DESCRIPTION FORM.

Community group survey teams will be responsible of disposing the bags with the garbage content. If any large items are recorded on the datasheet that cannot feasibly be carried, the NYC Department of Sanitation will be contacted to collect such items. No labels are needed on the garbage bags for final disposal and no preservation instructions are needed.

The third surveyor will keep walking along the sidewalk (approximately in a central portion of the segment along one block) counting all vehicles and people passing in the area designated for the survey. If necessary, binoculars can be used for traffic at a certain distance. The tallies/counters used are similar to the ones used in microbiology laboratories for counting bacteria. Each team will have two tally units, one for foot traffic counts and one for vehicle traffic counts. At the end of each 10 minute time slot, the totals displayed by the two tallies will be recorded in the proper blanks of the SITE DESCRIPTION FORM. Upon completing the counting of vehicles and people passing in the designated area, the third surveyor will tally the number of food -related businesses (e.g. bodegas, restaurants, cafes, etc.) in an 800 m by 800 m quadrat designated at each site. The surveyor will include in the tally any portion of the food-related business that enters the quadrat's scope. The scouting of these food related business activities can be done only once during the first visit at the site since they should not change between first and second surveys with the expectation of food trucks or carts that may mobilize out of the study area. Surveyors are to include tallies of food trucks and carts in the segment area for each survey. This scouting can also be done by the group at the end of the survey/collection by car. The division of the duties in the field does

not need to be standardized. Whoever, among the collectors and the tallier, finishes earlier can join the other to complete the duties in that segment.

Photos of the site and site conditions will be taken at the start of each survey at each site and submitted along with the survey forms and completed spreadsheet. Upon sorting the trash to complete the TALLY MATRIX FORM (Appendix 2), photos of the sorted trash will be taken for each site and submitted to PRI to analyze accumulation of brands of floatable debris, if any. Photos should be labeled digitally with date and Site ID. This information should be reflective of the whiteboard displayed on site while taking the picture which includes the date, time, and site ID. Please identify the photographer on the SITE DESCRIPTION FORM (Appendix 1). When taking photographs, do not use the zoom function on your phone camera or camera and include an identifiable location to reflect the direction the photographer is facing.

It is the community group's responsibility to determine what safety measures and personal protective equipment are adequate overall and for each survey location, as established in the community group's safety plan. The community groups will have their safety plans on file and available upon request or if audited. For instance, we encourage not to pick up any sharp items (e.g. broken glasses) or syringes (especially uncapped ones) when not properly equipped for this purpose. Moreover, if these items are collected, they should not be disposed in the same bag used for collecting the rest of the trash. Broken glass should be disposed in proper containers for sharp items while syringes should be disposed in specific disposal containers.

Equipment List:

Field Supplies/Equipment List are as follows:

- Clipboards
- White board
- Pencils (don't use pens or sharpie on waterproof paper)
- Erasable marker
- Work gloves/latex or latex-free gloves
- Safety vests
- Trash pickers or metal tongs
- Garbage and recycling bags
- Phone capable of taking photos or digital camera
- Tally counters (one for foot traffic and one for vehicle traffic
- GPS Garmin etrex 10
- Survey forms and instructions printed on waterproof paper
- Plastic or cardboard bin
- Digital scale
- Measuring tape
- Disinfectant and paper towels (if using any public table or surface for tallying the trash)

The following supplies will be loaned from Montclair to the community groups, as needed: GPS. The remaining supplies will be purchased by the community project supervisors and distributed to the volunteers at the day of each survey.

Instrument Calibration and Maintenance

Instrument/Equipment	Calibration Frequency	Maintenance Requirements
Handheld GPS Units	N/A	As per manufacturer's instructions

Field Data Sheets:

The following data sheets to be utilized for this project are provided in the Appendices as listed below:

- Site Description Datasheet – Appendix 1
- Tally Matrix Datasheet – Appendix 2

Training and Specialized Experience

Training:

PRI and HEP will host a joint training event at a site prior to the start of data collection. Participants will sign in on an attendance sheet and this sheet will be kept by HRF with contract documents. This training event will be required for all community group supervisors and recommended for any survey participant. The community project supervisors will then be responsible for ensuring that the volunteers follow protocols the day of the data collection event. Volunteers may rotate for data collection events at assigned locations while community project supervisors must attend all events to ensure protocols are being followed.

Personnel/Group to be Trained	Description of Training	Frequency of Training
Community project supervisors	Field data collection protocols and properly filling out datasheets. Demo of litter collection and tallying procedures	Once prior to data collection
Volunteers	Field data collection protocols and properly filling out datasheets. Demo of litter collection and tallying procedures	Prior to data collection event and as needed for new volunteers

Specialized Experience:

Training will be provided by the PRI/Montclair project manager and supervisor as well as the HEP project manager.

Rosana Da Silva is the water quality manager at HEP. Previously, Ms. Da Silva worked for the Rutgers Cooperative Extension Water Resources Program and has over six years' experience in the water quality field and community engagement. For this project she is overseeing the QAPP development, community group data collection and outreach efforts. Ms. Da Silva has several years' experience training individuals in stormwater management assessments.

Montclair State University's Passaic River Institute (PRI) actively engages in environmental research and education with a focus on prioritizing area environmental needs and identifying sustainable solutions. PRI has been especially active in providing environmental training and education programs, and promoting public awareness in environmental management and sustainability. Meiyin Wu is the Director of PRI and Professor of Biology at Montclair State University, an environmental scientist with specialization in water quality and aquatic ecology. For this project, Dr. Wu is sharing the responsibilities in QAPP development, designing and implementing litter survey, performing data sharing, and report preparation.

Alessandra Rossi is a Ph.D. candidate in the Environmental Management program at Montclair State University. Ms. Rossi has several years of experience in training students both in field and laboratory duties. This experience has been acquired during her Master Degrees (Biology and Ecology), her years of work in the environment, and during her current Ph.D. program. Ms. Rossi has been a Teaching Assistant for over seven years educating and training students both in laboratory sections, field experiences and lectures. Ms. Rossi is designing the litter survey, finalizing the map of the areas to be investigated, helping

in editing the QAPP, and training personnel for the actual site survey. She will also provide support to community project supervisors and will perform data analysis after collections.

Assessment and Oversight:

Any issue and challenge encountered during the survey will be reported to HEP Project Manager, MSU Project Manager, and MSU QA Officer within 24 hours. Project managers and QA officer will evaluate the scenario and provide instructions for corrective action if needed.

All collected data will be deposited to PRI. PRI will tabulate and analyze the data. The final results will be reported to EPA by HEP.

Assessment Type	Frequency of Assessment	What is Being Assessed	Who will Conduct the Assessment	How Issues or Deviations will be Addressed
Data Checks and Assessments	After each survey event	Completeness of datasheets (paper versions and excel spreadsheets)	Community project supervisors	Verify with field survey team
On-Site Field Inspection	During each survey with a new team	Field sampling teams following protocols	Community project supervisors	Discuss any issues with HEP/PRI project managers

Documentation and Records

Data Management:

All data will be entered on paper forms in the field and transferred into excel datasheets using a template spreadsheet. After each survey event, the data will be checked for completeness, missing information or questionable data. The community project supervisors will contact the volunteers if any data is missing and have the team clarify any discrepancies with the data. The community project supervisor is required to be present at all surveys. Three community survey teams comprised of one project supervisor each and at least two volunteers each will conduct the surveys.

The PRI and HEP Project Managers will review 10% of the data to verify completeness and reasonableness of the data entered into the datasheets. The completed and quality-assured datasheets will be shared with Richard Winfield at EPA (either via email or Dropbox) at the conclusion of the data collection period. He will inform the HEP Project Manager of any outstanding data issues.

Data Checks:

Any data issues identified by the community project supervisors, including but not limited to the items stated in the Data Checks table below, will be discussed with the HEP and PRI project managers and Montclair project QA manager to determine data usability on a case by case basis. All decisions to allow data that did not fully comply with QAPP requirements will be explained in the midterm report, and any resultant limitations on data use fully discussed in the final project report.

Field	Data Management
Surveys performed per QAPP/Protocols	Data entry and transcription errors
Evaluate any deviations from QAPP or Protocols to determine the impact of the data and project objectives	Proper data and document storage
	Missing and uncertain data documented

Post Collection Data Handling Information:

Data collected on site through fillable paper versions will be collected off-line. Community project supervisors will deliver paper versions, electronic datasheets, and any pictures that were taken to HEP/PRI using an email address created ad hoc. The files will be saved in the PRI computer at Montclair State University, in which a password secures the content. All information collected on site will be received by the same person in charge for coordinating the sample locations (Ph.D. candidate at MSU). This person will manually transfer the information in two separate excel documents for data analysis, one for the site survey and the other for the tally matrix. In this way data can be rearranged and or merged into one document for the statistical analysis and other elaborations. The above mentioned Ph.D. candidate, will also properly save the above mentioned files.

Statistical Analysis:

In addition to the common basic statistics (mean, max, min values), the different outcomes (e.g. weight, volume, and counts of litter) will be regressed against potentially explaining variables like foot and vehicle traffic, counts of food and drink related businesses. Example of statistical tools that could be used are, but not limited to, ANOVA and stepwise regression.

A particular interest will be paid to floatable item counts (plastic and Styrofoam in particular). Bar graphs and pie charts will help to categorize the main composition of these floatable items and what locations are potential most contributors of plastic litter ending up in the nearest waterbody.

Reconciliation with User Requirements

The quality and reliability of data collected during the surveys will be assured through several methods.

First of all, the days of survey will avoid rigorously within two days (48 hours) after street sweeping and/or after a major rain event. Conducting the survey, for instance, the day after street sweeping would represent a bias because it would underrepresent the quantity of trash which usually accumulates on the site. Same issue we would have if surveying right after a major rain event which, with the help of surface water runoff, would partially wash away the litter present in that specific area.

A second way of conducting a quality check on the collected results is to instruct the surveyors to report any abnormality or accident happening in the segment area during or witnessed immediately before starting the survey. There is a dedicated section on the SITE DESCRIPTION FORM which can be used to write notes. An example is if one of the surveyors sees a dweller or a business owner, sweeping or picking up the trash in front of their door or property. In this case, the surveyor has to estimate an approximate count of items removed and, if possible, their category/subcategory/material. Again, an estimation in this case is sufficient but it has to be specified as a note separate from the official TALLY FORM.

The above mentioned statistics will also represent a way to evaluate the goodness and the quality of data collected. The results of significant variables explaining the trash distribution along the sites and the quality of this trash will add value to the verification of quality of the site collections.

Reporting:

PRI will collate and analyze all field data collected by community groups. The field data analysis and results will be described in a final report. Analysis will include most frequently littered items, litter ranking by type/product and if possible by point of sale and brand. Further analysis will look into site conditions and additional variables.

The above project-related materials will be kept by HEP/HRF for as long as possible and for a minimum of three years from the date of submission of the final expenditure report, as stipulated by HRF's Document Retention and Destruction Policy.

Literature Cited

Alice Ferguson Foundation (AFF). (2008). *Volunteer Monitors Visual Trash Survey Handbook*. Alice Ferguson Foundation Trash Free Potomac Watershed Initiative.

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Appendix 1: Site Description Form

1. Date _____ Site ID_____ Name(s) of Surveyor(s) _____

2. Starts at: Lat_____ Long_____

Ends at: Lat_____ Long_____

3. Today: Temperature (°C/°F) _____ Rain (mm/inch) _____

4. Past 24 h: Avg Temp (°C/°F) _____ Rain (mm/inch) _____

5. Past 48 h: Avg Temp (°C/°F) _____ Rain (mm/inch) _____

6. Wind speed today (miles/h or km/h) _____

7. Survey start time _____ Survey end time_____

Assessment parameter	Least disturbed	Sub optimal urban	Marginal urban	Most disturbed	Average
Trash level first glance	Little or no trash detected (small pieces) which could be easily cleaned up in a short timeframe by one person.	Low levels of trash (few pieces) that could be easily cleaned up by two people in a relatively short time.	Medium quantity of trash evenly distributed or small piles of trash are visible. Site clearly shows MODERATE usage by people (e.g. cigarette butts, food and beverage containers, clothing)	Substantial quantity of trash throughout with large piles of trash . Site clearly shows HEAVY usage by people (e.g. cigarette butts, food and beverage containers, clothing)	
Surveyor 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Surveyor 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Access to the waterbody from the site	No access or difficult access due to any sort of barrier (vegetation or gate). Not used by people. Private or restricted area.	Limited access and no evidence of usage by people.	Public access is fair to good but no evidence of frequent use by people.	Optimal access (even dedicated trails) to the waterbody. Evident usage by people (e.g. food and/or drink items, cigarette butts).	
Surveyor 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Surveyor 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Floatability of litter found	Little (<25 items) or no floatable litter (transportable) litter (e.g. plastics, Styrofoam, cigarette butts)	Low to moderate (26-75 items) presence of buoyant (transportable) litter (e.g. plastics, Styrofoam, cigarette butts)	Moderate (76-200 items) presence of buoyant (transportable) litter (e.g. plastics, Styrofoam, cigarette butts)	Consistent (>200 items) presence of buoyant (transportable) litter (e.g. plastics, Styrofoam, cigarette butts)	
Surveyor 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Surveyor 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Large & or household items	No sign of illegal trash disposal. Trash is accidental or carried by surface runoff.	Some evidence of illegal dumping coupled with limited access.	One to two items (e.g. furniture, shopping carts, green waste) illegally dumped coupled with an almost facilitated vehicular access.	More than two items (e.g. furniture, shopping carts, green waste) illegally dumped coupled with an easy vehicular access.	
Surveyor 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
Surveyor 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
FINAL SCORE OUT OF A TOTAL OF 80 POSSIBLE POINTS					

8.

9. Ground cover (%): Paved____ Grass_____ Shrubs/Bushes ____ Wooded _____Sand/Soil _____

10. Number of landscaped areas (e.g. flowers, mowed areas) _____ Specify _____

11. Number of people that walk by you:
1st 10-min period _____ 2nd 10-min period _____ 3rd 10-min period _____

12. Number of vehicles that pass by you:
1st 10-min period _____ 2nd 10-min period _____ 3rd 10-min period _____

13. Total number of food-related business within the 800 x 800 m quadrant_____
- a) Number of Grocery stores (e.g. Shop Rite, Walmart, Trader Joe's) _____
- b) Number of Convenience stores (e.g. 7-eleven, Dollar Tree)_____
- c) Number of Restaurants/Diners (e.g. Olive Garden, IHOP) _____
- d) Number of Coffee shops (e.g. Starbucks, Dunkin Donut) _____
- e) Number of Fast-foods (e.g. Mc Donald's, Burger King) _____
- f) Number of Food carts (e.g. hot dog, halal, bagels) _____
- g) Number of Food trucks (e.g. Ice cream truck) _____
- h) Number of Other _____ Describe_____

14. Number of open bed vehicles (e.g. construction trucks, road maintenance) _____

15. Number of Public areas within the block _____ near-by_____ Distance _____

16. Number of Construction sites within the block_____ near-by _____ Distance _____

17. Number of Loading docks within the block _____ near-by _____ Distance _____

18. Number of Public buildings within the block _____ near-by _____ Distance _____

19. Number of trash cans on the block (both sides of the street) _____ (If 0 skip to question 21)
- a) Number of Trashcan with plastic bag liner _____ Without _____
- b) 100% full_____ 75% full_____ 50% full_____ 25% full_____ 0% full_____
- c) Number of trashcan with trash on the ground around the trashcan _____
- d) Among the trashcans with trash on the ground next to them, how many are:
  100% full_____ 75% full_____ 50% full_____ 25% full_____ 0% full_____

20. Number of recycling bins on the block (both sides of the street) _____ (If 0 skip to question 21)
- a) 100% full_____ 75% full_____ 50% full_____ 25% full_____ 0% full_____
- b) Number of recycling bins with litter on the ground around the bin _____
- c) Among the recycling bins with litter on the ground next to them, how many are:
  100% full_____ 75% full_____ 50% full_____ 25% full_____ 0% full_____

21. Number of manhole covers _____

22. Have you seen anyone collecting plastic bottles/cans? Yes _____ No _____

23. Number of storm drains (both sides of the street) _____

24. Number of storm drains clogged with litter or debris:
100% clogged__ 75% clogged__ 50% clogged__ 25% clogged__ 0% clogged__?

25. Is there a particular spot in which you see the most litter (next to trash bins, on storm drains, on sidewalk, on the road, in tree pits, etc.)?_____

26. Pictures taken before & after site collection (Y/N)
_____

Notable/Unusual weather conditions (or NOTES in general) _____
_____
_____

Measurements of the collected trash (provide at least one decimal place in each measurement):
_____

27. Volume determination of the bin:

a) Bin sides (cm): *height*_____ (cm) *width*_____ (cm) *length*_____ (cm)

b) Volume of the bin: *height* x *width* x *length* = _____ (cm^3)

28. Volume determination of the trash collected:

Trash volume (**full bin**) (Same volume of the bin at b): _____ cm^3

Trash volume (**not-full bin**): _____ cm^3

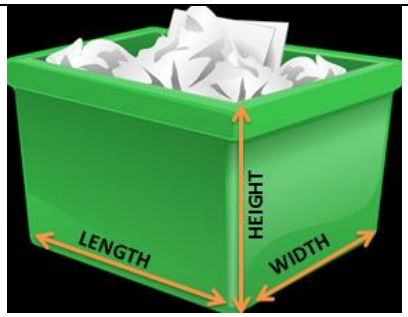
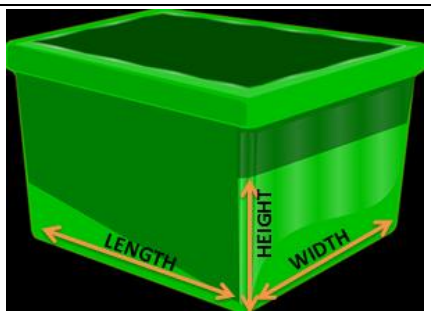
- Measure the *new height* of the trash inside the bin
- As for the *length* and *width* use the bin's measures from a).
- Compute the volume applying the multiplication at b).

29. Weight determination of the trash:

Put either the trash bag(s) or the bin with the garbage content on a digital scale.
If using the bin, weight the bin first or put the bin on the scale first and reset the scale to 0. Then weight the content, either loose or inside a trash bag.

Trash weight: _____ kg (one decimal point minimum).

NOTE: If measures are taken in pounds or inches or feet, this MUST be specified.

Bin with trash – example of FULL bin	**Bin with trash – example of a NOT-FULL bin**
	

Appendix 2: Tally Form

Category	Subcategory	Material	Tally	Brand/Notes
DRINKS CONTAINERS AND PARTS	Liquor Bottles	Plastic		
		Glass		
	Non-Liquor Bottles	Plastic		
		Glass		
		Metal		
	Juice boxes	Composite		
	Cups	Styrofoam		
		Plastic		
		Paper		
		Glass/Ceramics		
	Caps	Plastic		
		Metal		
	Lid	Plastic		
		Metal		
	Straw	Plastic		
	Coffee stirrer	Plastic		
	Cup sleeves	plastic		
		paper		
	4 or 6 pack rings for cans	Plastic		
	Bottle neck ring	Plastic		
	Liquor Cans	Metal		
	Non-Liq. Cans	Metal		
	Drink carrier/tray	Paper		
	Pull tabs	Metal		
FOOD WRAPPING &		Plastic		

	Gum/Snacks/ candies Wrappers	Aluminum		
		Paper		
	Utensils	Plastic		
	Ziplock bag	Plastic		
	Lollipop stick	Paper		
		Plastic		
	Popsicle stick	Plastic		
		Wood		
	Food Wrappers/Packaging	Plastic		
		Styrofoam		
		Metal		
		Paper		
		Composite		
	Food Containers	Plastic		
		Styrofoam		
		Metal		
		Paper		
		Composite		
	Plates	Styrofoam		
		Paper		
		Glass/Ceramics		
		Metal		
		Plastic		
MEDICAL RELATED	Drug vials	Plastic		
	Drug vials with content	Composite		
	Condoms	Plastic		

	Bandages	Plastic		
	Wound wrapping	Textile		
	Syringe	Composite		
	Pipette tips	Plastic		
ORGANIC WASTE	Human waste	Organic		
	Loose Pet waste	Organic		
	Wrapped Pet waste	Composite		
	Food waste	Organic		
	Yard waste	Organic		
	Leaves	Organic		
LARGER AND OR HOUSEHOLD ITEMS	Furniture	Composite		
	Mattresses	Composite		
	Bags with trash	Composite		
	Tires	Plastic		
	Appliances	Metal		
	Shopping carts	Metal		
	Vehicle batteries	Composite		
	Bike	Composite		
	Bike wheel	Composite		
	Vehicle wheel	Composite		
	Vehicle (specify)	Composite		
	Vehicle parts	Plastic		
		Metal		
TOBACCO PRODUCTS	Lighters	Composite		
	Cigarette/cigars butts	Composite		
		Plastic/cellophane		

	Tobacco wrap (cellophane)	Foil		
	Tobacco box	Paper		
	Cigarette holder	Plastic		
	Matches	Composite		
CONSTRUCTION MATERIALS/TOOLS	Concrete waste	Rock		
	Bricks	Rock		
	Wood boards	Organic		
	Wood chips	Organic		
	Rebar	Metal		
	Tiles	Rock		
	Tarp	Plastic		
	Tools	Composite		
	Gloves	Textile		
MISCELLANEOUS	Balls (type)	Plastic		
	Toys	Plastic		
	Toys	Textile		
	Non-vehicle batteries	Composite		
	Pen/pencil	Plastic		
		Metal		
		Wood		
	Chemical containers	Composite		
	Personal care bottle	Plastic		
	Home care bottle	Plastic		
	Make up item	Plastic		
		Composite		

	Greasy layer on water (either oil or surfactant)	Composite		
	Spray paint cans (or bottles)	Composite		
	Hose/Pipe parts	Plastic		
		Metal		
	Wire/cable/rope	Plastic/ Synthetic		
		Metal		
		Electric		
		Composite		
	Tarp	Plastic		
	Foam materials	Styrofoam		
	Dryer sheets	Textile		
	Non-food Wrappers/Packaging	Plastic		
		Metal		
		Styrofoam		
	Human diapers/pads	Composite		
	Wipes	Textile		
	Tampon applicators	Plastic		
	Grocery/Shopping bags	Plastic		
		Textile		
		Paper		
	Non-food containers	Plastic		
		Metal		
		Styrofoam		
MISCELLANE	Product tag/label	Paper		

		Plastic		
		Textile		
		Metal		
	Newspaper	Paper		
	Magazine	Paper		
	Office paper	Paper		
	Cardboard	Paper		
	Tissue/Napkin	Paper		
	Flyer	Paper		
	Shoe/Boot	Composite		
	Clothes	Fabric		
	Bedding	Fabric		
	Cleaning bottles/spray	Plastic		
		Metal		
	Dead animals	Organic		
FRAGMENTS	Fragments/ Pieces	Glass		
		Plastic		
		Textile		
		Paper		
		Metal		
		Styrofoam		
		Composite		
		Other		
OTHERS (SPECIFY)				

Appendix 3: Site Selection Protocol

Criteria for selection of sites to be surveyed

Acceptable survey locations are likely to be sites within areas that are highly impacted by trash, close to public shorelines and spaces, and other environmentally sensitive areas. Collect community input by speaking to community groups and residents that could later be recruited to assist in completing the survey as each site will need to be visited at least twice for data collection.

All survey locations are to consist of a 400 meter stretch of road and only on one side of the street. The starting point for the survey is recommended to be a particular cross-street identified on Google Maps and coordinates. The ending point will be identified through an address/landmark and coordinates. The final list of 20 segments to be surveyed will be complete of starting and ending point addresses at each segment. While selecting survey locations, priority should be given to areas within a buffer distance of 300 meters from the nearest waterway. If assessing multiple waterbodies, consider variations of sites along the main stream and its tributaries. It is believed that at this distance, trash will have a higher probability in entering the waterway without incurring into much obstruction. Conduct in-person scouting to verify access to sites and good representation of the survey parameters. Consider the following criteria which will influence accumulation of trash in selecting sites:

- Flood areas
- Slope
- Surface runoff
- Impervious surface
- Structures vs. empty spaces (roads, empty lots). This information will be estimated (%) on site during the survey.

Once the sites have been defined, visit the municipality's office and inquire about the following information:

- Municipal ownership
- Storm drain/system maintenance (protocols and schedules, if available)
- Street sweeping frequency
- Trash pickup schedule

This information will help the survey team to schedule the survey dates based on criteria mentioned earlier. We remind here that we want to avoid the trash collection for 48 hours after the streets have been swept and trash has been picked up and possibly within 48 hours of major rain events.

Appendix 4: Survey Protocol

Site Description Protocol:

Assessment parameter table: This table is meant to provide an initial general visual assessment of the visited site. Since this information is mostly subjective to the surveyor's opinion, both surveyors at each site should select the value that better describes (from least disturbed to most disturbed) each of the four parameters provided in the assessment parameter table. Two lines are provided in the table (one per each surveyor). No need to indicate who is surveyor 1 or 2. The values assigned to each parameter under evaluation will be averaged and each averaged value will be summed up to a final score reported out of the total of 80 possible points. This final score will help us to classify each site based upon an initial visual evaluation. For each parameter, four situations are described, and for each situation 5 values are available.

1. Trash level first glance: the surveyors should express in a value from 0 to 20, what is the level of trash presence in a first glance (pictures with examples to be provided).
2. Access to the waterbody from the site: each site was selected at a maximum distance of 300 m from the waterbody meaning that they are located fairly close to the waterbody. Despite their vicinity, some site may not have direct access to the waterbody (e.g. there is a private passage and/or a gate is present; it is densely vegetated and no pathways are cutting through the vegetation). On the other hand, direct access could be present that would easily allow for trash to accumulate along the shoreline.
3. Floatability of litter found: the amount of trash found at the site might be significant but only a part of it is light enough to be easily transported by the wind or surface runoff to the waterbody. Estimate the approximate quantity of items that potentially could reach the water because of light-weighted items (e.g. plastic, Styrofoam, paper, cardboard). This value can be assigned after the tally procedure has been completed. In this way, the surveyors will have a better idea of the real quantity of floatable items present on the street.
4. Large or household items: in addition to the light trash that potentially could be transported to the waterbody, evaluate the eventual presence of large and/or heavy items or any household object dumped on the street illegally that would negatively affect aesthetics.

Ground cover (%): The surveyor is required to estimate the percent coverage at the ground level of the following ground cover categories: 1) Paved 2) Grass 3) Shrubs/Bushes 4) Wooded 5) Sand/Soil. For instance: Paved 80%, Grass 0%, Shrubs/Bushes 5%, Wooded 5%, and Sand/Soil 10%.

Landscaped areas: Usually, signs of beautification like, presence of flowers, mowed areas, trimmed bushes, is a sign of people taking care of the neighborhood and interested in keeping

the area clean. Regarding this, remember not to collect any trash from front yards along the segment to be surveyed. We are conducting a survey, we are not provide a service.

People and vehicles that pass by you: This information will provide an idea of how busy the site is and the relative frequentation of vehicles versus pedestrians. While two surveyors are collecting and tallying the trash found along the surveyed segment, a third surveyor will be in charge of counting people and vehicles passing by in the street segment designated for the survey. The surveyor will conduct the count for 10 consecutive minutes using tally counters. One tally counter will be used for counting the vehicles and one for counting pedestrians. Ideally, the 10-minute intervals should be repeated two more times any time during the permanence of the surveyors on the site that date.

Food related business activities within the 800 x 800 m quadrant: Distinguish the different types of food related businesses with the purpose of later finding the sources of litter, especially when the wraps and containers found are showing a brand. The different types are grocery and convenience stores, restaurants are grouped with diners, coffee shops, fast-foods. These are the stores that are always present, but there also could be food-carrying vehicles like ice cream trucks and carts. Some examples are provided in parentheses for each category and an extra line is available for any other food business not listed.

Open bed vehicles: Vehicles that do not cover or secure their loads may allow for the release of items into the environment while operating or when parked and may represent a noticeable contribution of trash to local waterways. According to New York State regulation S 380-a states: "It shall be unlawful to operate on any public highway any open truck or trailer being utilized for the transportation of any loose substances, unless said truck or trailer has a cover, tarpaulin or other device of a type and specification approved by the commissioner of transportation which completely closes in the opening on the said truck or trailer while said truck or trailer shall be so operated, so as to prevent the falling of any such substances therefrom. However, if the load is arranged so that no loose substance can fall from or blow out of such truck, the covering is not necessary." For this reason, surveyors should write notes (e.g. plate number, business name) of any open-bed truck within the surveyed segment site whose load is not secured.

Public areas, constructions sites, loading docks, public buildings: These areas are potential sources or carriers of trash. Public areas include playgrounds and parks and may be a source of food and drink-related containers and packages. Construction sites and loading docks may be sources of big plastic wraps, debris and cardboard. Public buildings like hospitals, libraries, and post offices might represent highly-frequented meeting areas that may result in litter generation. These trash sources might be within the delineated surveyed area (within the 400m pre-determined segment(s)) and/or near-by. In this last case, the surveyors have to estimate the approximate distance (in m) from the limits of the surveyed block.

Trash cans and recycling bins: The presence of trash cans and recycling bins is extremely important in the intent to keep the environment in which we live clean. The higher the number of these containers and the better they are maintained to keep the street clean. In addition, the presence or absence of plastic bag liners is important especially when liquids are disposed and when trash is in small pieces. The presence of a liner would prevent liquids and small parts to be spread out on the ground and also leach into draining systems when rain dilutes and washes them. It is important to be consistent in tallying the bins on both sides of the segment visited and consistency should be applied to all sites. IMPORTANT: Trash bins have to be counted on both sides of the investigated segment.

Manhole covers: A manhole cover is a small opening in the street and covered by a lid, in order to allow staff in charge of maintenance to have access underneath it. This opening usually leads to a sewer. Depending on how the cover is made and what condition it is in, there could be a passage for trash. IMPORTANT: Manholes have to be counted on both sides of the investigated segment.

Collectors of recyclables: At times, people are seen sorting plastic bottles and aluminum cans from the trash bins and from the street and collecting them in big plastic bags to sell to recycle points. If one of these individuals are seen, it is important to record it on the notes section because they may remove these items in that area and cause a bias in the tallying. Please include in your notes the number of people seen actively collecting or sorting through plastic bottles and aluminum cans.

Storm drains: Storm drains in between the curb and the street usually have large openings to allow a good drainage of stormwater flow along the street. Unfortunately, when trash is present on the street, it can be transported along with the same stormwater and very often ends in these storm drains. Items smaller than the openings can be drained together with the stormwater but larger items may remain stuck against the storm drain structure. IMPORTANT: Strom drains have to be counted on both sides of the investigated segment.

Particular spot with a lot of litter: Surveyors should write down (and take a picture) if they see any particular spot in which the debris seems to accumulate most. The location of accumulated debris could shed light to the movement of material at that site or about particular activities or conditions which should receive the most attention.

Pictures: Suggest taking pictures of significant areas/points/events/situations. Before doing this, the first picture to take should be of a white board showing site-specific information (date, time, Site ID) written with a dry erasable marker. In this way all the following pictures taken at the site will be consecutive to the board displaying the site-specific information.

General Notes: Surveyors can write here anything that they think might need to be mentioned. For example if there is any unusual weather condition or activity.

Measurements of the collected trash:

Volume determination of the bin (cm^3): the measurements of the bin should be taken and multiplied by one another. This will provide the volume of the bin.

Volume determination of the trash collected (cm^3): this value will be the same of the volume of the bin if the bin is filled with trash. If the bin is not full of trash, only the height of the bin will be different. The surveyor will have to measure the new height and multiply this new measurement by the same width and length. If both a full bin AND a portion of the bin are the case, both values need to be reported in the proper blank spaces.

Weight determination of the trash (kg): the surveyor should put the trash on a field scale and record it in the proper blank spaces (one decimal point). Put either the trash bag(s) or the bin with the garbage content on a digital scale. If using the bin, weight the empty bin first or put the bin on the scale first and reset the scale to 0. Then weight the content, either loose or inside a trash bag. NOTE: If measures are taken in pounds or inches or feet, this MUST be specified.

Detailed instructions regarding how to determine the volume and the weight of the trash are provided in the SITE DESCRIPTION FORM (Appendix 1). The purpose of recording both volume and weight of the collected trash at the different locations is to provide results that can be compared with other projects even when the sites are in a totally different area. In some projects information about trash surveys is reported as count of items. In other researches, weight of the trash collected is provided. Finally, trash may be reported as a volume estimation. Having the opportunity to record both counts, weight and volume of the litter will provided an exhaustive set of information which will allow different projects with different methodologies applied to be compared.

Tally Form Protocol:

The first column lists the ten categories we grouped the item into: Drink containers and parts, Food wrapping and packaging, medical related, Organic waste, Larger and/or household items, Tobacco products, Construction material /tools, Miscellaneous, Fragments, Others.

The second column shows a long list of subcategories per each category, describing in details the several items that might be found as trash in an area. The subcategories indicate the individual items that will be tallied.

In the third column are listed all possible materials the individual items can be made of. The different materials listed are: metal, plastic, paper, glass, composite (when more than one material is present in the same item), Styrofoam, textile, fabric, organic (e.g.: food waste, material from pruning), and rock (e.g.: concrete, brick, tile).

The fourth column is for the tally. The person in charge tally lines (|) for each subcategory in the specific material it has been found. Tallies will be added up during the data analysis phase. An ordinal number can also be reported for the final count of the items when, for instance, counting the individual items piled up for each group of subcategory. A trash grabber or metal tongs and or latex/textile gloves should be used for picking up the trash.

The last column is intended for notes of any type. In particular, whenever it is possible and clear, the brand of the tallied item clearly coming from a particular store/discount/retailer should be specified. This will later help to trace back the sources of particular trash items and evaluate what could be done to reduce these sources.

Once trash has been tallied it has to be disposed in trash or recycle bags (except the large and/or heavy items) in plastic bags.