

STANDARD OPERATING PROCEDURES AND DATA COLLECTION FORMS FOR QUALITATIVE TRASH ASSESSMENTS AND QUANTITATIVE TRASH MONITORING IN RECEIVING WATERS

Bay Area Stormwater Management Agencies Association (BASMAA)

VERSION 2.0

1. Introduction

The following Standard Operating Procedure (SOP) describes the trash receiving waters monitoring protocol that will be implemented during the pilot-testing phase (October 2017 – February 2020) of the BASMAA Trash Monitoring Program Plan. The protocol includes a *qualitative* and *quantitative* method for measuring trash accumulation in a geographically defined assessment area located in creeks, channels, rivers, lagoons and shorelines within the jurisdictional areas of BASMAA member agencies. The protocols and methods in this SOP are based on a review of historical and current receiving water monitoring efforts for trash.

1.1. TYPES OF ASSESSMENTS AND MONITORING

Qualitative Assessment: The qualitative method is based on a visual survey technique that documents the levels of trash within the creek/river channel/shoreline and the relative contribution of trash from different transport pathways. The qualitative method may be applied to an assessment area that is defined prior to implementing the protocol. In general, the qualitative method provides a cost-effective approach to evaluate changes in trash conditions in receiving waters at numerous assessment areas at higher frequencies over time (e.g., evaluating seasonal and yearly changes). Additionally, the qualitative method is best used when attempting to detect relatively substantial changes in the levels of trash observed over a defined time period.

Quantitative Monitoring: The quantitative method includes the measurement of trash volume that is collected from a specific assessment area. The quantitative assessment method is more suitable for use at assessment sites that will be the focus of specific management actions, situations that require more refined estimates of trash volumes, or projects that have the goal of detecting relatively small changes in the levels of trash observed in receiving waters over a relatively short timeframe.

There are three major steps included in this SOP:

- **Step 1:** Defining the boundaries of **Assessment Area**, which forms the extent of where the protocol is conducted;
- **Step 2:** Conducting a **Qualitative Assessment** of trash levels and estimating the relative contributions of trash pathways. The assessment also includes an evaluation of the vegetative cover and structure/composition observed in the assessment area; and

- **Step 3: Conducting a Quantitative Assessment** of trash volumes and types by:
 - a) collecting and removing trash from the assessment area; and b) calculating the total volume of trash associated with different transport pathways;

Steps 1 and 2 will be conducted at all probabilistic sites and steps 1-3 will be conducted at all targeted sites. When both qualitative and quantitative assessments are planned at a site, they should be performed in the order presented within this SOP.

1.2. PERSONNEL ROLES AND RESPONSIBILITIES

There are three main roles that will be filled by each Stormwater Program to ensure the effective implementation of the program and QA/QC procedures. Each role and responsibility is described below.

- **Monitoring Project Manager** – Main responsibility will be to oversee and coordinate all aspects of the receiving water trash monitoring program for his/her Stormwater Program. Responsibilities will include conducting/coordinating the appropriate training of the Field Crew Supervisor(s) and Field Crew Members; selecting probabilistic and targeted sites; coordinating the management of all data collected during monitoring/assessment events; overseeing and conducting all QA/QC procedures; and overseeing the interpretation and reporting of the data.
- **Field Crew Supervisor(s)** – One or more individuals for each Stormwater Program that will oversee field assessment and/or monitoring activities at specific sites or events, and Field Crew Members assisting with monitoring/assessments. The Supervisor should be trained in the protocol and use of the data collection form; present at all applicable assessment/monitoring events; lead the recording of information on the data collection forms, including condition assessments, vegetative cover/structure assessments, volume measurements and pathway analysis; and participating in QA/QC procedures in the field.
- **Field Crew Members** – One or more individuals for each Stormwater Program that assists the Field Crew Supervisor in conducting qualitative assessments and quantitative monitoring. Field Crew Members are not required to go through formal training, but should have read the protocol and understand the field safety procedures.

2. Project Planning

2.1. SITE EVALUATION

Prior to the first monitoring event, the Monitoring Project Manager, in coordination with the Field Crew Supervisor(s), should attempt to gain access to the required number of targeted and probabilistic sites (and alternative sites should one or more sites not be accessible or safe), conduct field reconnaissance at the sites where access is granted, and document final site list. Reconnaissance can be conducted using a combination of office and field site evaluations. Field visits should evaluate if the site is accessible and safe for conducting visual trash assessments or conducting quantitative monitoring. The Monitoring Project Manager should manage the final site list.

2.2. FIELD MOBILIZATION

One or two days prior to trash assessment, The Field Crew Supervisor and Field Crew Members should complete/assemble the following materials and supplies for the field:

Material/Supplies	Trash Assessment Protocol	
	Qualitative	Quantitative
Paperwork (Site Evaluation Field Form, Trash Monitoring Plan SOP, field datasheets, maps, permits, gate keys)	X	X
Measuring tape	X	X
Flagging and/or stakes	X	X
Camera	X	X
Cell phone	X	X
GPS (could be cell phone)	X	X
First aid kit	X	X
Rubber boots or chest/hip waders	X	X
Super-heavy duty plastic trash bags and twist ties		X
Five-gallon buckets		X
Labels and marker to write on labels		X
Container for hazardous waste items		X

The Field Crew Supervisor or Monitoring Project Manager should schedule the trash assessment dates and locations with contracted parties that will be performing the clean-up and will haul the trash collected during the quantitative monitoring portion of the protocol (if applicable) to the landfill and recycling facility.

2.3. HEALTH AND SAFETY

Prior to conducting trash assessments, the Field Crew Supervisor should debrief field crews regarding health and safety issues. Some information, such as potential presence of illegal encampments and sensitive wildlife species should be gathered several days prior to field visits. The Field Crew Supervisor should conduct a tailgate meeting immediately prior to conducting the assessments. Health and safety issues include, but are not limited to:

- ✓ General safety and awareness of surroundings – deep water, steep banks, poison oak, blackberry bushes.
- ✓ Avoidance of deep spots in the channel and show caution for submerged objects while walking through the channel.
- ✓ Always work in groups of two crew members.
- ✓ Need to wear gloves to protect hands when collecting trash.
- ✓ Prevention of heat exhaustion and dehydration.
- ✓ Use of proper lifting techniques.
- ✓ Illegal encampments – Do not approach or interact with people living in camp. Do not remove items from an active camp. Follow existing protocols associated with illegal encampments.
- ✓ Hazardous materials – Do not remove any of the following hazardous items: sharps (syringes, razors, knives) or batteries, propane tanks etc. These items should be properly disposed of by staff who are trained and prepared for handling hazardous waste.

- ✓ Fecal material – Do not touch or remove any trash contaminated with feces. This material should be properly disposed of by staff who are trained and prepared for handling biowaste.
- ✓ Need to avoid disturbing wildlife, including nesting birds and wood rats. Steps to identify and avoid sensitive species habitat will be addressed during protocol training.

3. Defining Trash Monitoring/Assessment Areas

This section summarizes the process that Field Crew Supervisors and Crew Members will use to delineate the area where qualitative visual assessments and/or the removal of trash for quantitative monitoring will be conducted. Because the assessment area differs by receiving water type, assessment area delineation procedures for creeks, channels and the Bay shoreline are discussed separately below.

3.1. LENGTH OF ASSESSMENT AREA

The minimum length of the assessment area for assessment/monitoring sites is 300 feet for creeks, channel and rivers, which is consistent with a majority of the RMC probabilistic sites and Trash Hot Spots. The minimum length for shoreline locations is 600 feet, which is consistent with Trash Hot Spots at shoreline locations. At each monitoring site, the length of the trash assessment area will be measured and GPS coordinates and easily identified landmarks at the upstream and downstream ends of the reach will be documented. For the purpose of photo documentation, the assessment reach is divided into 100-foot segments that can be distinguished using easily removable markers (e.g., surveyor's flags).

3.2. WIDTH OF ASSESSMENT AREA

The width of an assessment area should be measured at three locations for creek and shoreline sites. These measurements will be used to calculate average width of the assessment area. For creek, channel and river sites, measurements should be taken at the furthest downstream location, roughly midway, and the furthest upstream location of the 300-foot assessment area. For shoreline sites, measurements should occur at the starting point, midpoint and end point of the 600-foot assessment area.

Measurements should be made by placing a tape measure or hip chain onto the ground, and measuring the width along the ground from one width boundary to the other width boundary (e.g., tops of bank). Field crews should mark the boundary of the assessment area during the initial monitoring event to facilitate future assessments. Assessment area widths only need to be measured once, prior to the first monitoring event, given that all area markers can be seen during subsequent events.

Creeks/Rivers/Channels - To the extent possible, the assessment area width for sites on creeks, channels and rivers will extend to the "top of bank". Top of bank refers to the creek or channel boundary where a majority of normal discharges and channel-forming activities takes place. The top of bank boundary will contain the active stream channel, active floodplain, and its associated banks. For transect locations where the top of bank is not accessible or safe for field crews to access (e.g., non wadeable or mud bottom), to the extent possible, the width of the assessment area will be measured at another location with safe access using the methods described above.

Figures showing how to delineate an assessment area for creeks/channels/rivers, and the Bay shoreline locations are included in **Attachment A**.

Shorelines - For lagoon and Bay shoreline sites, the shoreline assessment area width is delineated as appropriate, based on a change in substrate material, presence of a line of upland vegetation, or onset of development. The boundary along the water's edge may vary depending on height of tidal stage during assessment. Where possible, attempt to conduct assessment during low tide stage to optimize area that may have trash impacts. However, in cases where channel is not safely accessible during low tide (e.g., mud flats), we recommend extending the boundary to outer edge of mud bottom (not the water's edge). Also note the stage of the tide during the time of assessment. Similar approach for delineating segments and measuring assessment widths and photo documentation described in previous section should be conducted.

4. Conducting the Assessment/Monitoring Event

4.1. GENERAL SITE INFORMATION

This section describes procedures for completing the Section I (Trash Assessment Area and General Site Information) of the Receiving Water Trash Assessment Data Collection Form (**Attachment 2**).

4.1.1. Assessment Area Information

On the data collection form, complete all information associated with the location and boundaries of the assessment area. This includes the receiving water body name, associated jurisdiction(s), length and widths of the assessment area, GPS (lat/long) coordinates for the upper and lower (longitudinal) boundary of the area, channel type (for creek/river sites), site characteristics (i.e., flow, water clarity, bank angle and sinuosity), evidence of public use resulting in trash impacts (i.e., amount of trash generated by people littering or dumping directly at the site), and applicable land uses that may impact the assessment area. If site is tidally influenced, note the stage of tide occurring during time of assessment.

4.1.2. Number and Diameter of Stormwater Outfalls

Record the number and diameter of stormwater outfalls greater than 18 inches in diameter that were observed in the assessment area. Outfalls less than 18 inches within the assessment area, and outfalls observed outside of the assessment area should not be recorded.

4.1.3. Previous Trash Clean Up

Record the date and entity that performed a trash cleanup prior to the trash assessment event, but after the most recent assessment at the site (if applicable). Select "unknown" to indicate that it is unclear as to whether a cleanup event occurred during this timeframe.

4.2. QUALITATIVE TRASH ASSESSMENT

This section describes procedures for completing the Section II (Trash Condition and Pathways) of the Receiving Water Trash Assessment Data Collection Form (**Attachment 2**).

4.2.1. Trash Condition Category and Site Score

The qualitative assessment is a visual survey technique performed by at least two crew members (one being the Field Crew Supervisor) that documents the levels of trash within the creek, engineered channel, or on the shoreline; and the estimates the relative contribution of trash from different transport pathways. The Field Crew Supervisor should first walk the entire assessment area and score the site based on their “first impression” of the amount of trash observed. The trash condition is divided into four condition categories that include narrative descriptions of trash levels associated with a scoring range (1 – 12) as follows: Low (1-3), Moderate (4-6), High (7-9), Very High (10-12) (**Table 1**). Example photographs for each trash condition category are provided in **Attachment 3**.

Observers should physically walk on both banks and within or near the creek/channel (where feasible) to observe trash throughout the assessment area. Feasible conditions refer to flow conditions that allow the stream to be wadeable or safely accessed (e.g., muddy substrate), in addition to conditions that would avoid impacts to migratory nesting birds and fish spawning. Trash that is visible outside of the assessment area should not to be included in the trash condition score, but should be noted in the comments section of the data form.

Table 1. Trash condition categories and scoring system for qualitative assessments of receiving waters.

Condition Category											
Low			Moderate			High			Very High		
<ul style="list-style-type: none"> Effectively no or very little trash On first glance, little or no trash is visible Little or no trash is evident when streambed and stream banks are closely examined for litter and debris One individual could easily remove all trash observed within 30 minutes 			<ul style="list-style-type: none"> Predominantly free of trash except for a few littered areas On first glance, trash is evident in low levels After close inspection, small levels of trash are evident in stream bank and/or streambed. On average, all trash could be cleaned up by two individuals within 30 minutes to one hour. Approximately 2-3 times more trash than the low condition category 			<ul style="list-style-type: none"> Predominantly littered except for a few clean areas Trash is evident upon first glance in moderate levels along streambed and banks Evidence of site being used by people: scattered cans, bottles, food wrappers, plastic bags, etc. On average, would take a more organized effort (more than 2 people, but less than 5) to remove all trash from the area. Removal of trash would take 30 mins to 2 hours. Approximately 2-6 times more trash than the moderate condition category 			<ul style="list-style-type: none"> Trash is continuously seen throughout the assessment area Trash distracts the eye on first glance Substantial levels of litter and debris in streambed and banks Evidence of site being used frequently by people (e.g., many cans, bottles, food wrappers, plastic bags, clothing; piles of garbage and debris) On average, would take a large number of people (more than 5) during an organized effort to remove all trash from the area. Removal of all trash would take more than 2 hours. Approximately 2 or more times trash than the high condition category 		
1	2	3	4	5	6	7	8	9	10	11	12

4.2.2. Bank and Channel Cover Assessment

On data collection form, separately assess the proportion (%) of the assessment area for the banks (combined area for both banks) and channel bottom using categories in Table 2.

Table 2. Vegetated or vegetated debris cover categories for banks (streams and shoreline) and channel (streams only).

Assessment Area	Category	Definition
Banks	Grasses	Grasses, vines, weeds and other non-woody plants generally < 2 feet in height
	Bushed/shrubs	Woody plants such as shrubs, poison oak, black berries, reeds, grasses and other plants and trees that are between 2 and 10 feet in height
	Trees	Living trees/roots along toe of bank, other natural woody debris material
	Open/Exposed	Soil, leaves
	Armored	Concrete and other bank armoring material
Channel (Not applicable to shoreline sites)	Woody Debris	Logs, sticks, branches, and other natural woody material
	Aquatic Vegetation/Algae	Vegetation growing within the channel (e.g., grasses, rushes, sedges, water cress); filamentous algae (mats or floating) on surface
	Open/Wetted Channel	Channel surface has no woody debris or vegetation or other obstructions that may cause trash deposition
	Dry Channel	Exposed channel substrate and/or vegetation

Collecting this information will be helpful in assessing whether the amount and type of vegetation and other channel roughness elements affects the transport and accumulation of trash at a site.

4.2.3. Trash Pathways

Once the overall trash condition category and site score have been recorded, The Field Crew Supervisor will estimate the percentage of trash observed that is attributable to one or four trash transport pathway categories:

1. Litter/Wind (from adjacent land uses)
2. Illegal Encampments (from adjacent land use or upstream sources)

3. Illegal Dumping (from adjacent land use or upstream sources)
4. Other (e.g., Stormwater and Upstream Sources)

Table 3 includes factors that may help estimate the relative contributions from each pathway. Each pathway should be assigned a percentage between 0 and 100% (increments of 5%) of the total trash observed in the trash assessment area. There will be a high level of uncertainty associated with defining pathways for each of the trash items due to the inherent difficulty of assessing all the potential ways trash can enter the assessment area. As a result, the relative proportion of trash pathways should be considered a very rough estimate.

Table 3. Trash items typically associated with four types of transport pathways.

Trash Pathway	Trash Characteristics	Potential Location in Assessment Area	Example Trash Items
Litter/Wind	<ul style="list-style-type: none"> - Light weight - Distributed evenly, recent/not worn 	<ul style="list-style-type: none"> - Adjacent to or under freeways and road crossings - Near roadways, bike or foot paths adjacent to the water body 	<ul style="list-style-type: none"> - Fast food items - Paint spray cans - Carryout plastic grocery bags - Paper - Styrofoam
Illegal Encampments	<ul style="list-style-type: none"> - Large items - Dense, multiple piles near current or abandoned camping site - No sign of water damage 	<ul style="list-style-type: none"> - Adjacent to camps or trails - Banks, above and below high water mark - Under bridges 	<ul style="list-style-type: none"> - Mattresses - Fast food items - Bagged trash - Large items - Fabric and cloth - Cardboard/paper - Metal cans/debris - Glass Bottles/pieces - Food Containers
Illegal Dumping	<ul style="list-style-type: none"> - Large items - Recent - Large piles, adjacent to roads 	<ul style="list-style-type: none"> - Directly upstream or downstream of bridges - Near roadways 	<ul style="list-style-type: none"> - Furniture - Bags of trash - Construction debris - Fabric and cloth - Mattresses - Tires
Unknown/Other (e.g., Stormwater, and Unidentifiable Upstream Sources)	<ul style="list-style-type: none"> - Small, persistent, transportable - Old, worn, water damaged - Integrated with vegetation, debris - Well distributed and mixed with debris 	<ul style="list-style-type: none"> - Wetted channel - Banks below high water line - Directly below outfalls 	<ul style="list-style-type: none"> - Polystyrene food ware - Cigarette butts & wrappers - Food wrappers - Plastic bottles/cups - Plastic straws/caps - Carryout plastic grocery bags - Rubber balls/tape - Paper fragments

4.2.4. Photo Documentation

Each trash monitoring/assessment event will include photo documentation of the assessment area. Standardized photo documentation procedures are currently implemented by Permittees at

all trash hot spot areas and these same procedures will be used during both qualitative assessment and quantitative monitoring events. If only a qualitative assessment is being conducted at the site, then the photo documentation should be recorded in this section. If quantitative monitoring is being conducted at the site (i.e., trash is being collected and removed from the assessment area), documentation of photographs should be recorded in the in Quantitative Monitoring Section (Section III) of the data collection form. A summary of the photo documentation procedures are as follows:

1. Establish Photo Documentation Segments

Evenly divide trash assessment area into 100 foot intervals by placing easily removable markers (e.g., surveyor's flags) along the creek bank. For assessment areas that are 300 feet in length, label the segments A to C, beginning at the furthest downstream. If an assessment area is greater than 300 feet in length, continue to mark 100 ft segments until you reach the most upstream point your hot spot. For example, trash hot spot locations on shorelines are typically 600 feet in length and would thus have six (6) 100 foot long segments, which would get labeled A to F.

2. Photograph Trash Conditions within Segments

Digital photographs are used to show trash conditions over time at the same spot within each segment of the site. A minimum of three (3) photographs should be taken at each site. Photographs will be taken at segment A, B and C **looking upstream** and should illustrate the extent and magnitude of trash within each segment. Photographs should be taken as close to the middle of the active channel as possible. Field crews may choose to take additional photos taken beyond the three required to illustrate trash levels/conditions at the site. These photos should also be identified on the data collection form.

4.2.5. Comments

Field crews should attempt to record any comments about the site that would assist in interpreting the data collected via the qualitative assessment SOP. This may include, but should not be limited to, important sources or levels of trash in areas adjacent to the assessment area where the qualitative visual assessment is being conducted, or identification of areas within the assessment area that may not have been observed due to safety risk or access issues. Structures other than vegetation or vegetative debris that are present in the assessment area should also be described in the comments section.

4.3. QUANTITATIVE TRASH MONITORING

Quantitative measurements will be performed at all targeted monitoring sites (including selected trash booms) by collecting all trash from the assessment area (or captured by the trash boom). Trash items that are not visible during the assessment and/or cannot be safely accessed by field crew will not be included in the assessment, but should be noted in the comment section on the data collection form. Non-visible trash may include items on the bottom of the wetted channel or buried under dirt and debris on banks or within dry channel bed. Inaccessible trash may include items trapped in tree branches, dense vegetation (e.g., blackberry bushes) or on steep banks that cannot be safely accessed. If monitoring site contains active illegal encampments field monitoring staff will visually estimate the total volume of trash associated with the encampment and plan the removal of trash by properly trained personnel at a later date.

4.3.1. Estimate Trash Volume

After completing a qualitative assessment, the first step when conducting quantitative monitoring is to collect all trash from the assessment area and estimate its volume. Trash outside of the defined assessment area should not be collected or quantified as part of this protocol. Trash associated with each of the four different transport pathways should be quantified separately. All trash items are categorized into one of the four transport pathways using three characteristics: 1) type of trash, 2) trash condition/depositional pattern, and 3) location within assessment area (see Table 2).

Relatively small trash items associated with each transport pathway should be collected in 5-gallon buckets (with handles) or super heavy-duty trash bags of a known size. The outside of buckets should be marked with a permanent marker in 0.5 gallon increments. Once the bucket is full (i.e., level with the top of the bucket) empty into a super heavy-duty plastic garbage bag (e.g., 30 gallons). For partially filled buckets, estimate volume using 0.5 gallon increments. For trash volumes less than 0.5 gallons, mark “< 0.5” on the field data collection form. Small trash items that should be included in buckets/bags include the following:

- | | | |
|----------------------------------------|--------------------------------|----------------------------------|
| • Food Wrappers | • Sports Balls | • Single Use Plastic Bags |
| • Takeout Food Containers and Utensils | • Spray Paint Cans | • Small Automotive Related Items |
| • Glass and Plastic Bottles | • Small Styrofoam | • Paper Products |
| • Clothing/Shoes | • Aluminum, Steel and Tin Cans | • Cardboard |
| | • Cigarette Butts | |

Trash that is placed in buckets and bags should be un-compacted. Garbage bags should not be filled with more than 40 to 50 pounds of material. If material contains sharp or large objects, “double bag” the material, as necessary. Use multiple garbage bags per assessment site, if needed. Total number buckets and volume of collected trash is recorded on the Receiving Water Trash Assessment Data Collection Form (**Attachment 2**). All biohazards and hazard waste should be separated and handled appropriately by trained staff.

Materials that are too large to be placed in buckets or bags should be stacked together (by pathway) and the volume should be estimated visually. Estimates of large items (e.g., construction materials or appliances) should be made in cubic feet or cubic yards and recorded on the Receiving Water Trash Assessment Data Collection Form (**Attachment 2**). Large items may include, but are not limited to, the following:

- | | | |
|------------------|-----------------------|-----------------------|
| • Shopping Carts | • Appliances | • Automobile Parts |
| • Mattresses | • Tires | • Large Bags of Trash |
| • Coolers | • Bicycles, | |
| • Furniture | • Construction Debris | |

4.3.2. Identify Most Prevalent Trash Types

Field crews will identify the five most frequently observed types of trash when conducting quantitative monitoring. The five most prevalent trash items (by number) observed will be circled on the field datasheet. If an item is not present on the list, crew members may write in an item under “other.”

4.3.3. Photo Documentation

Photo documentation procedures described in section 5.3 will be followed when conducting quantitative monitoring. Additionally, a minimum of one photograph will be taken at each of three segments (A, B and C) **before and after** the collection and removal of trash, resulting in a total of 3 before and 3 after (cleanup) photographs for 300-foot creek assessment areas.

Photographs for monitoring sites greater in length (e.g., shorelines) should be taken at each 100-foot segment. Photo documentation of bagged and un-bagged trash should be taken prior to trash disposal.

4.3.4. Resources and Time Expended

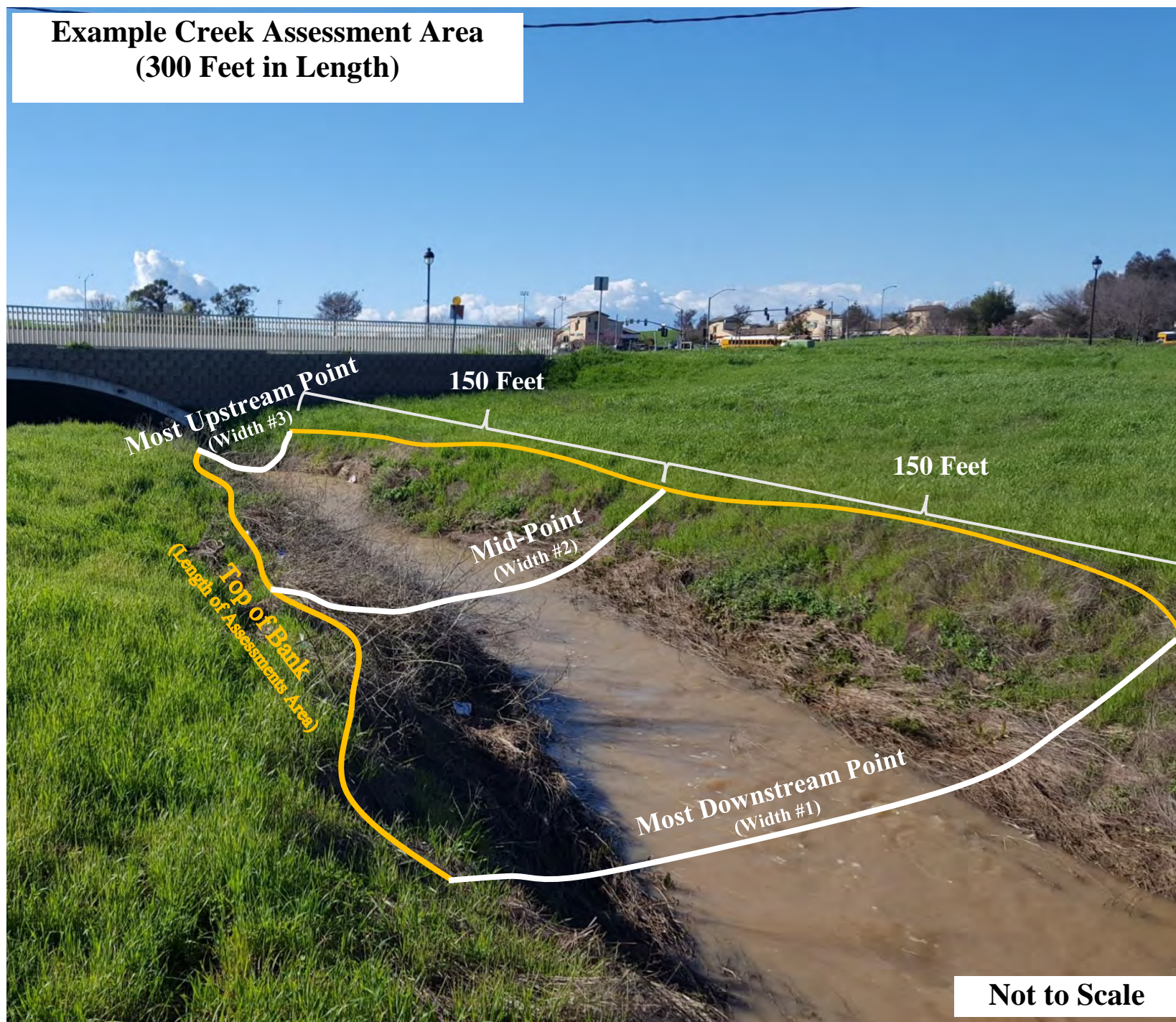
The Field Crew Supervisor should record the number of field crew members that assisted with the quantitative monitoring event, including the removal and disposal of trash in the site.

Additionally, the number of person hours in total spent during the quantitative assessment event (including travel time to and from the event) should be recorded.

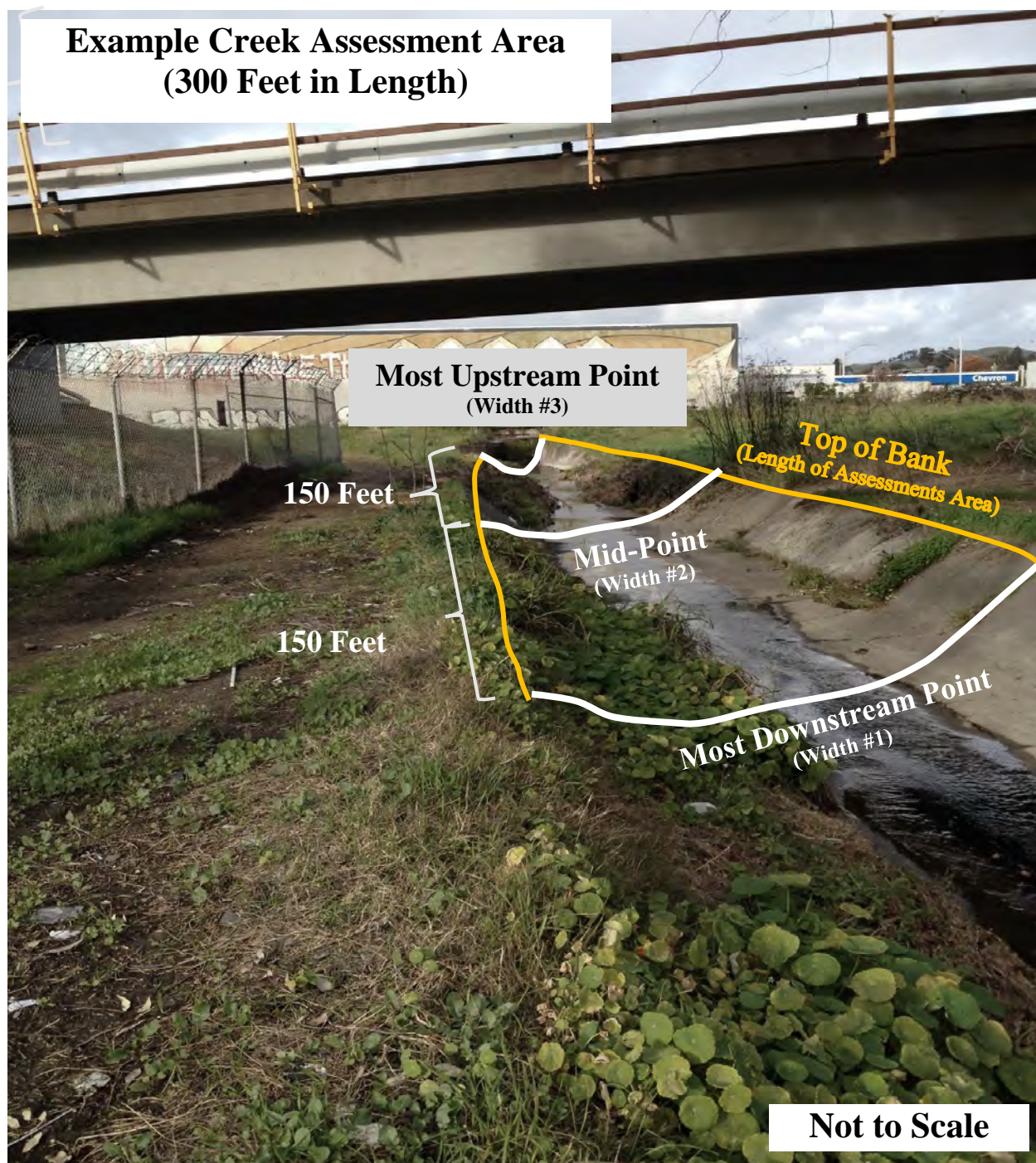
ATTACHMENT 1

GUIDANCE FOR DEFINING TRASH ASSESSMENT AREA

Example Creek Assessment Area (300 Feet in Length)



Example Creek Assessment Area (300 Feet in Length)



**Example Shoreline Assessment Area
(600 Feet in Length)**



Not to Scale

ATTACHMENT 2

DATA COLLECTION FORMS

Receiving Water Trash Assessment Data Collection Form (Version 2.0)

Date: _____ Time Start: _____ Time End: _____

Field Crew Supervisor: _____ Crew Members: _____

I. GENERAL SITE INFORMATION AND TRASH ASSESSMENT AREA

Site ID#: _____

Receiving Waterbody Name: _____ Jurisdiction: _____

Channel Type (check all apply): ☐ Natural ☐ Earthen ☐ Concrete/Armored (bank and/or bed) ☐ Other _____

Type of Site (check one): ☐ Probabilistic ☐ Targeted

Site Characteristics (circle/check one for each field below)

Observed Flow: Dry, No Flow, Isolated Pool, 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs

Water clarity/depth: ☐ Murky/deep (Channel bottom not visible) ☐ Shallow/clear (Channel bottom is visible)

Bank Angle (wetted edge to bankfull): ☐ Shallow (<30°), ☐ Moderate (30-90°), ☐ Undercut (>90°)

Sinuosity: ☐ None (straight channel) ☐ Sinuous (few, slight bends) ☐ Meandering (multiple, sharp bends)

Assessment Area (Measure in the field using tape)

Total Length (feet) _____

Bankfull Width (feet) Downstream/Start _____ Midpoint _____ Upstream/End _____

Contour Width (feet): Downstream/Start _____ Midpoint _____ Upstream/End _____

GPS coordinates (latitude / longitude): GPS Device: _____ Datum: _____ Accuracy: _____

Downstream/Start _____ / _____ Upstream/End _____ / _____

Nearby Land Uses/Infrastructure That May Impact Assessment Area

► Check all that apply: ☐ Residential (Single-family) ☐ Residential (Multi-family)

☐ Commercial ☐ Industrial ☐ Public ☐ Open Space ☐ Urban Park ☐ School ☐ Mixed-use

☐ Freeway ☐ Bridge ☐ Homeless Encampment ☐ Other _____

Evidence of Public Use Resulting in Trash Impacts

☐ None ☐ Low ☐ Moderate ☐ High Notes: _____

Stormwater Outfalls

► Number of stormwater outfalls in the assessment areas > 18 inches in diameter

18" to 24" _____ 24" to 36" _____ 36" to 48" _____ > 48" _____

Previous Cleanup Events

► Has a cleanup event occurred at the site since the last qualitative assessment event?

☐ Yes ☐ No ☐ Unknown

If YES, record the dates on the previous Trash Cleanup Event(s):

Date: _____ Entity: _____

Date: _____ Entity: _____

Receiving Water Trash Assessment Data Collection Form (Version 2.0)

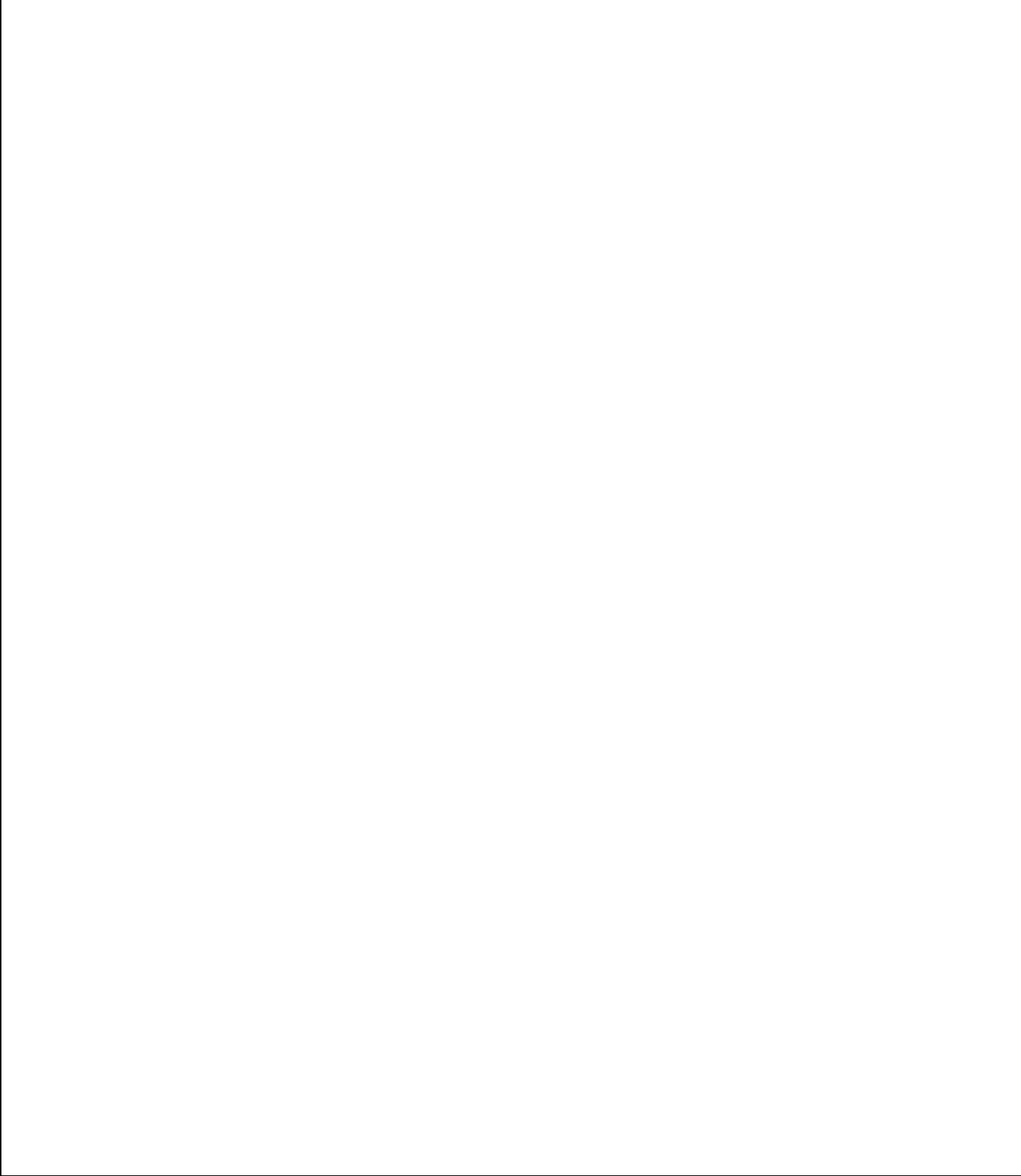
II. QUALITATIVE ASSESSMENT - TRASH CONDITION AND PATHWAYS														
	Trash Condition Category													
	Low			Moderate			High			Very High				
Description	<ul style="list-style-type: none"> Effectively no or very little trash On first glance, little or no trash is visible Little or no trash is evident when streambed and stream banks are closely examined for litter and debris One individual could easily remove all trash observed within 30 minutes 			<ul style="list-style-type: none"> Predominantly free of trash except for a few littered areas On first glance, trash is evident in low levels After close inspection, small levels of trash are evident in stream bank and/or streambed On average, all trash could be removed by two individuals within 30 minutes to one hour Approximately 2-3 times more trash than the low condition category 			<ul style="list-style-type: none"> Predominantly littered except for a few clean areas Trash is evident upon first glance in moderate levels along streambed and banks Evidence of site being used by people: scattered cans, bottles, food wrappers, plastic bags etc On average, would take a more organized effort (more than 2 people, but less than 5) to remove all trash from the area. Removal of trash would take 30 mins to 2 hours Approximately 2-6 times more trash than the moderate condition category 			<ul style="list-style-type: none"> Trash is continuously seen throughout the assessment area Trash is distracts the eye on first glance Substantial levels of litter and debris in streambed and banks Evidence of site being used frequently by people (e.g., many cans, bottles, food wrappers, plastic bags, clothing; piles of garbage and debris) On average, would take a large number of people (more than 5) during an organized effort to remove all trash from the area. Removal of all trash would take > 2 hours Approximately >2 times more trash than the high condition category 				
Site Score	1	2	3	4	5	6	7	8	9	10	11	12		
Bank Cover														
<p>► Below, Estimate the Proportion (%) of the total area of <u>combined banks within the Assessment Area</u> (including vegetated islands if present) that contains the following cover types: (Combined total cover = 100%)</p>														
Grasses (e.g., grasses/weeds, ground cover, < 2ft in height)			Bushes/Shrubs (e.g., bushes, poison oak, blackberries, reeds, tall grass, small trees 2-10ft in height)			Trees (e.g., living trees/roots along toe of bank, other natural woody debris material)			Open/Exposed (e.g., soil, leaves)			Armored (e.g., concrete and other bank armoring material)		
_____ %			_____ %			_____ %			_____ %			_____ %		
Channel Cover (Not applicable to shoreline sites)														
<p>► Below, Estimate the Proportion (%) of the total area of <u>channel within the Assessment Area</u> that contains the following cover types: (Combined total cover = 100%)</p>														
Woody Debris (e.g., logs, sticks, branches, and other natural woody material)			Aquatic Vegetation/Algae (e.g., grasses, rushes, sedges, water cress, filamentous algae on surface)			Open Wetted Channel (e.g., no wood/veg or other obstructions that cause trash deposition)			Dry Channel (e.g., exposed channel substrate and/or vegetation)					
_____ %			_____ %			_____ %			_____ %					
Comments on bank and channel cover:														

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Pathway Analysis																				
<p>► Below, estimate the contribution (%) by volume associated with each pathway below. Use <u>increments of 5%</u>. The percentages for the four categories should add up to 100%. <u>See Table 2</u> in Trash Assessment SOP for guidance in selecting trash items for each pathway.</p>																				
% Contribution of Trash to Assessment Area (5)% increments)																				
Litter/Wind (from adjacent land uses only)	Illegal Encampment (from adjacent land use or upstream sources)	Illegal Dumping (from adjacent land use or upstream sources)	Other (e.g., Stormwater/ upstream sources)	Total																
_____ %	_____ %	_____ %	_____ %	100%																
Photo Documentation																				
<p>► Take photographs (<u>looking upstream</u>) at three segments (A, B and C) for typical 300 foot trash assessment area. Additional segments will be photographed for longer sites (e.g., shoreline sites).</p> <p>Note: When conducting quantitative monitoring, do not complete this section, rather record photo documentation under Section III (Quantitative Monitoring).</p>																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #d3d3d3;"> <th style="width: 25%;">Segment</th> <th style="width: 25%;">Photograph ID</th> <th style="width: 25%;">Segment</th> <th style="width: 25%;">Photograph ID</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td></td> <td style="text-align: center;">D</td> <td></td> </tr> <tr> <td style="text-align: center;">B</td> <td></td> <td style="text-align: center;">E</td> <td></td> </tr> <tr> <td style="text-align: center;">C</td> <td></td> <td style="text-align: center;">F</td> <td></td> </tr> </tbody> </table>					Segment	Photograph ID	Segment	Photograph ID	A		D		B		E		C		F	
Segment	Photograph ID	Segment	Photograph ID																	
A		D																		
B		E																		
C		F																		
Comments for Qualitative Assessment																				
Description of trash sources present in land uses adjacent to the assessment area																				

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Image/Sketch/Diagram of Site



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III. QUANTITATIVE TRASH MONITORING

Site ID#:

Estimated Volume of Trash Removed

- Record total volume of trash associated with each trash pathway that was collected in the assessment area. For small items collected in buckets or bags, use 0.5 gal increments. For large (unbagged) items, use 0.5 ft³ or yd³ increments.

Trash Pathway	Trash Volume (Un-compacted)					
	Small (bagged) Items ¹				Large (Unbagged) Items ²	
	# Buckets	Bucket Size (gal)	# Bags	Bag Size (gal)	Volume	Unit (circle)
Litter/Wind						
Illegal Encampment						ft ³ yd ³
Illegal Dumping						ft ³ yd ³
Unknown (e.g., Stormwater, or Unknown Upstream Sources)						
Total Trash (Sum of the above rows)						ft ³ yd ³

¹ Small items may include: Food Wrappers, Takeout Food Containers and Utensils, Glass and Plastic Bottles, Clothing/Shoes, Sports Balls, Spray Paint Cans, Small Styrofoam Aluminum, Steel, and Tin Cans, Cigarette Butts, Single Use Plastic Bags, Small Automotive Related Items, Biohazards (Syringes, Diapers, Human Waste, Pet Waste), Paper Products, Cardboard

² Shopping Carts, Mattresses, Coolers, Furniture, Appliances, Tires, Bicycles, Construction Debris, Automobile Parts and Large Bags of Trash

Most Prevalent Trash Items Observed (Top 5)

- Circle the five most prevalent trash items observed at the site.

Plastic	Glass/Metal/Fabric	Construction/Auto Debris	Large Household Items	Toxic Substances
Single Use Plastic Grocery Bags	Aluminum cans	Metal material	Mattresses	Cigarette butts
Convenience/Fast Food items	Fabric and cloth	Wood material/debris	Furniture	Spray paint cans
Beverage Bottles	Paper and cardboard	Tires	Appliances	Biohazards (Used needles, diapers, human waste)
Polystyrene (Styrofoam)	Broken glass	Asphalt/concrete/bricks	Bicycles	Used oil
Other plastic	Shopping carts	Car parts		Batteries

Other:

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Photo Documentation

► Photographs are taken before trash removal and after trash removal at three segments (A, B and C) for typical 300 foot trash assessment area. Additional segments will be photographed for longer sites (e.g., trash hot spots at shorelines).

Segment	Photograph ID	
	Pre-removal	Post-removal
A		
B		
C		
D		
E		
F		

Resources and Time Expended

► **Total # of field crew members** involved in the quantitative monitoring event: _____

► **Total # of person hours expended in the field conducting the quantitative monitoring event:** _____

Comments for Quantitative Monitoring

[illegible]

ATTACHMENT 3

GUIDANCE FOR ASSESSING TRASH CONDITION

LOW TRASH LEVEL CONDITION

Effectively no or very little trash. On first glance, little or no trash is visible. Little or no trash is evident when streambed and stream banks are closely examined for litter and debris. One individual could easily remove all trash observed within 30 minutes





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MODERATE TRASH LEVEL CONDITION

Predominantly free of trash except for a few littered areas. On first glance, trash is evident in low levels. After close inspection, small levels of trash are evident in stream bank and/or streambed. On average, all trash could be cleaned up by two individuals within 30 minutes to one hour. Approximately 2-3 times more trash than the low condition category





October 2017

HIGH TRASH LEVEL CONDITION

Predominantly littered except for a few clean areas. Trash is evident upon first glance in moderate levels along streambed and banks. Evidence of site being used by people: scattered cans, bottles, food wrappers, plastic bags, etc. On average, would take a more organized effort (more than 2 people, but less than 5) to remove all trash from the area. Removal of trash would take 30 mins to 2 hours. Approximately 2-6 times more trash than the moderate condition category





October 2017

VERY HIGH TRASH LEVEL CONDITION

Trash is continuously seen throughout the assessment area. Trash distracts the eye on first glance. Substantial levels of litter and debris in streambed and banks. Evidence of site being used frequently by people (e.g., many cans, bottles, food wrappers, plastic bags, clothing; piles of garbage and debris). On average, would take a large number of people (more than 5) during an organized effort to remove all trash from the area. Removal of all trash would take more than 2 hours. Approximately 2 or more times trash than the high condition category



October 2017



October 2017