

## Trash Sources and Pathways to Urban Creeks September 2007

At the core, people are the source of all trash in urban creeks and San Francisco Bay. However, similar to other stormwater pollutants, more specific sources and associated transport processes must be identified to allow the implementation of effective management actions. SCVURPPP recently developed a simple conceptual model (Figure 1) to better define potential sources of trash found in, and transport processes to urban creeks. Source and pathway categories described are based on urban creek trash assessments conducted in Santa Clara County and local agency staff knowledge of how trash is deposited and transported to local waterways.

Defining source and pathway categories will assist SCVURPPP in:

- Developing consistent terminology for effective communication between Co-permittees, regulatory agencies and other stakeholders;
- Continuing to build conceptual understanding of trash source types present in watersheds and how these sources enter creeks and waterways; and,
- Determining the most optimal and cost effective control points to implement institutional and/or treatment controls.

The following section summarizes SCVURPPP's conceptual understanding of potential trash sources and pathways to urban creeks and provides definitions of key terms used throughout the Trash BMP Tool Box. In addition, information on the types of trash items typically found in creeks is also provided.

### Defining Core Concepts

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The following are key terms relevant in understanding trash sources and pathways:

**Trash** - Man-made litter in accordance with the California Code Section 68055.1(g) (CA State 2007). Litter means all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and water. This definition excludes sediments, oil and grease and exotic species.

**Illegal Dumping** - The act of improperly and illegally disposing of waste items, typically in large in volume, in the environment. Illegal dumping occurs in rural or urban settings and primarily happens to avoid disposal fees or the time, cost, and effort required for properly disposing large items (i.e., furniture, appliances) and/or hazardous materials. In addition, large volumes of trash can be illegally dumped or discarded by illegal encampments near or within riparian areas. Direct dumping of grass clippings or other yard wastes are included in this category.

**Trash Dispersal** - Inadvertent distribution of trash into the environment due to improper containment during handling or transportation.

# Trash Sources and Pathways to Urban Creeks



Figure 1. Potential trash sources and transport pathways to urban creeks. Source categories include pedestrians, vehicles, waste containers and illegal dumping. Stormwater conveyance systems, wind, direct disposal and downstream transport are transport pathways.

## Trash Sources to Urban Creeks

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The conceptual model identifies four distinct source categories for trash to urban creeks:

1. Pedestrians;
2. Vehicles;
3. Inadequate Waste Container Management; and
4. Illegal Dumping.

A definition of each source category and examples of associated sources are provided below. Figure 1 illustrates examples of trash sources to urban creeks.

### 1. Pedestrians

Pedestrians who lack the willingness to properly dispose of waste or do not have access to waste containers are likely the greatest source of trash in local water bodies. Land areas where pedestrians litter typically include high foot traffic locations (e.g., shopping plazas, convenience stores, parks), transition points (e.g., bus stops, train stations, entrance to public buildings), and special event venues (e.g., concerts, sporting events and fairs). Pedestrians are generally considered a chronic source of trash to urban creeks.

### 2. Vehicles

Drivers and passengers who litter from vehicles or do not adequately cover their vehicles when transporting trash and debris are also sources. Land areas that may generate trash from vehicles include roads, highways (on/off ramps, shoulders or median strips) and parking lots. Similar to pedestrian litter, vehicles are considered a chronic source of trash.

### 3. Inadequate Waste Container Management

Waste containers (e.g., trash receptacles, recycling bins and dumpsters) may become sources of trash if not managed appropriately. Trash receptacles or dumpsters that are overflowing and/or uncovered can deposit trash on the landscape, allowing transport to storm drains, creeks and other waterways. In addition, improper storage, handling and transport of trash and recycling materials during curbside collection (e.g., residential and commercial areas) can allow trash to be deposited on the land. Inadequate waste container management is a chronic trash source to creeks.

### 4. Illegal Dumping

Illegal dumping can occur on land or directly into a waterway within specific areas throughout a watershed. In most instances, illegal dump sites attract further dumping as the volume of trash increases at a site. This source includes trash illegally dumped or discarded by illegal encampments near or within riparian areas. Illegal dumping typically occurs sporadically and usually consists of large items (e.g., furniture, appliances and tires) compared to other source categories.

## Trash Pathways to Urban Creeks

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Trash from source categories can potentially enter urban creeks by four major transport pathways:

- A. Stormwater Conveyance Systems;
- B. Wind Transport;
- C. Direct Disposal into a Creek; and,
- D. Downstream Transport.

A description of each transport pathway is included above. Figure 1 provides an illustration of transport pathways.

#### **A. Stormwater Conveyance System**

Stormwater conveyance systems can transport trash to waterways from any combination of the four source categories during storm events and dry weather flows. Small and floatable trash items are particularly susceptible to transport through this pathway. Typically, the greater the discharge of runoff and frequency of storm events, the more likely trash will be transported through stormwater conveyance systems to urban creeks.

#### **B. Wind Transport**

Trash can be transported to a waterway by wind, especially when a trash source is located in adjacent land uses with minimal riparian vegetation and obstructions (e.g., fences). Wind can also transport trash over land to the stormwater conveyance system and road crossings over creeks.

#### **C. Direct Disposal**

Trash can enter waterways when directly disposed within the stream channel or on its banks. Illegal dumping and pedestrian litter are the two most prevalent trash source categories applicable to this pathway. Typical trash items associated with illegal dumping into waterways include: construction and landscaping materials, furniture, electronics, tires, and hazardous materials (e.g., paint, batteries). Typical trash items associated with the direct deposition of pedestrian litter into waterways include: beverage containers, food waste and cigarette butts. Easy access to creeks facilitates the direct disposal of trash.

#### **D. Downstream Transport**

Trash that enters the creek from any of the above pathways can be transported and/or deposited to downstream locations. The amount of trash deposited in a creek can vary by site, depending on channel gradient, stream velocity and density of stream/riparian vegetation. Trash items within creeks may be transported to larger downstream waterbodies (e.g., wetlands, bays and estuaries), where additional influences (e.g., tides, currents and wind) affect distribution.