Tobacco and Cannabis Debris Survey Protocol

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Method Article

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Abstract

Tobacco and cannabis product use can result in debris (a.k.a. litter) on the landscape, with implications to soil and water quality and thus potential impacts to ecosystems. More information is needed regarding how much debris exists on the landscape, such that the magnitude of potential associated environment problems can be quantified. Such information can raise awareness in the public about environmental hazards from tobacco and cannabis product use. The goal of this protocol is to quantify, via a timed survey approach, the tobacco and cannabis debris load (i.e. cigarette butts, cannabis or e-cigarette waste) at study sites. Multiple sites in a geographical location may be of interest for comparative analysis, for example sites used regularly by humans (e.g. trails, parking lots, around buildings, garbage cans) versus other sites that are suspected to have low human use. In any case, the same survey data sheet would be used (included with this protocol). Each survey will take 15 minutes per site to conduct. In the process of surveying, debris is collected and retained for later sorting, counting, and photographic documentation. The time to sort and count the collected debris will depend on the quantity and diversity of debris collected.

Introduction

Reagents

Equipment

Timer (watch or phone), disposable gloves (minimum 1 pair per person per site), resealable plastic bags (minimum 1 per survey), data sheet (1 per survey, for each site; included with this protocol), pencil, permanent marker, GPS unit (or phone), camera.

Procedure

1. Download and print data sheets (1 per survey) from Supplementary Files, and gather all supplies listed above.

2. On the data sheet, fill out the Date, Location, Survey Site Name, Site Description, Site Proximity to Surface Water Bodies, Name(s) of Surveyor(s), and Start Coordinates for your survey transect/area.

2.1 The duration of each survey should be 15 minutes.

2.2 If working in a team, one person can keep track of the timer, and take notes, while the other (with gloves on) actively searches and bags debris items. Only one person should actively search for, and bag, debris.

3. Label a resealable plastic bag with transect/location, site name, date, and name(s) of collector(s) using a permanent marker.
4. Put on gloves.

5. Set a timer for 15 minutes.

6. Search and collect as many visually observed tobacco and cannabis debris items on the landscape as possible. Place all items inside the resealable plastic bag.

7. Stop the search immediately when the timer goes off.

8. Seal the bag; remove but save your gloves.

9. Record End Coordinates for your survey.

10. Repeat steps 2-9 at additional site(s), filling out a new survey form.

11. Find a location where the collected debris can be easily sorted and counted (out of the wind). This can be done later and out of the area if you are running out of time/daylight or if there are adverse weather conditions.

12. Put the gloves on again, to protect your skin while handling collected debris. Sort and count debris items based on categories listed on the data sheet (see Figures 1-10 for examples). Count the number of cigarette butts with the filters intact (“fresher”) vs. those where the outer paper is partially or completely degraded (“older”). Make a note of any visible brand names on the butts. Separately count any hand-rolled butts, cigars, e-cigarette/vape waste, and other debris as listed on the data sheet. Photograph all debris after counting.

13. Place all tobacco and cannabis debris back into the bag, seal, and dispose properly, or store safely and properly if further study of debris items is desired.

14. Photograph the data sheets and send along with the photos of the debris to debris.survey@gmail.com. Retain the data sheets until confirmation of receipt.

Precaution: Avoid physical contact with tobacco and cannabis product debris at all times.

Troubleshooting

Time Taken

Anticipated Results

References

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Figures
Figure 1

Sorted cigarette butts post survey. These would be considered “fresher” butts, as the outer paper covering the filter is intact. Compare these butts with those in Figure 2. Counts of this item should be recorded in the first category on the included data sheet.

Figure 2
Sorted cigarette butts post survey. These would be considered “older” butts, as the outer paper covering the filter is partially or completely degraded. Compare these butts with those in Figure 1. Counts of this item should be recorded in the second category on the included data sheet.

**Figure 3**

Hand-rolled tobacco or cannabis papers/“butts” (no filter). Counts of this item should be recorded in the third category on the included data sheet.
Figure 4

Example of a blunt, which is a hollowed out cigar filled with cannabis. Blunts can be handmade, or purchased as readymade wraps (as this one is). Counts of this item should be recorded in the fourth category (Cigars/Blunts) on the included data sheet.
Figure 5

Example of an e-cigarette. Counts of this item should be recorded in the fifth category on the included data sheet (E-cigarette and Cannabis Vape Product Waste).
Figure 6

Used e-cigarette/vape pod (pen included for scale). Counts of this item should be recorded in the fifth category on the included data sheet (E-cigarette and Cannabis Vape Product Waste).
Figure 7

Used e-cigarette bar/stick (pen included for scale). Counts of this item should be recorded in the fifth category on the included data sheet (E-cigarette and Cannabis Vape Product Waste).
Figure 8

Cannabis vape cartridges. Counts of this item should be recorded in the fifth category on the included data sheet (E-cigarette and Cannabis Vape Product Waste).
Figure 9

Cigarillo tips. Record counts of this item in the Other Litter category.
Figure 10

Additional examples of items to record in the Other Litter category: hemp/cannabis wrap packaging (top), lighter (bottom left), smokeless pouch (bottom middle), e-cigarette packaging (bottom middle), cigarette packaging (bottom right).

Supplementary Files
This is a list of supplementary files associated with this preprint. Click to download.

- DebrisSurveyDataSheet.pdf