



PROTOCOL

for cigarette litter (butts) measurement on beaches



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The **LIFE AMMOS** “Integrated information campaign for the reduction of smoking related litter on beaches” (**LIFE12 INF/GR/000985**) project was co-funded by the European Union’s Programme **LIFE+ Information & Communication**.

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MEDITERRANEAN SOS Network

www.medsos.gr



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The **LIFE AMMOS** project aims at the prevention and minimization of smoking related litter (cigarette butts) on beaches, focusing on the behavioral change of the public (smokers and non-smokers) as well as on the development of the appropriate tools for the confrontation of the problem.



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Introduction

The *"Protocol for cigarette litter (butts) measurement on beaches"* was developed by the scientific team of **TERRA NOVA**:

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The performance of the Protocol was tested during September and October 2013, as well as during the summer months of 2014, by the scientific teams of TERRA NOVA, Mediterranean SOS Network and University of Patras, for the measurement of smoking related litter (cigarettes butts) at the following 15 beaches in Greece:

1. [Fanari](#) (Municipality of Komotini)
2. [Epanomi](#) (Municipality of Thermaikos)
3. [Agios Ioannis](#) (Municipality of Zagori – Mouresi)
4. [Loutsa/ Vrachos](#) (Municipality of Parga)
5. [Kalogia](#) (Municipality of Dymaios)
6. [Voidokoilia](#) (Municipality of Pylos - Nestoras)
7. [Plytra/ Pachia Ammos](#) (Municipality of Monemvasia)
8. [Vai](#) (Municipality of Sitia)
9. [Georgioupoli](#) (Municipality of Apokoronos)
10. [Tsampika](#) (Municipality of Rhodes)
11. [Karfis](#) (Municipality of Chios)
12. [Agios Isidoros](#) (Municipality of Lesvos)
13. [Agios Ioannis/ Monastiri](#) (Municipality of Paros)
14. [Perissa](#) (Municipality of Thira)
15. [Schinias](#) (Municipality of Marathonas)

Based on the results of the above measurements and on the relative conclusions that were extracted, the required optimization modifications were performed on the Protocol in order to conclude in its current final version.



1. Selection of Area of Interest

The selection of the Area of Interest inside the broader area of the beach is of high importance in order to ensure that the measurements results will be representative regarding the behavior and the habits of the beach users.

More specifically, the Area of Interest is a subtotal of the beach, which is defined based on the following criteria:

- Organised use of the beach (sun beds, umbrellas)
- Significant use by bathers outside the organized zones
- Areas of the beach in front or around of kiosks, beach bars and other commercial activities (e.g. water sports).

2. Selection of Measurement Sites

Inside the Area of Interest of the beach, a representative grid of sites (Measurement Sites) is developed, where the measurements of smoking related litter (cigarette butts) will be performed. The design of the grid must be in relation with:

- ✓ the geographical characteristics of the beach
- ✓ the current uses of the beach.

The grid consists of:

- horizontal (parallel to the sea) alphabetical lines (A, B, C, etc.)
- vertical (vertical to the sea) numerical lines (1, 2, 3, etc.).

The horizontal alphabetical lines are defined as follows:

- 1st line (A): exactly next to (towards the interior of the beach) the wave breaking line
- 2nd line (B): 5 m after the 1st line towards the interior of the beach
- 3rd line (C): 5 m after the 2nd line towards the interior of the beach
- 4th line (D): 5 m after the 3rd line towards the interior of the beach, and so on.



The vertical numerical lines are defined as follows:

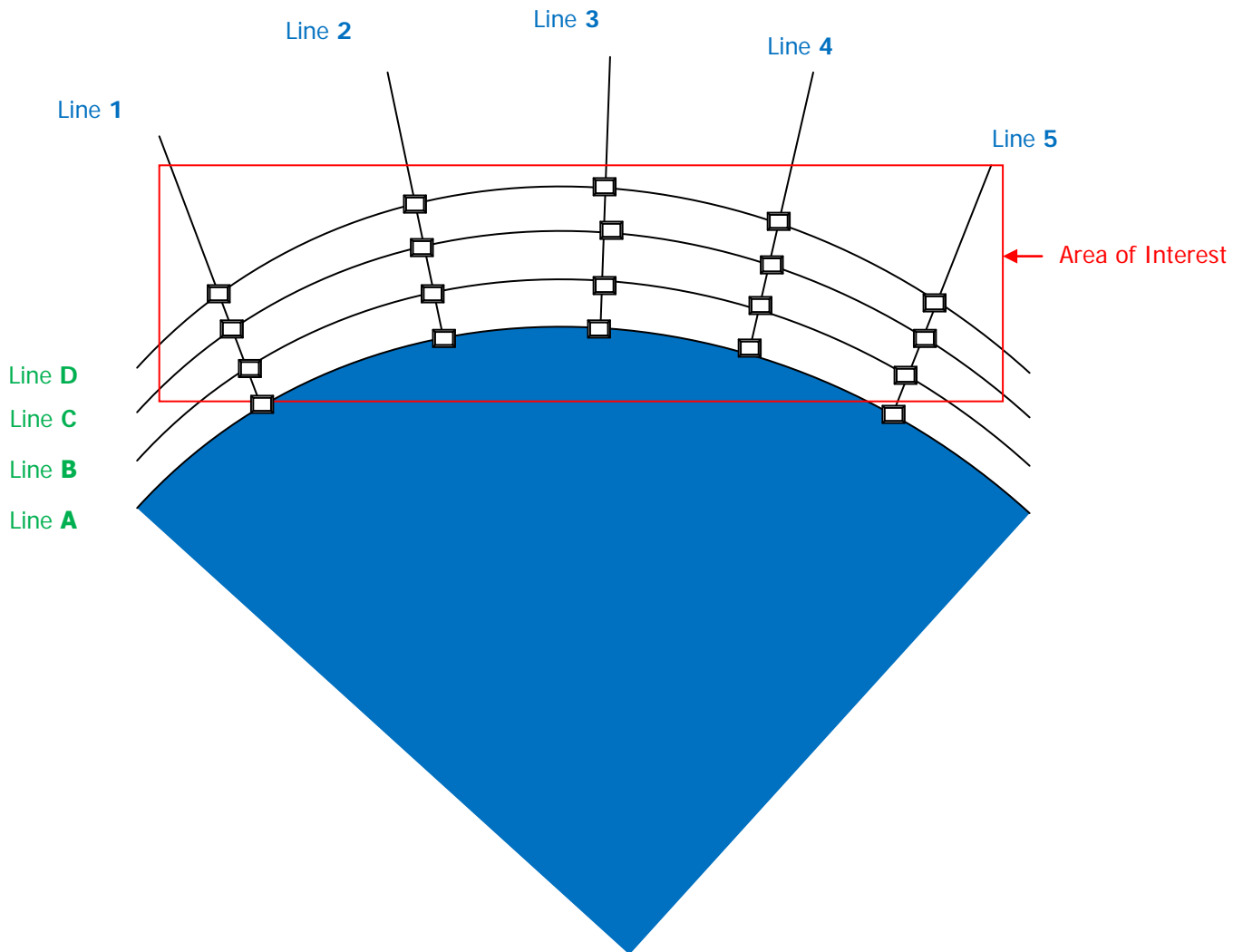
- For beaches having length of their Area of Interest less than 200 m, the distance between successive lines is 20 m.
- For beaches having length of their Area of Interest less than 500 m, the distance between successive lines is 50 m.
- For beaches having length of their Area of Interest more than 500 m, the distance between successive lines is 100 m.

Note: the above distances between the successive numerical lines can be increased or decreased according to the judgment of the auditor during the field work, based on the particularities of each beach regarding its geomorphological characteristics or/and the site allocation of the various uses on it.

- The 1st (No. 1) numerical line is defined at the left limit of the Area of Interest (viewing the beach from the sea)
- The last (No. ...) numerical line is defined at the right limit of the Area of Interest (viewing the beach from the sea).

Each Measurement Site is named by the combination of the horizontal alphabetical lines and the respective vertical numerical lines, e.g. A1, A2, A3, B1, B2, B3, etc.

The above design of the Measurement Sites grid is presented in the following drawing:



Note: in case that the auditor will discover sites with increased concentrations of cigarette butts inside the Area of Interest, which have not been initially included in the designed grid, he can choose them to perform measurement (at an area of 1 m x 1 m x 10 cm) in order to be recorded as peaks.

The same measurement procedure will be followed for these sites as for the Measurement Sites inside the grid (see Chapter 4), but in this case it will be declared in the *"Form for cigarette butts measurements at the beach"* (see Annex) that the specific site is outside the grid by using the indication extra 1, extra 2, etc. and the site will be drawn in relation to the grid.



3. Area of Measurements Sites

Each Measurement Site (A1, A2, B1, B2, etc.) has dimensions:

1 m x 1 m x 10 cm (depth)

4. Measurements procedure

First of all, for each beach an office preliminary work is taking place on a map of appropriate scale. An initial assessment of the Measurement Sites is performed, which are confirmed/ finalized by the auditors during the field work based on the particularities of each specific beach.

While in the field (beach), the following works are implemented by the auditors:

- ✓ Photos of the beach are taken from its 2 limits (left and right) in order to provide documentation of the uses on the beach during the date of the field work.
- ✓ The cigarette butts measurements at the Measurement Sites are implemented methodically from one side of the beach to the other (for recording convenience purposes, the measurements is suggested to initiate from the left limit of the Area of Interest, viewing the beach from the sea).
- ✓ At each Measurement Site the following measurements are taking place:
 - (a) the cigarette butts which are laid on the surface of the sand (*"surface butts"*)
 - (b) the cigarette butts which are dug inside the sand at a zone of 10 cm depth (*"volume butts"*).

The sum of measurements (a) and (b) gives the total of the measured cigarette butts at each Measurement Site.

- ✓ The coordinates of each Measurement Site are taken by using an appropriate GPS device. This is important to compare the results, in case that the measurements will be repeated in the future.
- ✓ A photo of each Measurement Site is taken (vertical shot with frame at the dimensions of the Measurement Site) before the initiation of the cigarette butts measurement.
- ✓ From each Measurement Site A, meaning from the wave breaking line, a photo of the corresponding vertical numerical line is taken. In these photos, all Measurement Sites of each specific vertical line must be shown.



- ✓ The cigarette butts which are measured at each Measurement Site, are collected and disposed at the garbage bins which serve the beach.
- ✓ The current uses on and right above the Area of Interest of the beach are recorded.
- ✓ A concise recording of the situation at the beach during the date of the field work is performed (estimation of the number of people on the beach, status of cleanliness, etc.)

5. Record of measurements results

The results of the cigarette butts measurements are recorded by the auditors, while being in the field, in the *"Form for cigarette butts measurements at the beach"* (see Annex).

After the completion of the measurements at the field (beach), the measurements results are imported into the *excel* file *"Record file of cigarette butts on beaches"* for statistical process.

6. Record of meteorological conditions

The meteorological conditions which prevail at the beach during the date that the measurements are taking place, are recorded by the auditors in the *"Form for cigarette butts measurements at the beach"* (see Annex):

- a. Situation of the sea (height and direction of the waves)
- b. Wind strength and direction (estimation of the auditors or/and available data for the specific day from meteorological web sites)
- c. Sunshine/rainfall.



7. Required equipment

The auditors during the cigarette butts measurements on the beach must be equipped with the following items:

1. Google Earth map of the beach at an appropriate scale
2. Print-out of the *"Form for cigarette butts measurements at the beach"*
3. Cards for photographic signing of the Measurement Sites (A1, B1, C1,)
4. Surveyor's tape of at least 50 m length
5. 4 small stakes to define each Measurement Site
6. Disposable rubber gloves
7. Garbage bags
8. Digital photo camera
9. GPS device
10. Small garden rake
11. Small shovel (preferably with folding handle)
12. Sun protection gear (hat, sun glasses, sunscreen lotion).



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