

ENVIRONMENTAL FORENSICS

ENVIRONMENTAL CRIME SCENE ANALYSIS

Introduction

Although environmental crimes include several typologies (illegal emission or discharge of substances into the environment, illegal trade in wildlife, illegal trade in ozone-depleting substances, illegal transport, shipment or dumping of waste, etc.), the most common is the illegal discharge of pollutants to the environment. Because of this, the most frequent task of an environmental forensic expert is the investigation of pollution crimes. The Pollution Crime Forensic Investigation Manual (INTERPOL, 2014) identifies the following steps for the successful prosecution of an environmental case: (i) collection of the appropriate evidence, (ii) maintenance of legal continuity of the evidence, (iii) organization and documentation of evidence, and (iv) presentation of the evidence to the various audiences (enforcement office management, police, prosecutors, judges and the court). The first step in the process requires a thorough examination of the polluted site or an environmental crime scene analysis.

Procedures to be followed in Environmental Crime Scene Analysis

In the general sense, a crime scene is where a crime has taken place and where the criminals leave crime traces and evidence within a certain range of time and space (Wang et al., 2018). In this sense, an environmental crime scene is the place where the illegal discharge has happened and from where evidence for convicting the polluter can be collected. The general procedures followed in crime scene analysis, such as (i) securing the crime scene, (ii) preliminary crime scene survey, (iii) crime scene documentation (using notes, sketches, photography, and videography), (iv) crime scene searches, and (v) collection, preservation, inventorying and packaging of physical evidence (Miller, 2003), are relevant and significant for pollution crimes. Underpinning all of these steps is the need for a robust and transparent process that can stand up to scrutiny in court. The Pollution Crime Forensic Investigation Manual of INTERPOL (vol.1&2) explains most of these steps in the context of a pollution crime. The manual is designed to 'assist the investigator through the forensic environmental investigation process from initial receipt of information of a potential violation, through planning and implementation of the evidence gathering process, to preparation and presentation of data and evidence in a prosecution brief'. The first volume of the Manual identifies common environmental investigation scenarios and presents a stepwise approach to gathering evidence.

The INTERPOL Manual has guidelines for investigating

many pollution crime scenarios normally encountered (Figure 1, for example). However, there are pollution episodes where identifying the crime scene itself can be challenging. Leaking underground storage tanks or undisclosed chemical dumps polluting the groundwater are classic examples (Morrison, 2000; Varghese et al., 2015). In such cases, the effects of the crime are first observed (in the form of pollutants appearing in some environmental media or as impacts of pollutants on human health or ecosystem), and a careful and detailed investigation may lead the forensic expert to the crime scene. Investigations can become all the more challenging when there is a delay in the manifestation of impacts after the polluting incident has occurred. Identifying and deciding on an appropriate 'pollution signature' relevant to the case can be useful in complex situations (Abdul Samad et al., 2020). The pollution signature is the pollutant/combination of pollutants/attributes of the pollution representative of the case under investigation. Each pollution incident may have one or more pollution signatures associated with it that can lead the investigators to the pollution source.

Challenges specific to Environmental Crime Scene Analysis

There are many challenges that are specific to environmental crime scene analysis. Due to the toxic nature of polluting emissions, sometimes going near the crime scene can be detrimental to the health, and even life, of the forensic expert. Ample precautions, including a well thought out risk assessment, are required when there is suspected release of toxic emissions. Another challenge for the environmental forensic expert is the possible presence of several pollutants at the crime scene, some of them caused by legal activities or natural phenomena. Moreover, these pollutants may be present in the different environmental compartments (air, soil, surface water, groundwater, etc.), that too at concentrations varying spatially and temporally, all making crime scene investigations extremely complex.

Pollution crimes, unlike other crimes, may come to light many days, or even years after the crime is committed, making investigation difficult. One reason for this is that the presence of pollutants in the environmental medium can go unnoticed until its effect is felt on human health or on the ecosystem. Very often, it takes a considerable amount of time for the effects to become manifest at environmental doses (Briggs, 2003). Another issue is the way society perceives environmental crimes. It is not a priority in many societies and not even a concern in some of the societies, severely limiting the resource availability for carrying out rigorous environmental forensic investigations.

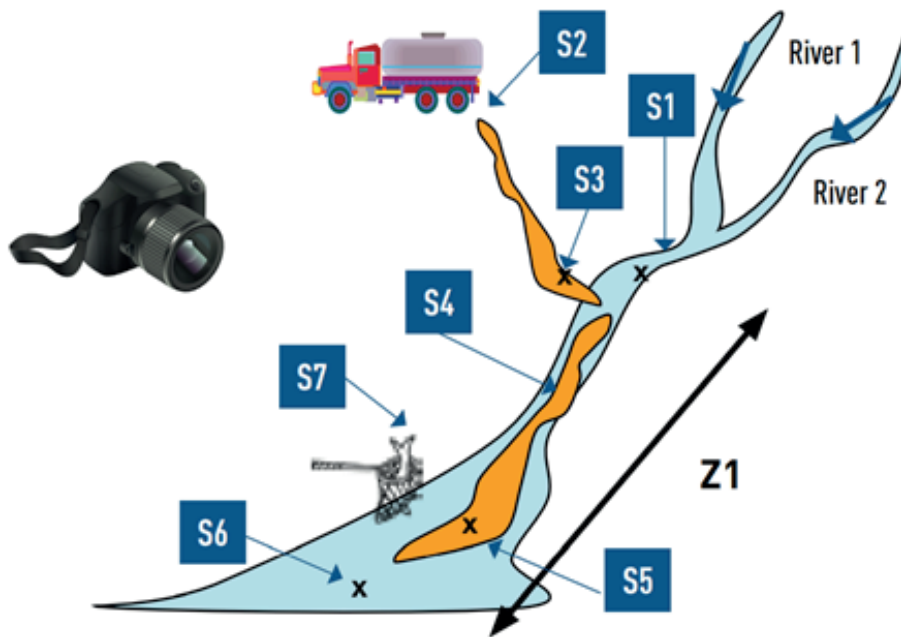


FIGURE 1: Investigative strategy- Improper disposal of sewage through runoff to a water body (INTERPOL, 2014).

Concluding Remarks

Environmental crime scene analysis is the first and often the most critical step in the investigation of environmental crimes, specifically pollution crimes. The general procedures of a normal crime scene analysis can be adopted for the investigation of environmental crime scenes with contextual modifications. The Pollution Crime Forensic Investigation Manual of INTERPOL is a standard reference material for forensic experts for undertaking environmental crime scene analysis. However, there are complex situations where these standard procedures may not fully serve the purpose or are even irrelevant. Improvisation is required to tackle the situation on a case by case basis, which makes the job of an environmental forensic expert challenging.

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