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FOREST MONITORING SYSTEMS AS AN INSTRUMENT OFFENSES AND OFFENSES AGAINST THE ENVIRONMENT

Arkadiusz ZAGAJEWSKI, Tomasz ŁAGUTKO, Kamila ZAGAJEWSKA, Michał ŁAGUTKO, Daniel LIKUS
University of Zielona Góra

Abstract:
The article surveillance issues in the context of efforts to reduce the number of offenses against the environment carried out in forest in the Lubuskie provincy area. It presents the legal aspects concerning the definition of crimes and offenses against the environment. At the same time provides information on the capabilities and the applicability of forest monitoring and the legal situation of this type of technology.

Key words: *forest areas, offense, against, monitoring*

INTRODUCTION

In 2011 General Analitycal Magistrate of Natonial Forrests reported in annual Report of fighitng against forests wrecking that overall loses in 2010 reached 5 559 980 PLN in 62 821 registered cases of forests sabotage [1]. Forest sabotage is defined as unlawfull using of forests spaces (ie. thrashing), poaching, thievery or destruction of foresstry management properties, timber thievery. Vast number of registered cases makes problem of finding and avoiding such acts most vitable. Thus the following article was focued on presenting idea for a practical modern system containing instruments (devices) which might be used as a „weapon" against forestry offences and crimes. Also classification of fellonys and crimes against environment and its legal regulations in Poland has been presented in this paper.

DEFINITION AND CLASSIFICATION OF OFFENCES AND CRIMES AGAINST ENVIRONMENT

According to The Penal Code [2] a crime is an act written in The Penal Code. This act must be unlawfull, culpable and socially harmfull more than insignificant.In case of legal protection of environment there are two very important legal actions mentioned in article 39 point 5 and 6 of The Penal Code:

- obligation to compensate,
- obligation to pay exemplary.

An crime against environment is an socially dangerous act (that fullfils requirements described in The Penal Code or other Laws), unlawfull, culpable and punishable by the court. The Legislator described detaily types of environment related crimes. In many cases those punishable acts derives as unvoluntaries effects of economic acctivities in form of harmfull wastes, liquids, ashes, gases, radioactive substances and ionizating radiation, which might be harmfull for human health or live or they might devastate plants and animals. It is known that in pursue of greater economical profits forced by companies environment stand no chances on its own. Therefore there is need for protecting in as many areas as possible environment through the law. The crimes against environment are detaily described in art. 181-188 of The Penal Code. For example:

- ommission of performing mandatory air pollution and radiation measurements,
- failure to use necessarry means needed to maintain ecological balance in processes of designing and performing digging or violation of the terms of performing works with crucial socially-economically aspects determined by IOŚ[3] or WIOŚ [4],
- disregarding special directives which are focused on air protection; disregarding warrants or bans related to protect air; disregarding,
- destruction of soil binding plants or cleansing environment plants; using chemical means, digging, or using mechanical devices in harmfull for the trees way,
- disregarding mandatory requirements of protecting environment against wastes,
- disregarding obligations related to protect environment agains radiation.

In case of offences The Petty Offences Codes regulates punishments. In forrests areas most cases of offences and crimes are usually form anthropogenic stress-inducing forrest wrecking (table 1).

The law enforcements designated to preventing and fighting crimes agains environment tries to protect as many aspects of the environment as possible thus there is a need for increasing detection rate of crimes and offences against

environment. In following article mainly forrests of Lubuskie Provincy are considered. To protect those forrests an Forrests Guard has been estabilished. One of main duties of this forces is protecting communal wealth, according to Law about Forrests 28th September 1991 [7] National Forrests are part of communal wealth. Forrests guards have following rights and privileges while performing duties described in article 1:

- to check documents of people suspected of commiting crime or offence, likewise witness of crime or offence,
- to incline and estreat fines described by different laws,
- to stop and control means of transportation on forests areas and its close vicinities in order to check its load and passangers luggages, in case of probable cause of offency or crime,
- to search facilities in case of probable cause of offency or crime along with rules described in The Penal Code,
- to apprehend red-handed crime or offency offender also right after chase and bring him to the Police,
- to confiscate and held with a receipt items used to commit crimes or offences,
- to run a case against offenders and to stand as a public prosecutor in regional courts,
- to investigate and to bring accusations in small claims track if aspect of the offence is timber from forrests owned by treasury,
- to carry short and long firearms or gas weapons and hand operated gas throwers,
- to demand necassary help from national institutions, to ask for help from economical entities, social organizations and in urgent cases from any citizen to help on the basis of law of the Police.

In order to effectively use high competencec of Forrests Guards it's crucial to quickly detect offences or crimes. Modern monitoring system should significantly improve efficiency of Forrest Guards. The Lubuskie Provincy is quite unusual provincy in Poland, since almost 50% of its acreage are forrests [8]. Besides almost half of all fires in Lubuskie forrests are deliberate arsons. According to Actualization of Waste Management Program for Lubuskie Provincy for years 2009-2012 with vision for years 2013-2020 [9] many entrepreneurs tries to reduce costs and dumps their wastes directly in forrests.

Table 1
Forrest wrecking amongs other stress-inducing factors affecting environment [6]

ABIOTIC	BIOTIC	ANTHROPOGENIC
1 **Atmospherical factors**	1 **Structure of forrest stands**	1 **Air pollution**
Weather anomalies	Species composition	— energetics
— warm winters	— domination of conifers	— communal management
— cold temperatures	Incompability with habitat	— transportation
— late hoarfrosts	— conifers on deciduous trees soil	2 **Pollution of water and soil**
— hot summers	2 **Insect vermins**	— industry
— abundant snows	— primary	— communal management
Thermically - humiditially	— secondary	— agriculture
— lack of humidity	3 **Infectious fungus illness**	3 **Transformation of earth surface**
— floods	— leefs and shoots	— mining
Wind	— trunks	4 **Forrests fires**
— dominant direction	— roots	5 **Forrests wrecking**
— hurricanes	4 **Excessive amount of herbivores**	— poachery and thievery
2 **Soil properties**	— mammals	— excessive recreation
— humiditial	— rodents	— mass mushrooming
Low lewel of ground water		6 **Inapropriate forestry management**
Soil fertility		— schematical actions
— sandy soils		— overusing
— past agricultural soils		— insufficient plant and animals care
3 **Physiographics conditions**		

VALIDITY OF MONITORING FORRESTS IN LUBUSKIE PROVINCE

According to General Inspector of Personal Data [10] using monitoring devices in locations where peoples presence is possible might cause legal issues due to the legal protection of personal data. Although Inspector also remainded how important is who has the records, and who has access to those records.

It is believed that forrestry monitoring might be very helpfull while tracking offenders. With help of modern technology bringing offenders, poachers, arsonists, timber thieves to the court might be simplier. High competence of police as well as forest guards with ability to precisely pinpoint offenders wherabouts due to monitoring devices should increase abilities mentioned forces to find and capture offenders.

Because of high environmental versability in Lubuskie provincy there is need for special qualities of institutions governing environment. In Lubuskie provincy there are six special areas of conservation habbitats listed in Natura 2000 program: Valey of Lazy Obra, Pszczewskie Lakes, Valey of Obra, Nietoperek, Moor Chłopiny, Moor Młodno, Noteć Estuary. Warta Estuary is also listed on Natura 2000 special area of bird nesting places. 39.3% of Wartas' Estuary surface is considered as region of a extremely important natural values.

Furthermore Lubuskie provincy held many habitats of protected, rare and even threathaned with extinction species of plants and animals, many of which has been enlisted in Polish Red Book of Plants and Animals. Since Lubuskies' provincy most important resources is rich, versalite environment it is necessary to protect by monitoring this environment on highest possible level.

POSSIBLE WAYS OF USING MONITORING DEVICES

Camers installed in forrest may also track and spy some animals. Hidden camers might record spectaluar behaviours without any human presence. Cameras used to record animals are sometimes known as traps. They are deployed along with animals usual walking paths or near watering places. Each animal that interferes with devices infrared beam activates recording process thus giving necessary data for scientist who can later count and estimate number of different species. Data gathered in such fashion are very usefull for scientifically friendly medias, such as National Geographic Society or World Wide Fund For Nature (WWF, further Workd Wildlife Fund). Mentioned organizations were among most active trap cameras promotors.

There are four major groups of forest wrecking: unathorized using forest, timber thievery, fire protection and protection agains excessive usage of forest ares in recreational purposses. Monitoring might help preventing all of those acts. One of most onerous and difficult to find crime is polluting forrests (excessive usage of forrest). Timber thievery is divided into: thievery „from the spot", if trees are cut down and stolen and „from supplies" when prepared logs of wood are stolen.

Forest monitoring might reduce pollution level in polish forrests, which is common and expensive problem despite regular Forrests Guards patrols. In 2008 National Forrests spend 9.5 million PLN for cleaning thrashes left in forrests. If some amount of this money was spend for modern monitoring system it might have reduced overall costs of cleaning forrests.

Timber thievery is also a huge reason of losses for the National Forrests. In 2010 around 27 thousand of cubic meters of wood worth 3 millions 200 thousand PLN has been stolen. Although there is decline in amount of stolen wood in 2010 comparing to 2009 by 3% , due to increase of wood prices worth of stolen wood increased. According to spokesman of National Forrests thieves captured red handed often attacked forrests guards.

National Forrests spreads on over 7.5 million ha of forrests in Poland. All this theritory is guarded by approximately one thousand forrests guards. Because of this protection National Forrests has lower level of stolen wood than public forrests. In 2010 Forrest Guards reffered 2016 indictments.

Each year in National Forrests there are thousands of fires. In registerd 1740 cases of fire in National Forrests in 2010 burned 380 ha [14]. Most disturbing fact is that 43% of this fires resulted of arsonists actions. In forrests near Zielona Góra 240 cases of fire was noted of which 36% was cases of deliberate arsonery. According to the Regional Management of National Forrests in Zielona Góra 95 cases of fire detection was reported to the fire fighters by a random persons, while observations points detected fire 88 times.

TECHNICAL REQUIREMENTS FOR FORREST MONITORING

A camera that is bound to discretely monitoring wide forrests areas should be constructed in a way that minimize services. Frequent visits of servicemans might reveal locations of hidden cameras. Also such devices should be tough enough to withstand harsh environmental conditions.

Although there are suggestions, in the literature, that animals might react for cameras, there are no specific researches how cameras interferes with flora and fauna. Thanks to technological improvements some undesirable properties of recording devices might be avoided. The new generation cameras need no artifical light to record (infrared or thermovision). Because modern camers has no moving parts their loudness has been drastically reduced. Some technological novelties, such as photovoltaic cells extends time between servicing devices – batteries needs to be replaced when they lifespan ends, not every time when they simply discharges. There are available on the market cameras with built in GSM and GPS modules. When stolen these devices send theyre current location to the monitoring center, sometimes with taken pictures (usually sent as MMS). Sending single pictures through GSM carriers is relatively inexpenssive in comparision to sending real-time video stream, but given enough funds there is option to create live-time complex monitoring system.

CONCLUSIONS

Most cases of fellonies and crimes on forrest areas are forms of unaothorized forrest using (i.e. arsonery of polluting) and timber thievery (including thievery of National Forrests properties). They are very disturbing problem in general forrestry management in The Republic of Poland. Sheer numbers of crimes and fellonies against forrests environments and loses due to those crimes and fellonies require effective means of finding offenders. We believe that one of those means might be modern monitoring system. Such system might prevent crimes and helps to track perpetrators thus minimalizing loses to countrys budget. It seems that because of higher competition between hardware and

software manufactures leading to declining prices and wider offerts, usage of monitoring devices in forrests will ascend drastically in following years. In conclusion: market for qualified products and qualified specialists will expand and forrests areas will be better protected with efficient instruments.

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Arkadiusz Zagajewski
Tomasz Łagutko
Kamila Zagajewska
Daniel Likus
University of Zielona Góra
Scientific Group of Eco-Management
ul. Podgórna 50, 65-246 Zielona Góra, POLAND
e-mail: a.zagajewski@e-system24.pl; t.lagutko@e-system24.pl

Michał Łagutko
University of Zielona Góra
Faculty of Mechanical Engineering
ul. Podgórna 50, 65-246 Zielona Góra, POLAND

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