

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 province 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 Analytical Magistrate of National Forests reported in annual Report of fighting against forests wrecking that overall losses in 2010 reached 5 559 980 PLN in 62 821 registered cases of forests sabotage [1]. Forest sabotage is defined as unlawful using of forests spaces (ie. thrashing), poaching, thievery or destruction of forestry management properties, timber thievery. Vast number of registered cases makes problem of finding and avoiding such acts most vitable. Thus the following article was focused 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 felonies 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 unlawful, culpable and socially harmful 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), unlawful, 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 activities in form of harmful wastes, liquids, ashes, gases, radioactive

substances and ionizing radiation, which might be harmful 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:

- omission of performing mandatory air pollution and radiation measurements,
- failure to use necessary 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 harmful for the trees way,
- disregarding mandatory requirements of protecting environment against wastes,
- disregarding obligations related to protect environment against radiation.

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

The law enforcements designated to preventing and fighting crimes against 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 forests of Lubuskie Province are considered. To protect those forests a Forests Guard has been established. One of main duties of this force is protecting communal wealth, according to Law about Forests 28th September 1991 [7] National Forests are part of communal wealth. Forests guards have following rights and privileges while performing duties described in article 1:

- to check documents of people suspected of committing crime or offence, likewise witness of crime or offence,
- to impose and execute 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 passengers luggages, in case of probable cause of offence or crime,
- to search facilities in case of probable cause of offence or crime along with rules described in The Penal Code,
- to apprehend red-handed crime or offence offender also right after chase and bring him to the Police,
- to confiscate and hold 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 forests owned by treasury,
- to carry short and long firearms or gas weapons and hand operated gas throwers,
- to demand necessary 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 competence of Forests Guards it's crucial to quickly detect offences or crimes. Modern monitoring system should significantly improve efficiency of Forest Guards. The Lubuskie Province is quite unusual province in Poland, since almost 50% of its acreage are forests [8]. Besides almost half of all fires in Lubuskie forests are deliberate arsons. According to Actualization of Waste Management Program for Lubuskie Province for years 2009-2012 with vision for years 2013-2020 [9] many entrepreneurs try to reduce costs and dump their wastes directly in forests.

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

ABIOTIC		BIOTIC		ANTHROPOGENIC	
1	Atmospherical factors	1	Structure of forest stands	1	Air pollution
	Weather anomalies		Species composition		– energetics
	– warm winters		– domination of conifers		– communal management
	– cold temperatures		Incompatibility 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 - humiditally		– secondary		– agriculture
	– lack of humidity	3	Infectious fungus illness	3	Transformation of earth surface
	– floods		– leaves 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
	– humiditally		– rodents		– mass mushrooming
	Low level of ground water			6	Inappropriate 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 remained how important is who has the records, and who has access to those records.

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

Because of high environmental versatility in Lubuskie province there is need for special qualities of institutions governing environment. In Lubuskie province there are six special areas of conservation habitats 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 province held many habitats of protected, rare and even threatened with extinction species of plants and animals, many of which has been enlisted in Polish Red Book of Plants and Animals. Since Lubuskie's province most important resources is rich, versatile environment it is necessary to protect by monitoring this environment on highest possible level.

POSSIBLE WAYS OF USING MONITORING DEVICES

Cameras installed in forest may also track and spy some animals. Hidden cameras might record spectacular 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 useful for scientifically friendly medias, such as National Geographic Society or World Wide Fund For Nature (WWF, further World Wildlife Fund). Mentioned organizations were among most active trap cameras promoters.

There are four major groups of forest wrecking: unauthorized using forest, timber thievery, fire protection and protection against excessive usage of forest areas in recreational purposes. Monitoring might help preventing all of those acts. One of most onerous and difficult to find crime is polluting forests (excessive usage of forest). 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 forests, which is common and expensive problem despite regular Forests Guards patrols. In 2008 National Forests spend 9.5 million PLN for cleaning thrashes left in forests. If some amount of this money was spent for modern monitoring system it might have reduced overall costs of cleaning forests.

Timber thievery is also a huge reason of losses for the National Forests. In 2010 around 27 thousand of cubic meters of wood worth 3 million 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 Forests thieves captured red handed often attacked forests guards.

National Forests spreads on over 7.5 million ha of forests in Poland. All this territory is guarded by approximately one thousand forests guards. Because of this protection National Forests has lower level of stolen wood than public forests. In 2010 Forest Guards referred 2016 indictments.

Each year in National Forests there are thousands of fires. In registered 1740 cases of fire in National Forests in 2010 burned 380 ha [14]. Most disturbing fact is that 43% of this fires resulted of arsonists actions. In forests near Zielona Góra 240 cases of fire was noted of which 36% was cases of deliberate arsonery. According to the Regional Management of National Forests 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 FOREST MONITORING

A camera that is bound to discretely monitoring wide forests areas should be constructed in a way that minimize services. Frequent visits of servicemen 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 artificial light to record (infrared or thermovision). Because modern cameras 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 their current location to the monitoring center, sometimes with taken pictures (usually sent as MMS). Sending single pictures through GSM carriers is relatively inexpensive in comparison to sending real-time video stream, but given enough funds there is option to create live-time complex monitoring system.

CONCLUSIONS

Most cases of felonies and crimes on forest areas are forms of unauthorized forest using (i.e. arsonery of polluting) and timber thievery (including thievery of National Forests properties). They are very disturbing problem in general forestry management in The Republic of Poland. Sheer numbers of crimes and felonies against forests environments and losses due to those crimes and felonies 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 losses to countrys budget. It seems that because of higher competition between hardware and

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

REFERENCES

- [1] Report of fighting against forests wrecking 2010. Analytical Part General Magistrate of National Forests. Warsaw 2011, pp. 1-2.
- [2] The Penal Code, J. o L. 1997 , nr 88, pos. 553 with following changes.
- [3] IOŚ – Institute of Protecting Environment J. o L. from 2007 year, nr 44, pos. 287 with following changes.
- [4] WIOŚ – Province Inspectorate of Protecting Environment, Law about Inspection of Environment Protecting J. o L. 2002 year, nr 112 pos. 982.
- [5] Code of Petty Offences J. o L. 1971 Nr 12 pos. 114.
- [6] Report of Polish forest condition 2009. National Forests Information Center. Warsaw 2010.
- [7] Law about forests 28 september 1991, J. o L. 991 nr 101 pos. 444.
- [8] <http://www.eregion.wzp.pl/lesnictwo/wskaznik-lesistosc.html> (02.05.2012)
- [9] Actualization of Waste Management Program for Lubuskie Province for years 2009-2012 with vision for years 2013 – 2020, pp. 59.
- [10] http://www.giodo.gov.pl/520/id_art/4628/j/pl/ (02.05.2012)
- [11] Directive 2009/147/WE dated on 30 November 2009 in case of protecting wild birds and Directive 92/43/EWG in case of protecting environmental habitats and wild fauna and flora.
- [12] Report of Polish forest condition 2010. National Forests Information Center. Warsaw 2010.
- [13] National Forests 2011. <http://www.lasy.gov.pl/zakladki/aktualnosci/kradzieze-drewna-w-lasach>.
- [14] National Forests 2010. http://www.lasy.gov.pl/o_nas/programy-unijne/ogien-w-lesie-a-przyroda.
- [15] Regional Management of National Forests in Zielona Góra 2011. http://www.zielonagora.lasy.gov.pl/web/rdlp_zielonagora/statystyki_pozarowe.

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