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ENVIRONMENTAL MONITORING IN THE HEALTH RESORTS

Abstract: Appropriate management of the environmental resources for the therapeutic purpose in the health resorts should be realized according to eco development's principles or balanced development. Effectiveness of therapy will considerably depend on the environmental condition. Objective estimation of the environmental condition can be performed on the base of long-lasting researches, realized according to elaborated monitoring researches' program for all environment's components. Range of researches should be established with the special attention to the specific health resorts service and requirements, which are included in proper Laws and Disposals.

Key words: monitoring, environment management, eco development, balanced development

Introduction

Modern methods of leading economical activity, family life and societies' leisure time are characterized by high rate of organization, therefore they require efficient methods of management at every stage and level of performed activity. Casual event, improvisation or spontaneous behavior can not be base for taking decision, because can not guarantee to attain an intentional objective, and moreover they can be connected with suffering considerable financial losses. Management in all fields of life plays an important role, what refers to developing professional – state and private educational process with management faculty connected with marketing. Natural environment resources and original landscape are limited because of increasing anthrop pressure and they obviously require appropriate environmental management. The main goal is a biotope protection against progressive degradation and devastation processes.

There are two groups of factors, which cause necessity for efficient management of own, limited leisure time, destined for therapy, rehabilitation, recreation and regeneration of loosing strength during working time: from one side it is lengthening life time because of medicine development and from the other side it is worsening

general health condition of modern societies. Increasing demand for medical service in the health resorts and increasing costs of medical benefits cause intensive exploitation of natural environmental resources by industrial methods. Depending on the health resort's range, its geographical position and specified medical benefits, exploitation intensity of natural resources for treatment necessity will be diversified and with disadvantageous influence on environment. Taking into account the right of modern and future generations to exploitation of natural resources and riches, there should be described and applied appropriate rules of using all environment components, what in consequence can provide in practice with use of balanced development rules.

The base of appropriate organizational activity in the management is clear, unequivocal and actualized (according to changeable situation) law, where the acts are basic documents in Poland. The present Law, which regards the health and therapy resorts (Law 1966), is a document, which in practice limits the health resorts' development because of politic and economic transformations in Poland. New versions of the project concerning health resorts' laws, which appear regularly, could not have been accepted by society so far and the problem of dozens of resorts with the medical status Fig. 1 (Krasiński 1998) is still open. Initiated process of the property transformations is associated with privatization, what in consequence causes lengthening discussion regarding law.

1. Monitoring as the vehicle in the environment management

Appropriately organized management system must be build on the base of correctly prepared human's resources with the special attention to the valid law and financial possibilities. Interdependence among mentioned links are evident and only complete coordination within taken activities can be effective vehicle in appropriate management if natural environment resources in health resorts are taken into account. Except visiting patients, the health resorts are inhabited by native population, whose the only source of subsistence is work in health resorts' services. Appropriately created the health resorts' infrastructure is highly significant if protection and exploitation of the environmental resources are taken into account. Specific character of the health resort in sphere of providing a medical service refers to many conditions, but mainly to the possibilities, which are given by natural medicine. In most of the cases, after using medical qualities of the environmental component during the treatment (water, solid and gas substances), there are left wastes, which can be dangerous substance for biotope because of the fact that having physic-chemical properties it can be stored in long- term conditions and in large amounts. Thus, if health resorts are taken into account, environment management should be focused on the utilization problem of wastes, which occur after therapy applying, for example bore bath, water after mineral bath.

In the process of environment management, especially in the health resorts, there should be obeyed eco development principle, which the first stage is balanced development consisting in:

– harmonizing of the level consumption, patterns of leisure time use, life style,
– maintaining possibilities in reproduction of the reconditioned resources,

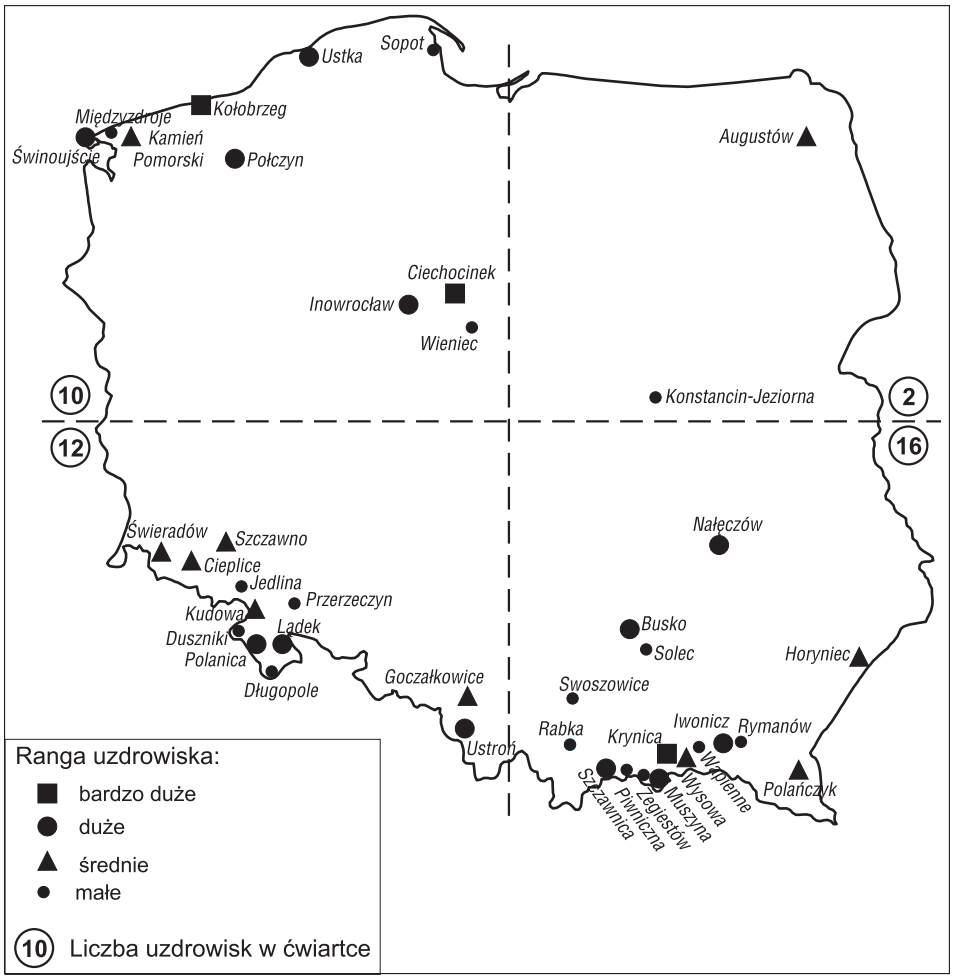

Fig. 1. Polish health resort's map (Krasński 1998)

– effective exploitation of non reconditioned resources and pursuing its substitution for reconditioned one on the base of appropriate technology and projects based on ecological criteria,
– low energy exploitation and preference in utilizing reconditioned energetic resources,
– preferences towards new directions of environmental resource's exploitation and their utilization in closed cycles with the purpose of gradual elimination the use of dangerous and toxic substances from economic and the other processes,
– application of the ecological development base in settle process and different forms of space exploitation,

– constant protection of the lively and still nature in sphere of: landscape, eco system, space and gene issues,
– creation for the enterprises and offer services conditions for the fair competition with the access to decreasing natural row materials' resources and increasing amount of spreading pollutions to environment,
– aspiring to socializing the processes concerning making decisions in field of environment exploitation,
– creation of the conditions, which serve ecological safety within the development and keeping physical and mental health towards the necessity of realization the purposes referred to family and society.

Environmental state and the dynamic of its changes are described on the base of indicators' value, what is taken into account in the estimation of selected biotope components. They are the indicators of effective practical use of the rules in balanced development. The most significant are indicators, of which value can be under influence of performed health resorts' service or which can describe influence of deposition results, used in medical substances' services upon environment. In practice, effects of anthropogenic impact on the guests native inhabitants are cumulated and the anthrop pressure effects can be intensified as a result of synergic impact or varied biocenoz components' interaction and also substances unknown by natural environment.

In that complicated situation, regular control of environment state is complicated issue, which requires considerably organized, permanent actions, specialized services, which were brought into existence within a framework of local autonomy. Specified activities are included in *monitoring, which is comprehended as control – decisional system, which enables to identify and predict environmental state on the base of prepared predictions and in consequence it takes into consideration economical, social, health and recreation needs.*

Elementary assignments for monitoring:
– analysis of processes and phenomenon, which proceed in natural environment and their origin,
– performing of control functions with the possibility of emergency states' identification, which require immediate intervention,
– providing society with information about environment condition and eventual ecological menace,
– providing society with information about actual condition of pollution within selected environment's components with reference to economical and social activity what in consequence will estimate efficiency in realization of environment protection program,
– long-term prognosis preparation, what enables to plan future activity, which in consequence will contribute to maintain required environment cleanness,
– providing with data, required to invest and local policy management, what tends towards reduction of environment natural state's violation and restitution of its primeval resources,
– recognition of interaction within sectors, which absorb amounts of pollutants relocated in monitoring system area,

– providing society with information about predicted results of environment exploitation (conceptions and prognosis) on the base of obtained information concerning pollution's components emitted to environment for the purpose of establishing order of priority actions.

In principal, sphere of monitoring activity should include all environmental components:
– lively nature,
– lithosphere,
– surface and underground waters,
– atmospheric air,
– noise surrounding,
– ionized and electromagnetic radiation.

Different spheres of monitoring or omission of some components will be always effect of specified natural conditions and sorts of medical services in the health resort and in consequence local decisions in this sphere.

Collected information, which will be regularly used for various needs, should fulfill the following conditions:
– periodicity,
– unification and accreditation of research's methods,
– unification of control – researching apparatus,
– unification of interpretation within measures and researches' results.

On the Fig. 2 there was presented basic elements of general algorithm in environment monitoring of health resorts, which because of its all – purpose character, can be also used in organization of monitoring in different areas.

In specific cases, elements included in base and superstructure constitution, can be extended according to needs as a result from local conditions.

Collected information about environmental state, according to Law concerning access to information, environment and its protection (Law 2000) should be available to all interested citizens of the country. Thus, determination of environment state for monitoring necessity means not only information set with local significance, but also created information bank for necessity of wide groups of interested citizens.

1.1. Water monitoring

Apart from less or more precious medical features of waters, generally they can be divided into two groups: surface and underground waters.

Natural waters are generally used for:
– economic-existential purposes of native inhabitants and visitors,
–medical treatment, generally underground waters,
– place, where flowing waters have their destination.

Elementary assignments within a framework of water monitoring include:
– providing with full data concerning present water conditions,

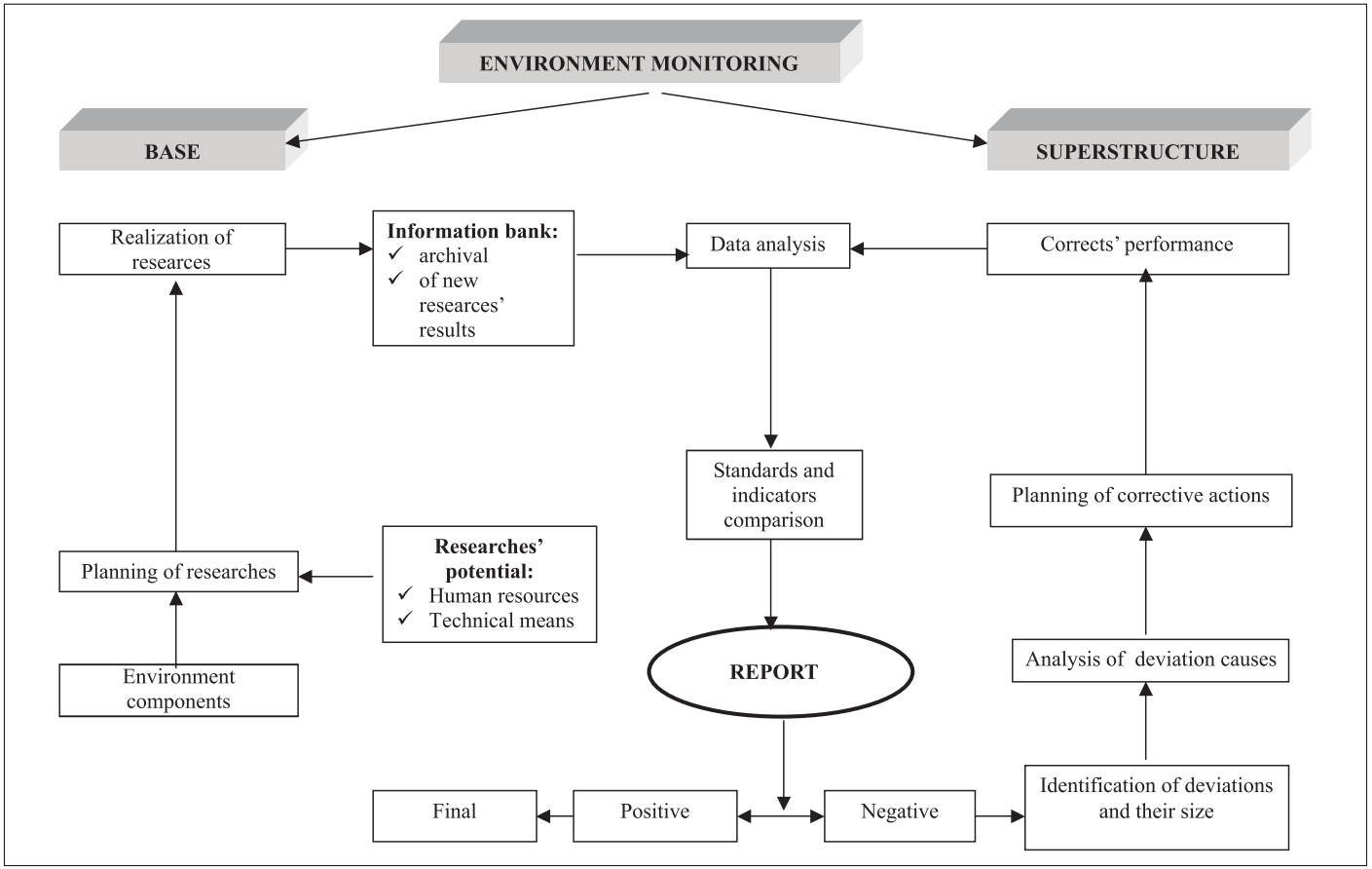

Fig. 2. Organization of environment monitoring in health resorts

– providing, completing and data processing, which enable to analyze hydro geo chemical processes. These processes occur in rivers accumulation place and enable to make decisions connected with water utilization,
– creation of the basis for performing appropriate operations in districts, which are potential candidate to registration as health resort,
– providing with data within a framework of international obligations' realization of Poland as a result from signed agreements and conventions,
– acquiring a significant argument as a base for certificate dispense, concerning medical service according to ISO standards.

Water monitoring assignments within a framework of local needs:
– establishment the water quality and first-importance issues of its utilization for communal needs and economical activity, with the special attention to sanatoria facilities' needs,
– recognition within the period of time, natural geographic areas and anthropogenic processes, which form water quality,
– description of water immunity to wide-area pollutants,
– establishment and description of existing and potential sources of pollutions and description their range and menaces with reference to water,
– presentation of trend within water quality changes and set up strategy of its protection,
– providing with the information, which enable realization of undertaking with the purpose of water protection against pollutants and quality improvement of possibly polluted water,
– providing with necessary data to reasonably economical management of underground waters for social and medical needs,
– providing with necessary data to make plans in the sphere of space management of the area with the aim of water protection.

Monitoring of underground water with the medical function is performed by Mining Companies and Provincial Sanitarian – Epidemic Stations in the sphere of activity connected with physic-chemical and medical features of specified resources presented in health resort. State Environment Monitoring (State Environment Monitoring 1998) conducts system of water researches and a range of selected indicators within four-years cycle. This system subjects to permanent modifications according to changeable situation in environmental condition, international agreements and financial possibilities of the Country.

1.2. Air monitoring

State of atmosphere in the health resorts depends not only from geographic factors, but most of all economical activity, which is led by native population and patients stayed in the town. Contamination emitted from the means of transport are the most serious problem of human agglomeration. Modern means of transport emit to environment much noxious substances, not only with burn – products (except water, all burn – products from liquid and gas fuel: carbon oxide, carbon dioxide, nitrogen oxides, multi annular aromatic hydrocarbons – WWA, the are harmful for people and environment), but also with assemblies, sub- assemblies and parts of modern vehicles: volatile substances

emitted by plastics, which are present in vehicle over 50 per cent, mechanical pollutions from brake system and running gear (heavy metals, asbestos, WWA, chloral derivatives, ingredients of rubber). These elements and chemical compounds cause cancer. Noxious influence of air-pollution on environment appears as changes of climate because of smog formation, what in consequence causes decrease of radiation intensity, particularly ultraviolet – UV, what influences significantly on amount of disease's bacteria (respiratory diseases) including cancers. Emission components and increase in natural values of atmosphere components cause decrease in plants' vegetation ability, corrosion of metal constructions and destruction of buildings.

Another important source of atmosphere pollution is so called low emission, what means emission to the air gas pollutants and dusts as a result from fuel burning on the farm furnace. Particularly dangerous for vivid organisms are dioxins and furans, compounds, which appear as a result of low – temperature burning (600-900 °C) of plastic containing chlorine (for example plastic package, parts of wardrobe and shoes and the like). At present there is observed a dangerous phenomenon of returning to traditional solid fuels and frequent burning of all burnt products, including wastes in household, as a result of regular increase in prices of other energy carrier. Latest years show distinct modernization of larger energy units, what is realized by transformation of solid fuels (carbon, coax) into gas and liquid fuels. Opposite tendencies, as it was mentioned, are noticed in individual household. Decree of the Minister of Environment Protection, Natural Resources and Forests, which refers to acceptable density values of polluting substances in the air (Decree 1998), in an enclosure number 4, includes the list of polluting substances, acceptable density values of these substances in the air on health resort area and a period of obligation. In the list there were mentioned the most noxious air pollutants like: arsine content, smoke generation, gas pollutants, including content of benzene, benzoic a pyron, nitrogen and sulphur dioxide, carbon oxide and heavy metals like: cadmium, nickel, lead and mercury. Mentioned indicators do not fulfill the whole list of noxious substances for atmospheric environment, because in practice there can occur cases of environmental pollution by different, not mentioned substances, which come from local emission and imission resources. Those substances ought to be taken into account as indicators, which are subject to control during the monitoring process.

Elementary assignments within a framework of atmosphere monitoring include:

– information acquiring for the estimation of atmosphere state and eventual exceed the standards,
– estimation within following the strict atmospheric air standards for protected areas, inhabited by native population and visitors in view of therapy and recreation,
– efficiency verification in activity of programs elaborated by local government within atmosphere protection against pollutants,
– following the tendency of changes in the content of anthropogenic pollutants in atmospheric air in order to limitation economic subjects, which affect on environment,
– data acquiring in order to cause and result analysis, with the help of epidemiological tests on the immovable health resort's inhabitants, what can be base of programs elaboration, concerning economical development and plans of space-area management and environmental state improvement,

– information acquiring for the research concerning acid rainfall influence on plants, water, soil and building structures,
– data collecting needed for operation making in order to register in the list of health resorts and receive certificate for the health resorts' services.

1.3. Noise monitoring

Noise is inseparable phenomenon, which accompanies all human beings, independently on place on the earth and stage of development. Noise noticed in urban areas generally does not affect human life, but causes more and more painful discomfort in life conditions.

Atmosphere pollution with noise effect is caused by many factors and the most important are: means of communication, noise coming from economical activity, streets' cleaning, building and renovation processes and occasional events like: mass entertainment, public meeting with regards to anniversary, civil and religious celebrations etc. Noise, which is present everywhere more and more often causes many pathological states, connected with defective hearing. Common use of loud making equipment, which enables individual sound reception to ear, radio equipment, mobile phones, they all are examples for negative noise influence on health. Decree of the Minister of Environment Protection, Natural Resources and Forests refers to acceptable noise level in environment (Decree 1998) and mentions "A" health resorts areas as places with special protection against noise.

Elementary assignments within a framework of environmental noise monitoring in health resorts include:
– information acquiring, what refers to acoustic climate in the health resorts in order to identify possible dangerous areas for people,
– elaboration of computer map with noise resources and areas of its influence,
–obtain the possibilities for following the changes in environment of noise and include them in plan of the health resort's development (communication roads, building, economical activity),
–utilization of competing information in preventive activity and protection against emitted noise into environment as a result of anthropogenic reactions.

Range of researches if monitoring is taken into account, should include identification of acoustic climate state described in system method according to accepted methodic way of survey, researches according to actual needs as a result of changeable situation and noise survey in random situations. Long lasting survey system of environmental noise can determine basic argument for including resort in the list of the health resorts and receiving the certificate in sphere connected with estimation of environmental values including noise level.

1.4. Soil monitoring

Soil monitoring is performed for the sake of the observations' necessity in changes of soil quality because of anthrop pressure. Soil eco system is distinguished by low ability to self -cleaning process. As far as self-cleaning processes in air proceed very

quick: it is a few days, in water a few years, but in soil self-cleaning process can last even a few thousands years (Skinder 1991). Therefore, soil pollution are the most difficult to elimination as a result of usually anthropogenic reaction. So far in Poland there has not occurred normative in rank of Law or Decree branch minister in sphere of soil pollution's estimation. In practice, estimation of soil quality is usually performed with reference to indicators labored by Institute of Fertilization and Soi-Expertise (Institute of Fertilization and Soil – Expertise 1996). Poland disposes satisfactory spacious recognition of soil quality and its agricultural aptitude, but for monitoring necessities in the health resorts' areas much of attention is paid to information regarding anthropogenic pollution or possibilities of its occurring with reference to spacious management or economic subjects' reaction.

The aim of soil monitoring is similar to above introduced aims of water and air monitoring, but with special attention paid to specific soil ecosystem, geographical localization of the health resort and specific medical service. Soil as a base for economical and food production is mostly locally economized for health resorts' necessities and ought to be subject to strict protective stipulation not only in administrative areas of the health resorts, but also in areas of food production within close and further distance from the health resort's district. If soil monitoring is organized, one should get familiar with methodical researches and soil researches' results, received from the nearest Petrol Station, which leads cumulated natural environment monitoring, in sphere of country's environment monitoring. The choice of researched indicators for soil quality should include:
– area of soil unit,
– amount and quality spacious structure of geomorphologic and soil's region,
– spacious system of zones with environmental threat,
– sort of preferred agricultural production within researched region.

Appropriately organized soil monitoring is difficult and expensive undertaking for local government, because it requires long-lasting and expensive researches, but it is indispensable element of complex environment monitoring.

1.5. Natural environment monitoring

In the health resort districts, basic significance in recovery and recreation processes is widely comprehended natural environmental state. Natural environment is exposed to negative results of anthrop pressure in the same way as above introduced different its components. Natural environment as complex system of biotic and still life elements, which stay in mutual relations, requires particular attention if organization of integrated monitoring is taken into account. Only penetrating knowledge of nature laws enables to elaborate monitoring principles and to select a range of control researches within the sphere of allocation amount – rational indicators and different factors numbered among group of quality indicators. In sphere of presented correlations existing in natural environment, it is difficult to indicate objectively the number's criterion according to described indicators for different environmental components. Basic sphere of measurement program ought to include (Country Environment Monitoring 1994):

– meteorology,
– chemise of atmospheric air,
– chemise of atmospheric fall and snow cover,
– heavy metals in mosses,
– chemise of assimilative organs,
– representative flora and plants,
– structure and dynamic of vegetable cover,
– inventory of tree state and its damage,
– tree's epiphytes,
– microbiological decomposition of mulch,
– invertebrate fauna.

Obtained data ought to be used to indicate areas with particular environmental protection, because of existed mischievousness or onerous ness for environment. Areas damaged by economical activity, agriculture, exploitation of mine deposits and also areas damaged by the forces of nature ought to be under the particular supervision and a range and frequency of detailed researches ought to come off true state of natural environment and anthropogenic threats.

Program of natural and half-natural environment's monitoring ought to include different categories of its representatives:
– individual – exclusively refers to trees (natural monuments),
– population – generally refers to species groups with special care, invasive species groups with strong competition features and highly expansive and native species typical of given region and valuable with regard to natural issues.

Program of nature monitoring, which is created totally or mostly by human being and stays under his strong pressure, should include the following systems:
– agricultural forests,
– arable lands: corn plants, trench plants, industrial plants,
– permanent green lands: meadow, pastures,
– areas with historical significance.

Natural environment monitoring should also include specialized systems, created by human being or created as a side – product of his activity, which have strong impact on still life environment and vivid nature:
–roads with different category,
– cable railways,
– water tanks,
–drifts after quarries, storages of communal and industrious wastes.

Particular attention should be paid to wastes' storages (Law 2001), which are numbered among objects dangerous for environment and according to actual regulations (Decree 2001) they require leading long – lasting monitoring of investment's impact on environment.

In sphere of administrative and organization requirements, natural environment monitoring ought to include:

– standard register: regarding areas with special environment protection and list of flora and fauna species with special care,
– list of nature elements, which have economical significance and the methods of their control,
– list (all the time actualized) of researchers and their Harmon gram.

2. Summary

Environment state in Poland, including health resorts areas reached far more than acceptable level of pollution. The characteristic feature of city's environment pollution are: fatal state of atmospheric air and surface waters. That environmental state is presented in Provincial Inspectorates' Reports of Environment Protection. Progressive order in life conditions of the societies, which follow trends presented in developed countries of West Europe forces to adaptation the UE standards level and range of medical services in the health resorts. Presenting process of ownership's changes in health resorts is a base to "quick action" in terms of medical reorganization in health resort, which efficiency strongly depends on its realization conditions, including environmental state. In 1998 there were performed analyses of environmental state and according to the results there was presented the conception of monitoring for Krynica (Niemiec 1998). It is very difficult operation to put into practice environment management and monitoring researches as effective tool of plan and control, because researches and program operating (human potential) require big amount of financial expenditures. Moreover, there has not appeared automation so far, which in consequence could give the possibility of use measurable financial advantages as significant argument for leading organized monitoring of environmental state. Some kind of hope for quick introduction the specialist monitoring performed for health resort's needs, is introduction a new Law regarding health resorts and the necessity of possessing the certificate e.g. according to ISO standards for medical services. The certificate's possessing is generally accepted objective proof of service refer in the world and with the high declared level. In practice, some amount of environmental state's indicators are determined at the time being according to the law's requirements and factors connected with sorts of economical activity like: quality indicators of consumptive water, medical waters, materials used in natural medicine like: bore therapy, various sorts of soils and different deposits or natural resources, which before exploitation ought to be obligatory researched. Results of fragmentary researches and appropriately organized environmental management can be successfully used for wide needs for desired data base in environmental monitoring.

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Monitoring środowiska w uzdrowiskach

Streszczenie

Uzdrowiska to miejscowości, w których świadczy się usługi lecznicze z wykorzystaniem naturalnych zasobów przyrodniczych. Brak nowoczesnej ustawy o uzdrowiskach, wpływa w istotny sposób na ich dalszy rozwój. Eksploatacja zasobów przyrodniczych w celach leczniczych i komercyjnych metodami uprzemysłowionymi, zagraża zrównoważonemu rozwojowi tych miejscowości i wymaga prowadzenia monitoringu środowiska w celu prawidłowego zarządzania nim. Zrównoważony rozwój uzdrowisk wymaga monitoringu wszystkich komponentów środowiska naturalnego: przyrody ożywionej, litosfery, atmosfery, środowiska hałasu i promieniowania, a zbierane informacje powinny być gromadzone w bazie zgodnie z metodyką zapewniającą stałą kontrolę oraz możliwość wprowadzania korekt zapewniających utrzymanie na wysokim poziomie jakości usług uzdrowiskowych oraz zgodnie z zasadami zrównoważonego rozwoju. W pracy przedstawiono podstawowe zasady zarządzania środowiskiem w uzdrowiskach, z wykorzystaniem monitoringu wszystkich komponentów środowiska.

Przedstawiono sposób organizacji badań monitoringowych, zgodny z wytycznymi Państwowego Monitoringu Środowiska, którego wyniki tworzą bazę danych, do wykorzystania w celach naukowo-badawczych stanu środowiska i podejmowania decyzji przez administrację lokalną, w zakresie zarządzania środowiskiem w obszarach uzdrowisk. Przykładowy sposób zorganizowania monitoringu dla uzdrowiska Krynica, wykonano w 1998r. w Politechnice Rzeszowskiej.

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