

PROTECTED AREAS OF BIHOR COUNTY (RO) BETWEEN EU WISHES AND REALITIES ON THE GROUND. THE CASE STUDY OF THE PEȚA BROOK NATURE RESERVE

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Abstract

One of the steps taken by Romania in the EU adhesion process was the implementation of the Natura 2000 network, thus helping to strengthen the European system of protected areas. In this context, in Bihor county, the area and number of protected areas has increased, so that currently, there are 64 protected areas covering 30 867 ha (0.4% of the county area), of which two nature parks and 62 reserves of national interest (26 reserves are included in the Apuseni Nature Park and one in the Nature Park of Cefa). A number of 13 county interest reserves and 37 sites of Natura 2000 were added to it. In theory, this sounds good statistics, but realities on the ground contradict theory. For example, natural areas are not recognized locally. Often, local communities do not know of the existence of such protected areas (especially the Natura 2000 sites) or have a negative attitude. Regarding the nature reserve Peta brook, Romania risks triggering an infringement procedure because, at the present time, the thermal lake ecosystem is compromised due to an accumulation of human aggressiveness on it. But topping the list of human intrusion in this protected area, it is the intensive exploitation of the Cretaceous geothermal reservoir which provides the necessary thermal water for the Baile Felix (national interest) and 1 Mai (local interest) spas to function, but also ensures the habitat of three endemic species surviving the Ice Age (the thermal water lily, the thermal rudd and the thermal snail).

Key words: protected areas, Natura 2000, Peța brook, thermal water exploitation, ecological crisis.

INTRODUCTION

In 1992, the European Union set up Natura 2000 network by the adoption of two Directives: Habitats (92/43 EEC) and Birds (79/409 EEC) in order to reduce fragmentation of natural habitats. The Natura 2000 network is the main instrument for natural heritage conservation within the European Union and Member States are obliged to initiate or continue investments in infrastructure, activities, staff and / or institutions. In achieving these goals a series of activities were required such as developing management plans; habitat restoration; active management measures; species monitoring; encouraging traditional and environmentally friendly activities (activities of farming, grazing, mowing, cultivating land etc).

Through the European legislation species of flora and fauna to be protected through Natura 2000 sites are established, but sustainable development activities are also promoted that enable the conservation of species, as well as protecting residents' interests (Baltag Șt. E., Pocora V., 2001; website1).

MATERIAL AND METHODS

The data and information obtained in carrying out this paper were partially obtained from an inspection of the Nymphaea magazine collection (where the work Marossy Ana, 1999, Danciu V.M. 2004, 2006, 2007, Huza R. et al., 2014 etc. stand out) coordinated by the department of Natural Sciences of the Criş Land Museum and also due to researcher R. Huza, whom I kindly thank once again for providing us with particularly useful information and advice. Furthermore, other studies and cartographic references (including web sources) were consulted corresponding to the study area, but we also made field investigations (direct observations, interviews etc).

RESULTS AND DISCUSSION

Implementation of the Natura 2000 network of protected areas in Romania was one of the important steps in the process of EU pre-adhesion. If at the beginning of 2007, merely about 8% of Romania was included in the category of protected areas, in 2009 the surface of these protected areas has increased to over 19%, due to the designation of Natura 2000 sites (consisting of SCI - Sites of Community Interest, SPA - special Protection Areas), and in 2015 they cover 23% of Romania. According to the website of the Ministry of Environment, at European level, Romania has the most diverse and valuable natural heritage. The highest percentage is held by nature reserves (48%), followed by SCI (21%), natural monuments (17%), SPA (8%), scientific reserves (4%) and national and natural parks by 1 % (fig. 1).

The network of protected areas pre existing was integrated almost entirely within the new protection structures of the Natura 2000 network and residents whose lands overlie these protected areas should receive severance payments (for farmers, forest owners, etc.) (*DECISION on the set up of the state aid compensation scheme representing the timber counter value of July 23rd, 2015* - website 3) and be exempt from paying tax on land ... if the sites have management plans and adequate management and approved measures.

In this overall context, in 2007, in Bihor county the number of protected areas increased rapidly and (fig. 2), ranking second in the country in this regard, being outnumbered only by Alba. Protected areas amount to approximately 30,867 hectares, which is more than 4% of the total area of Bihor County (7544 sq km). The largest areas are occupied by nature reserves (54%), followed by the Natura 2000 sites (33%), reserves of county interest (11%) and nature parks (2%) (fig. 3).

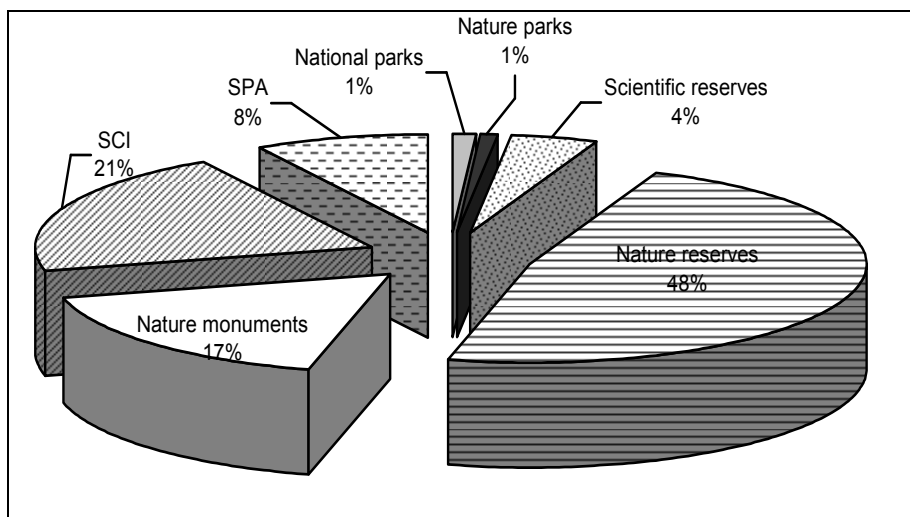


Fig. 1. Protected areas' spread in the national system

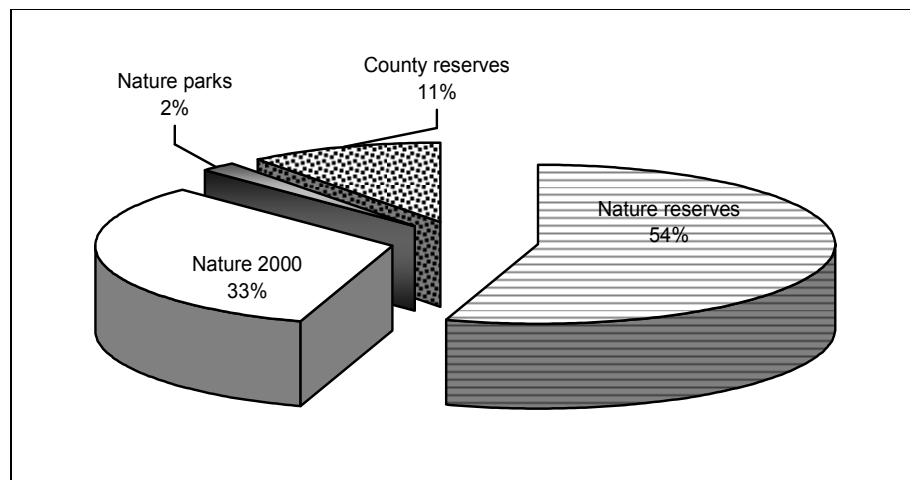


Fig. 2. Protected areas' spread in Bihor county

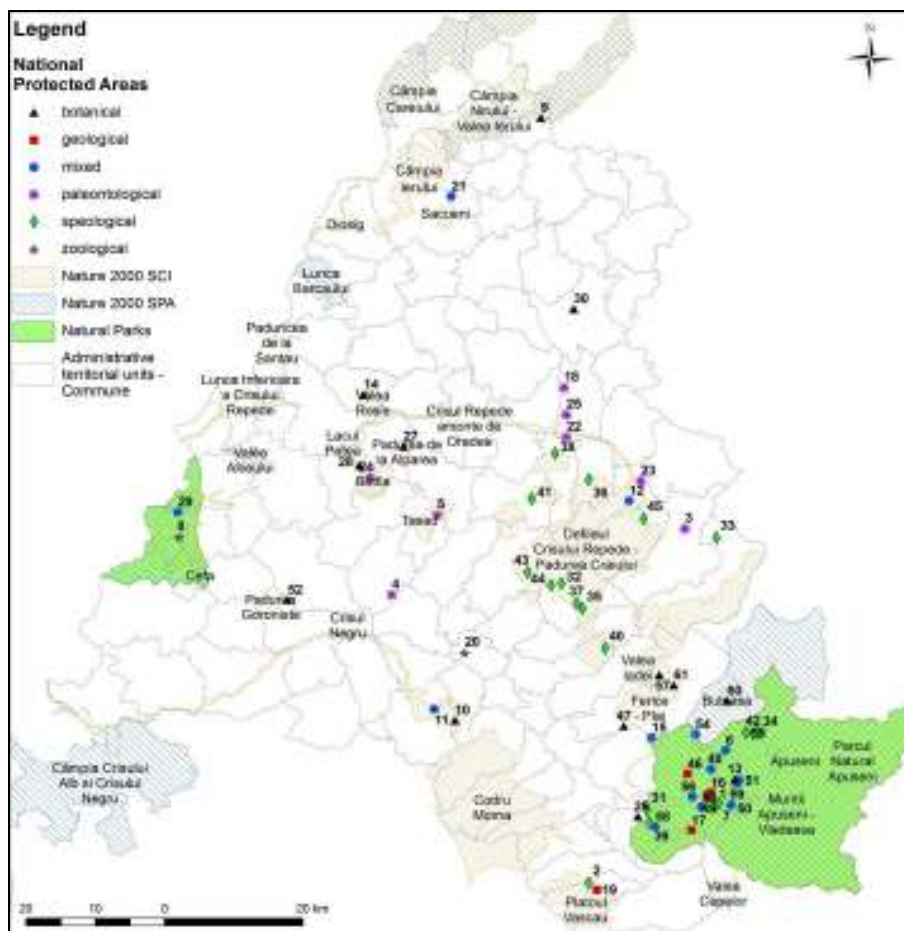


Fig. 3. Map of protected areas in Bihor county

1. Avenul Bortigului, 2. Avenul Câmpeneasa cu Izbucul Boiu, 3. Calcarele cu hipuriți din Valea Crișului, 4. Calcarele tortoniene de la Miheleu, 5. Calcarele tortoniene de la Tășad, 6. Cetatea Rădesei, 7. Cetățile Ponorului, 8. Colonia de păsări de la pădurea Rădvani, 9. Complexul hidrografic Valea Recea, 10. Dealul Pacău, 11. Defileul Crișului Negru la Borz, 12. Defileul Crișului Repede, 13. Fâneța Izvoarelor Crișului, 14. Fâneța valea Roșiei, 16. Groapa de la Barsa, 17. Groapa Ruginoasa, 18. Gruul Petrii, 19. Izbucul intermitent de la Călugări, 20. Izvoarele mezotermale Răbăgani, 21. Lacul Cicoș, 22. Lentila 204 Brusturi-Cornet, 23. Locul fosilifer de la Cornișel, 24. Locul fosilifer de pe Dealul Șomleului, 25. Locul fosilifer din valea Lionii-Peștiș, 26. Molhașurile din valea Izbuclor, 27. Pădurea cu narcise din Oșorhei, 28. Păraul Peța, 29. Parcul Natural Cefa, 30. Pășunea cu Corynephorus de la Voivozi, 31. Peștera urșilor-Chișcău, 32. Peștera Ciur-Izbuc, 33. Peștera cu Apă din valea Leșului, 34. Peștera din Piatra Ponorului, 35. Peștera Farcu, 36. Peștera Gălășeni, 37. Peștera Gruet, 38. Peștera Igrita, 39. Peștera lui Micula, 40. Peștera Meziad, 41. Peștera Osoi, 42. Peștera Smeilor de la Onceasa, 43. Peștera Toplița, 44. Peștera Vacii, 45. Peștera Vântului, 46. Piatra Bulzului, 47. Piatra Grăitoare, 48. Pietrele Boghii, 49. Pietrele Galbenei, 50. Platoul carstic Lumea Pierdută, 51. Platoul carstic Padiș, 52. Poiana cu narcise de la Goroniște, 53. Poiana Florilor, 54. Sărtoarea Bohodeiului, 55. Complexul carstic Peștera Cerbului-Avenul cu Vacă, 56. Valea Galbenei, 57. Valea iadei, 58. Valea Sighiștelului, 59. Vârful Biserica Moșului, 60. Vârful Buteasa, 61. Vârful Cărligați, 62. Ghețarul Focu Viu, 63. Depresiunea Bălileasa, 64. Peștera Ciur-Ponor

Although in theory things seem to be fine, yet realities on the field contradict theory strongly. It was found that SCIs and SPAs overlap each other (eg ROSCI0062 Crisul Repede Gorge - Pădurea Craiului Mountains overlaps partially with ROSPA0115 Crisului Gorge - Valley Iadului) or they overlap nature parks (as in the case of the nature park Cefa).

Then most of these areas do not have management plans or even functioning regulations. Some protected areas do not have a custodian / administrator (the case of Cefa Nature Park, declared in 2010, but never functional, although it had a manager until 2014). In areas where there are administrators or custodians, they hardly ensure a minimum of functionality, because Romania's budget can't allocate financial resources for their administration and from own funds they cannot achieve the management plans which involve high financial costs. Nonetheless, many custodians have necessary expertise to carry them out.

Also since 2012, as a result of accessing some European funds, some steps were both taken towards developing management plans (website 4, 5) and in the planning of environmental infrastructure. Thus, in some Natura 2000 sites arrangements were made for visitation (perimeters' landmarks, thematic routes, information materials, boards, fencing, observation towers, and information centers). Through recent planning, several protected caves entered into a civilized tourism circuit such as: Unguru Mare, Peștera cu Apă de la Vadu Crișului, Gălășeni, Meziad, Peștera cu Cristale din mina Farcu, Meziad Crystal Cave of Farcu mine, the oldest tourist planning (since 1980) is the cave Bears' Cave (later upgraded).

Despite these measures (few in number, in our opinion), there was an overall negative perception of "overprotection" because of the integration of existing reserves within the huge Natura 2000 sites (only 8 protected areas remained outside these sites). Then, most often, the residents of these sites do not know / do not want to know of their existence (particularly on Natura 2000 sites). They have a hostile attitude / neutral attitudes, they consider (justified or not) that they cannot exercise their ownership right over their land, because they are hindered to work the land, to exploit pastures, and especially the forest and cannot build in these protected areas.

Our findings, based on field study are not unique, similar opinions can be found in a survey in 2013 in a project run by the POS Mediu (website 6, 7) which actually highlights a generalized situation in the country - many residents of these areas do not know anything about biodiversity / protected areas and do not know they *live in a protected natural site* (72%!); - There is a major discrepancy between people's expectations and environmental policies; however, people who know about the Natura 2000 network, appreciate its utility.

And there are further authoritarian voices that admit this situation: "The fact that protected areas comprise almost 20% of Romania is a limit for the real estate development and tourism projects initiated by private investors or local authorities" (website 8).

In Bihor county, serious problems are related to forestry sites which stretch from mountain areas where forests hold the largest shares (eg Apuseni Nature Park is "famous" for this kind of problem). Unfortunately, Bihor also faces other problems related to the intensive exploitation of natural resources, including the notorious Peta Brook case where protected nature species within the reserve are on the brink of extinction because of major habitat disturbance.

Case study: Peța Brook Nature Reserve

Overview

Peta Nature Reserve consists of a lacustrine unit and the upper part of Peta brook (fig. 4), declared a nature reserve since 1932 and included in the Natura 2000 site since 2007 (*ROSCI0098-Lake Peța*). It is situated in the central-western part of Bihor county, about 1.5 km from Felix and 7 km from Oradea.



Fig. 4. The nature reserve of Pârâu Peța

The importance of this reserve is that it shelters three endemic species in a natural subtropical type ecosystem, considered by specialists as having survived glacial Quaternary periods: thermal water lily (*Nymphaea lotus* var. *Thermalis*), thermal snail (*Melanopsis parreyssi* 'Moellendorff' Philippi - 1847), thermal rudd (*Scardinius racovitzai* Müller - 1958), but there are other species of community interest (fig. 5).



Fig. 5. The three endemic species of the reserve
(photo 1: website 9; photo 2: Linc R.; photo 3: website 10)



Fig. 6. Recent evolutionary steps of the thermal lacustrine ecosystem of Lake Peța
(photos 1, 2, 3, 6: Linc R.; photos 4, 5: website 11)

Overall, throughout the twentieth century, this ecosystem was assaulted uninterruptedly (Oltean-Cosma C., 1991; Linc R. et al., 2013), but the constant adjustment and survival skills of this relict species is downright astounding. But since 2011, the thermal Peta Lake ecosystem entered into a genuine ecological crisis for two reasons associated with: the sharp drop in the thermal water lake level reaching the level of drying up in the summer of 2012 and 2015 (fig. 6) and the intense water temperature drop at about 11°C (far below the physiological needs of the thermal species).

Attitude and measures

Several years ago, prestigious researchers, some representatives of Criș Land Museum, others from the University of Oradea, and other stakeholders (Borza al., 1927; Oltean Cosma C., 1991; Șoldea V., 1997, 2003; Marossy A., 1999; Danciu V.M., 2004, 2006, 2007; Venczel M., 2001; Gavriloiu I.C. et al., 2010; Linc R. et al., 2013; Ilieș D. et al., 2015 etc), fired numerous warning signals through various publications, memoirs, referrals, participation in workshops, conferences, symposia on the state of this ecosystem (website 12, 13, 14).

An important role was also played by the media in Oradea, but by the national one which, continuously warned the public about the state of the reserve (selective items are numerous and all point on a moderate or vehement tone the collapse of the Peta lake ecosystem: website 15, 16, 17, 18, 19, 20, 21, 22, 25 etc).

It would have expected that from the moment in which the ecological crisis, heralded by all and eventually produced, the authorized institutions to operate in a unison to reduce environmental damage and then to rehabilitate the ecosystem. Instead of a coherent action plan, many controversies arose between those institutions which lasted for four years (Bihor County Council, the custodian of the reserve - Criș Land Museum, Environmental Guard, ANRM -National Mineral Resources Agency, the actors involved in the development of the Sânmartin commune - on whose territory is reserve is located) (website 9, 13, 23, 24).

Punctually, some measures were taken (some even before this ecological crisis became too obvious), but with no spectacular results, taking into account the state of degradation of the reserve. Thus, some attempts to diminish the negative effects of human activities on the territory of Sânmartin related to desilting the thermal lake, building a concrete dam for water storage and thermal lily habitat extension in 2002 at about 200 m downstream and fencing of the thermal lake in 2004-2005.

After the materialization of the ecological crisis, among the urgent solutions, in an extreme gesture to attempt to maintain water temperature as high as possible, additional external thermal water was brought through a

hose and Peta brook water infiltration through the dam and from the shores was diminished as much as possible. Copies of relict species of the lake have been collected for their survival and multiplication, meant to ensure a genetic storage of the two endemic species, for now, *ex-situ*. *Racoviță's rudd* seems to manage to multiply in conditions of captivity (in aquariums of Oradea, Galati, Gödöllő and Budapest - Hungary, Vienna - Austria, Berlin - Germany), but there are no positive results for the *Melanopsis snail*. In situ, these species were declared extinct by the reserve custodian.

Thermal water lily rhizomes and seeds are breathtaking and prove to be extraordinarily resilient, as in the summer of 2013 and even the water lilies' pond in the summer of 2015, all blossomed (website 15) the plant survives in the Felix spa's pool conditions. The best known biologist of Bihor who has devoted her life to studying the thermal water lily - Ms. Ana Marossy - claims she found the thermal water lily stems and fruit along the Hidișel creek (website 25). Furthermore at the University of Oradea in the Flora-Expo laboratory the in-vitro cultivation of the water lily was begun.

During 2014, this reserve's ecosystem was permanently monitored, following the bathymetric evolution level of the lake, its surface, the water volume and temperature, as well as the lake's clogging estimates (Huza R., Drimba N., Drimba Gh., 2014). During the same year, the granting of new licenses for exploration / exploitation of thermal water has stopped, the thermal water consumption was reduced by 30% and the causes that led to the drying lake started to be researched (website 14).

In 2015, hydro-geologists who led the current project have presented a report showing unequivocally (hinted and circulated by everyone, but disliked by some economic and political stakeholders of the county) that thermal water is extracted/pumped out over passing the rehabilitation capacity of the natural geothermal reservoir.

The nature reserve Peta lies within the range of influence of two important resorts in the county, and the country (Băile Felix and 1 Mai) which have developed intensively and chaotically on exploiting the geothermal spring (Herman, Tătar, 2015). In our attempt to investigate tourism units requesting the geothermal spring's resources for various purposes (curative, recreational, heating), we found out first that their exact number is unknown because not all have been registered officially and secondly, the researcher on the field runs into "a wall of silence" or even hostility from owners. On the website <http://turism.gov.ro/informatii-publice>, within the *List of tourist units with functions of tourist accommodation four such units are classified* in 1 Mai and in the village of Haieu 38 accommodation units are listed, this figure is far from what is on ground.

Further on, we reveal the inventory of units active in the field of tourism, namely *the ones that answered to our investigation*. There are, in fact, 62 tourism units, of which 2 pools (Venus and the wave pool), a recovery department, physical medicine and balneology for children, 3 hotels and 56 villas and guest houses.

With reference to the inventory of the thermal water consumers in I Mai, we took into account only those units equipped with swimming pools. Therefore, three units have a cold water pool, a unit with heated water, 9 units have thermal water pools (15%), two units did not have any pool when investigating and 43 units have not declared anything (77%) (fig. 7).

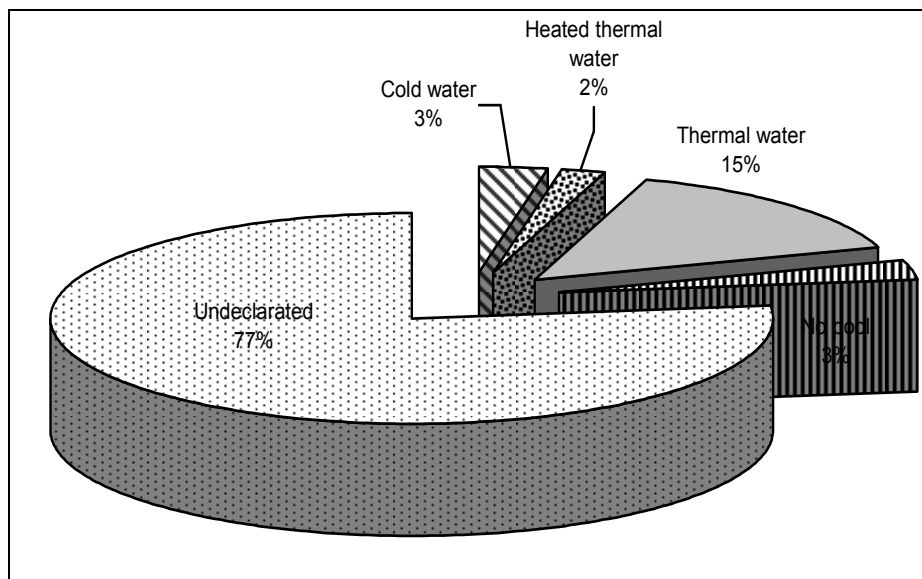


Fig. 7. Inventory of thermal water consumers of I Mai Spas

It was further on found that there is no tourism unit which declared to use geothermal water for heating during the cold season. Many of them use wood for heating (17 units), while 35 units gave no answer. It is noteworthy that no tourism unit mentioned the heat pump as a heating source (fig. 8).

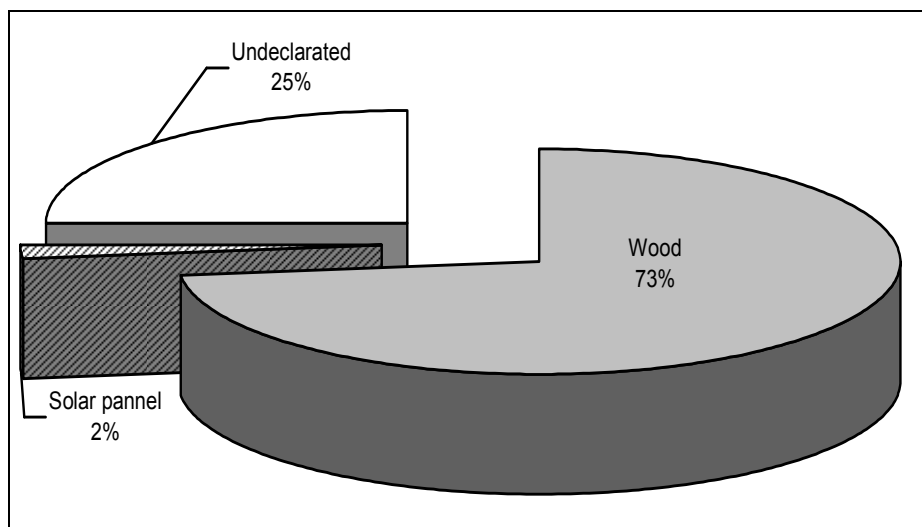


Fig. 8. Inventory of heating sources of the tourist units in 1 Mai Spa

CONCLUSIONS

Romania has established a protection regime for 20% of the country area, but not all protected areas are functional.

Bihor County ranks second on the number of protected areas (4% of the county area), but there were numerous failures related to the late takeover in custody of many protected areas, the lack of financial and logistical support for the accomplishment of coherent and consistent management plans according to the residents' needs and realities in the field of protected areas; hostility from the residents of protected sites.

The nature reserve Peța Brook (part of Natura 2000 ROSCI0098 site) is strongly degrading. In fact the thermal lake turned into a puddle of a few square meters without any ecosystemic relevance, the unique endemic species being saved in extremis in ex-situ locations.

Aggression on the thermal ecosystem are many and date back a long time, but after 2000 there is an explosive growth of Felix and 1 Mai spas based on an intensive exploitation of the geothermal reservoir.

Effective measures to reduce damage to the ecosystem were barely taken three years after the onset of the "ecological crisis".

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