

Specific Issues in Green Resource Management in Romania

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SUMMARY

This article discusses the integration of data on green areas in Geographical Information Systems. The special situation of Romania, in which, in the absence of laws and appropriate management of applications are returned impressive surfaces covered with forests and green areas in major cities. It is a actual issue in our country, involving both important legal aspects and aspects of computerization. It shows the main legislative provisions in this area and the need to adopt new regulations. In fact the main beneficiaries of such changes would be mainly citizens.

SUMMARY

In acest articol este abordata problematica integrarii datelor referitoare la zonele verzi in aplicatii GIS. Este evidentiata situatia speciala din Romania, in care, in lipsa legilor si a unor aplicatii de management adecvate, se retrocedeaza suprafete impresionante acoperite cu paduri , precum si suprafete verzi din marile orase. Este o tema de actualitate in tara noastra, care implica atat aspecte juridice importante, cat si aspecte de informatizare. Se arata principalele prevederi legislative in aceasta zona, precum si necesitatea adoptarii unor noi reglementari in domeniu. Beneficiarii principali ai unor astfel de schimbari ar fi in principal cetatenii.

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1. THE LEGAL FRAMEWORK - THE OVERALL SITUATION

According to European Directive Habitats, each EU Member State - including Romania - has committed to ensure the maintenance or restoration of natural habitats and of wild fauna and flora of Community interest in a favorable conservation status, to help maintain biodiversity. (European Council Directive 92/43 EEC on the conservation of natural habitats and of wild fauna and flora)

After joining the EU, Romania has committed to maintain a favorable conservation status of terrestrial and marine species and habitats of national and European importance, as provided in GEO no. 57/2007.

To analyze the problem of resource management in Romania must remembering national legal provisions in force with major impact on green resources.

Law no. 165/2013 on measures to complete restitution in kind or by equivalent of the real estates confiscated during the communist regime in Romania was published in the Official Gazette, Part I, no. 278 of 17 May 2013. Many cases of restitution pending state after the appearance of this law. The law impacts the whole territory of Romania. The complex process has began with the establishment of committees to inventory and ended with the approval documents by the Cadastre and Land Registration Office (CLRO), but only after the documents have been checked and declared compatible with the national database. At the basis of this law were the four principles: prevalence restitution; the principle of equity; the principle of transparency in determining remedial measures; principle of maintaining the right balance between the private interest of former owners and the general interest of society. Since the Revolution of 1989 and until present, in Romania have been illegally returned 400,000 hectares of forest. (according to the Federation for the Protection of Forests, <http://www.federatiapaparareapadurilor.ro>) Causes according to which reached the current critical situation were those in Figure 1.

Regarding the urban areas, in 2014, was adopted the Law 135 which amends the green spaces in cities. Green spaces private property, which appearing in the land book as court-construction category can not be inventoried or declared as green spaces without that land to be expropriated first. In this category are most green spaces between blocks of flats, landscaped small park in residential areas, and even pieces of park squares, all restored during the past 15 years, although obviously that must not to be built.

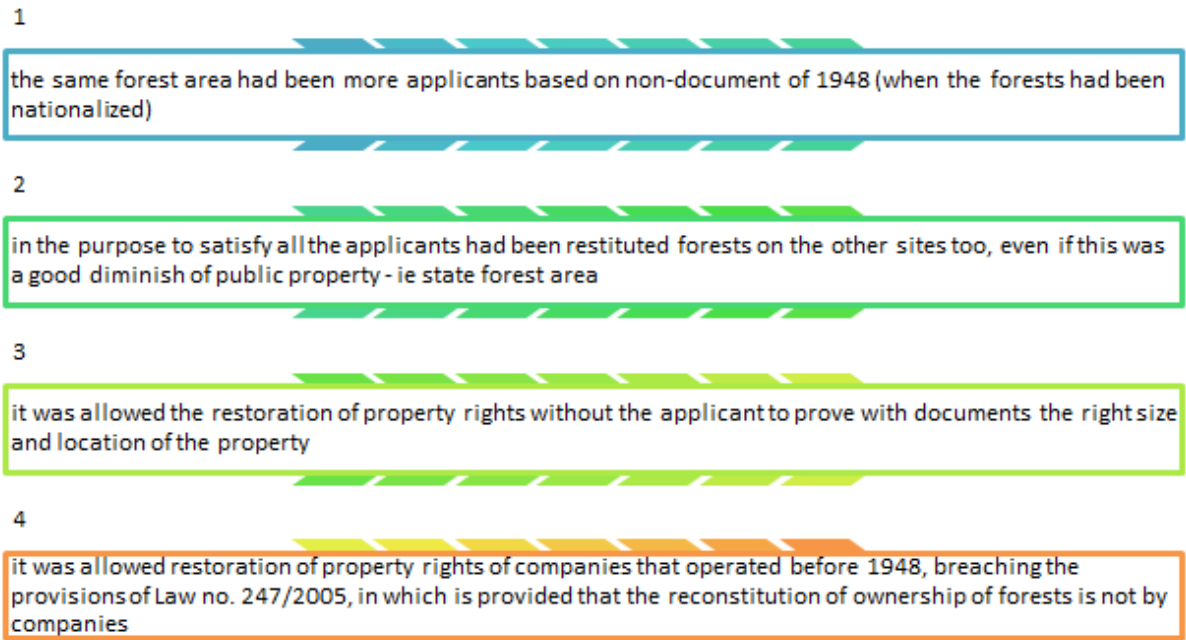


Fig. 1. Main reasons that led to the present situation

2. INITIATIVES - CREATING GEO-PORTALS FOR GREEN RESOURCE MANAGEMENT

At national level, especially by European projects, were created geo-portals for green resource management, which are based on integrated information systems that provide advanced functionality.

The proposed solutions of these systems provide the following mechanisms and services:

- interoperability with external systems;
- use of specialized equipment (PDA) for data acquisition in the perimeters covered by the system;
- well-defined sets of functionality:
 - front-end - for external users, with view and query functions containing data managed throughout the public system;
 - back-end - technological support needed to sustain the functionality of the front end.

A good example is the portal site of the Danube Delta Biosphere Reserve Administration (figure 2) (<http://www.ddbra.ro>). Geo-portal has been created to provide:

- Collection and use of environmental information in geospatial format to monitor and manage the ecological balance, biodiversity and natural heritage;
- Implement a tool for collecting, analyzing and forecasting the monitored environmental indicators.

There are several components: portal component - to personalize and publish all system user interfaces for interaction with users; management database component – to store DDBRA

data in a relational database (RDBMS) with extended capabilities for replication and backup; informational component linked with GIS coordinates; resource management components for processes, documents, collaborative working.

GIS subsystem (Ovidiu et al., 2009) consists of the following parts: geospatial database that will be stored, indexed and accessed data; software applications specific to DDBRA - web components; mobile applications; data-centric module in which information is published in the database.

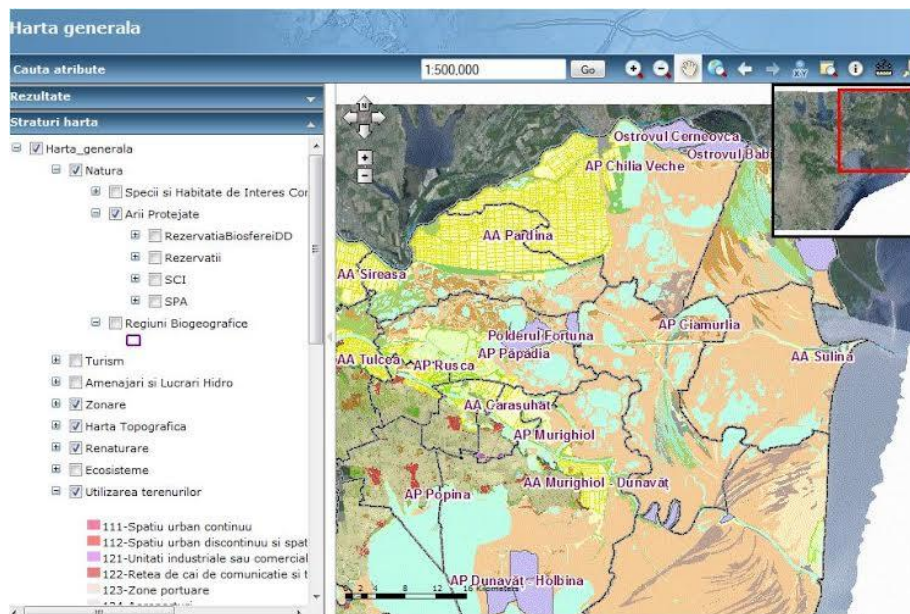


Fig.2. Geodata layers - application interface

The standard form could be filled by the following information:

- Sites / protected areas nationwide
- Habitats
- Species
- Management activities with impact on sites and protected areas
- Management of other information necessary for the standard form Natura 2000
- Information on real estate management and site management
- Comment on information entered by the various users
- Operating data on the map

The application allows recording, verification and validation of information and generating XML specification files according to the provisions which can be found on the address <http://bd.eionet.europa.eu/art17dataflow/XML%20Format%20description.pdf>. The aim is to enable interoperability with other systems and data aggregation to a higher level. Geographical data retrieving could be made also using photogrammetric systems. (Badescu, G. et al., 2009)

3. MANAGEMENT OF GREEN SPACES WITHIN LOCALITIES

Green spaces register is an information system that includes technical data of green spaces as well as indices of quality and quantity.

In accordance with Law no. 24/2007, republished, as amended and supplemented, on the regulation and management of green spaces in urban areas, municipalities are required to organize and manage the registry of green spaces in the public and private domain of the municipality.

Objectives ensured through developing local registers of green spaces within localities are:

- protection and preservation of green spaces to maintain the biodiversity;
- maintenance and development of the green areas on water, soil, climate change, maintaining landscapes in order to protect public health, environmental protection and quality assurance of life;
- regeneration, expansion, improvement composition and quality of green spaces;
- developing and implementing a set of measures for bringing and maintaining green spaces in the proper condition according with their functions;
- identify deficient areas in vegetation and implementing provisions for expanding areas covered with vegetation;
- extension of areas occupied by green spaces through including public green spaces in the category of land with environmental or socio-cultural potential.

Local registry of green spaces within localities is correlated with general urban maps and urban planning regulations made under the Law no. 350/2001 on spatial and urban planning, as amended and supplemented. The landscaping works must be: global, chasing coordination of different sectoral policies in an integrated whole; full operated, taking into account the natural and built environment based on common interests and cultural values; prospective, must considering the long-term development trends of economic phenomena and economical, environmental, social and cultural interventions; democratic, ensuring participation of the population and its political representatives in decision-making.

Regarding urban areas, the technical rules in force refer to green spaces located on private owned lands, public owned lands, degraded lands within the built-up area, that could be renovated and refurbished likely to be as green spaces; isolated trees (diameter, height) planted along traffic roads, educational institutions lands, housing lands, places of worship, cemeteries and other like these; protected trees, regardless of health status and size.

Execution of identification, surveying and representation of green spaces within localities is made on the topographical maps, cadastral maps and georeferenced orthophotos, which shall be made available by the CLROs, in analogue or digital form, by paying legal fees.

4. GREEN SPACES INFORMATION SYSTEM

Green spaces information system is achieved as a result of performing identification, measurement, inventory and mapping of land defined as green spaces, as well as collecting specific information about the species of trees and vegetation existence, with determining quantitative and qualitative indicators. Green spaces information system is a set of graphical and textual databases, unitary designed, maintained independently and operated together.

Based on data and information from the Local registry of green spaces within localities are generated and viewed thematic maps, statistical reports, charts and other like these, in order to:

- maintain and update the Local registry of green spaces within localities;
- ensure a support for decision of the public authority, used in regulatory activity and management for green urban fund management (cutting, trimming, replanting etc.).

Checking and updating the Local registry of green spaces within localities is a permanent activity, depending on the changes occurring in the field of green spaces. Changes in green spaces records are updated on maps, according to the rules and instructions issued by the National Agency for Cadastre and Land Registration. Data set updating of specific information on state land, existing vegetation, qualitative and quantitative indices is performed according to the rules and instructions of the environment. Updating data on urban settlement is made according to the rules of urbanism.

5. GREEN SPACES SITUATION IN BUCHAREST

According to EU directives, local public administration authorities have the obligation to ensure an area of green space more than 26 sqm/capita. Currently the green area/capita in Bucharest is about 23.21 sqm.

Situation at district level in the year 2013 was like in figure 3. (according to www.pmb.ro, <http://www.zf.ro>) According to existing "Green Cadastre" System, in Bucharest are 1.7 million trees, by 0.88 trees per capita. Last complete measurements published for "Green Cadastre" System were performed in accordance with the Order of Ministry of Development and Public Works no. 154 /2008 for approval of the Local technical register for development of green spaces within the city limits, as amended and supplemented.

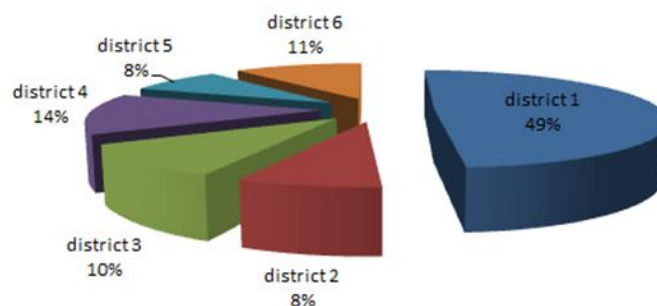


Fig. 3. Situation on Green Areas in Bucharest, by Districts

Digital map data were developed based on these measurements: trees, protected surfaces compact green spaces located on owned land of Bucharest (parks, gardens, squares, sports areas, etc.), isolated trees planted on alignments of traffic arteries on grounds of public administration institutions, public educational institutions, institutions of culture, housing assemblies, the places of worship of cemeteries, degraded land in Bucharest which can be arranged as green spaces.

According to European Green City Index, Bucharest situation is highlighted in Figure 4.

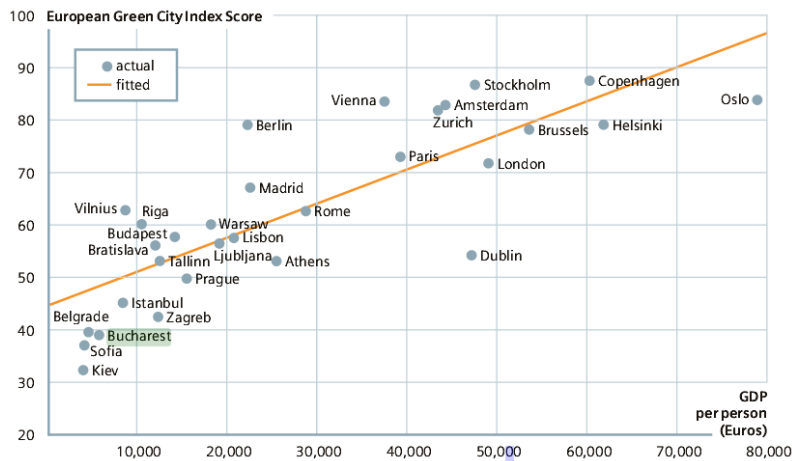


Fig. 4. Bucharest in European Green City Index

(http://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/report_en.pdf)

For example, large parks in Bucharest affected by restitution are shown in Figure 5. In terms of green spaces between blocks of flats, the most threatened neighborhoods are Floreasca neighborhood, where many lots of green lands were restituted and built to date. Another affected neighborhood areas in Bucharest are Stefan cel Mare, Dorobanti and Iancului. In present the same situation could be found in public squares, or small park areas between housing areas.

The law prohibits the construction of green areas, but many green spaces in Bucharest do not have this quality in official documents, including those listed above, except for parks.

To protect them, Bucharest City Hall auctioned inventory of green spaces which are on private property in Bucharest - the most threatened of concrete works - to be officially recognized in documents.

There have been information systems for green spaces which operate with GIS database (Badea A.C. and Badea G., 2013) including and managing informations about:

- green lands and compact green areas: location, area, category, existing tree species (unique identification number, location, species, crown diameter, stem diameter, height, condition assessment of viability for specimens that carry potential risks, evaluating the maintenance) on private or public property within the city;
- degraded lands that can be rehabilitated as green spaces: location, area, type, existing tree species, assessment of maintenance level;
- isolated trees: coordinates for trees positioning, unique identification number, location, species, diameter, height, age, condition assessment of viability for specimens that carry potential risks;
- protected trees: unique identification number, location, species, condition of viability for specimens that carry potential risks.

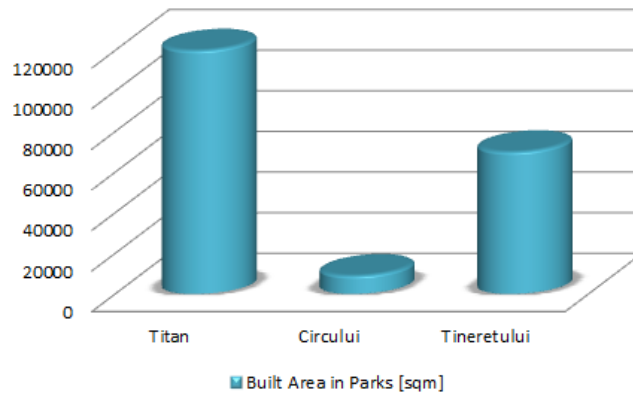


Fig. 5. Main parks of Bucharest affected by buildings on restituted areas

In addition to specific layers mentioned above, the digital map integrates a number of basic topographic layers (street network, the locations of representative institutions, etc.). (Clinci et al., 2013) The green areas are identified and defined in accordance with the GUP (General Urban Plan) provisions. An example is the computer system designed Circus Park. (Figure 4) Data collection is done with mobile applications that enable field staff learned to:

- mapping;
- spatial query geographic features;
- drafts geographic features;
- integrate GPS equipment;
- Edit geographic entities.

This allows applications like:

- guidance in the field;
- mobile communication;
- identify objectives and their coordinates;
- data collection in various formats;
- connecting to servers and data transfer.

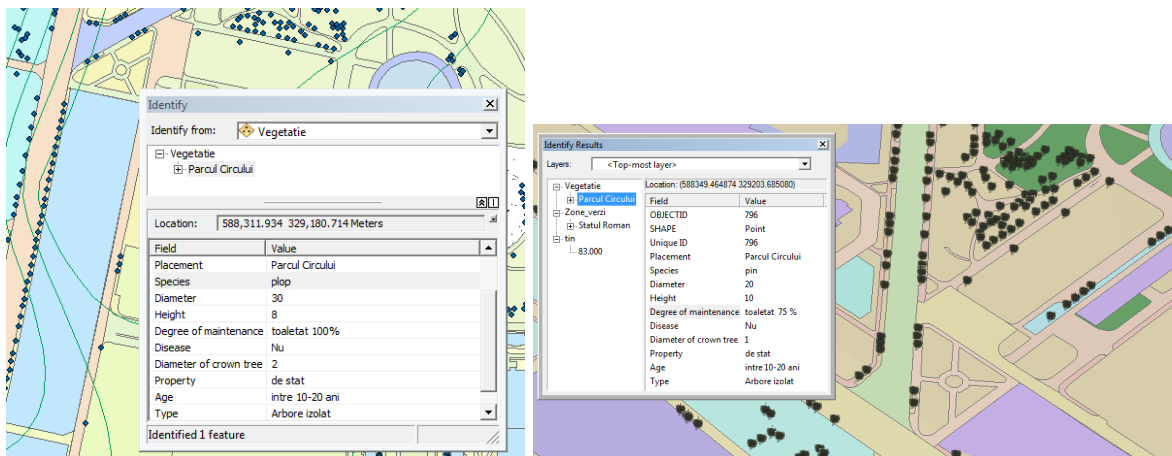


Fig. 6. Information retrieved from specific information system created for Circus Park, Bucharest

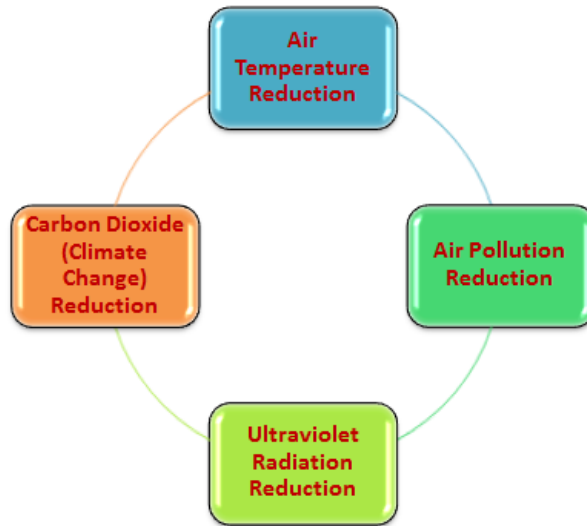


Fig. 7. Advantages of urban parks (Nowak and Heisler, 2010)

The main recommendations and goals for park management (Nowak and Heisler, 2010) are:

- Park designs that include a variety of land cover—areas of dense trees, scattered trees, and lawn—are likely to provide the greatest opportunities for optimum physical comfort of visitors;
- By increasing the number of healthy trees could increase pollution removal and carbon storage;
- Use long-lived trees (reduces long-term pollutant emissions from planting and removal);
- Use low maintenance trees (reduces pollutants and carbon emissions from maintenance activities);
- Plant trees to shade parked cars (reduces vehicular VOC emissions);
- Supply ample water to vegetation (enhances pollution removal and temperature reduction);
- Avoid pollutant sensitive species in heavily polluted areas (increases tree health);
- Utilize evergreen trees for particulate matter reduction (year-round removal of particles);
- Where feasible, provide park recreation areas with large trees to give visitors the option of being in shade.

6. CONCLUSIONS

One of the most important factors in the create of green space is the location, therefore, to determine the optimum location, maximizing efficiency of green spaces and better services for users offers. Considering the fact that green spaces should be switching to a fellow professional in the city where it seems necessary. (Molaei Qelichi et al., 2012)

The main advantages of creating spatial information systems and resource management through green geoportals in Romania are:

- Increased storage capacity and follow-up data (at historical data, users) - spreading areas, populations and their trends;
- Standardize monitoring conservation status, in accordance with European standards;
- Public access to information;
- Avoid illegal situations;
- High availability of data, coupled with increasing accuracy and consistency of data;
- Standardized mechanisms of interoperability;
- Administration and unitary operation;
- Managing user identities and access control to system resources;
- Web-based structure, intranet / internet.

REFERENCES

Badea A.C., Badea G., 2013, The advantages of creating compound GIS functions for automated workflow, International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM, 1, pp. 943-950, DOI number 10.5593/SGEM2013/BB2.V1/S11.043

Badescu G., Stefan O., Badescu R., Badea G., Badea A.C., Didulescu C., 2009, Air-borne photogrammetric systems used in topographic and cadastral works in Romania, Proceedings of the 5th WSEAS International Conference on Remote Sensing, REMOTE '09 pp. 22-26

Clinici T.S., Badea A.C., Badea G., 2013, Organization of cadastral activity in Romania, International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM,1, pp. 837-844, DOI number 10.5593/SGEM2013/BB2.V1/S11.029

Molaei Qelichi, M., Oroji, H., Asadi, S., 2012, Optimum locating of urban parks and green space using GIS and TOPSIS technique, International Conference of GIS-Users, Taza GIS-Days, May 23-24, Proceeding Book

Nowak, D. J., Heisler, G. M., 2010, Air Quality Effects of Urban Trees and Parks, Printed by NRPA,

Ovidiu S., Badescu G., Badescu R., Badea G., Badea A.C., Didulescu C., 2009, GIS applications in the field of the Maramures subterranean mining exploitations, Proceedings of the 5th WSEAS International Conference on Remote Sensing, REMOTE '09, pp. 27-32

Law no. 350 of 6 July 2001 on regional planning, as amended and supplemented, published in the Official Gazette no. 373 of July 10, 2001

Law no. 135/2014, published in Official Gazette no. 753 of October 16, 2014

Law no. 24/2007 regarding the regulation and management of green spaces within localities, republished in the Official Gazette no. 764 of November 10, 2009

http://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/report_en.pdf , accessed March, 2015

http://www.nrpa.org/uploadedFiles/nrpa.org/Publications_and_Research/Research/Papers/Nowak-Heisler-Research-Paper.pdf, accessed March, 2015

<http://www.romania-insider.com/romanian-capital-needs-450-more-hectares-of-green-areas-to-comply-with-eu-requests/27185/>, accessed March, 2015

www.pmb.ro, accessed March, 2015

<http://www.zf.ro>, accessed February, 2015

<http://www.federatiaaparareapadurilor.ro>, accessed February, 2015

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm, accessed February, 2015

<http://www.ddbra.ro>, accessed February, 2015

<http://portal.ddbra.ro>, accessed March, 2015

<http://bd.eionet.europa.eu/art17dataflow/XML%20Format%20description.pdf>, accessed March, 2015

BIOGRAPHICAL NOTES

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Gheorghe BADEA is Professor and Vice-Dean of Faculty of Geodesy, Technical University of Civil Engineering Bucharest. He was project manager of the research project “Techniques, Technologies and Ontologies for Data Portals and Spatial Data Services” and of one strategic project for developing superior competences in Geodesy”. He is President of the organizing committee of the Faculty of Geodesy Scientific Symposiums with international participation.