



DOI 10.1515/pesd-2016-0028

PESD, VOL. 10, no. 2, 2016

RECENT MUTATIONS IN THE SPATIAL DISTRIBUTION OF FORESTS WITH THE MAIN FUNCTION OF PROTECTION IN THE COUNTY OF IASI

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Key words: land forests, functional groups, retrocession, protection, Iasi County.

Abstract. In the last few years, Romania's forests have become one of the most interesting and most talked about topics for an increasing number of researchers from the most varied fields, both nationally and internationally. The present study aims at analyzing as accurately as possible the forests of Iasi County, especially forests with primary functions of protection, following the changes occurred after 1990 and the way these affected the functional framing of the forests and their state. This research has been accomplished based on precise statistical data collected from every region (or forestry district), these in turn being matched with maps, satellite images and aerial imagery.

Introduction

Romania's physical - geographical and climacteric conditions fostered the emergence and development of forests on approximately 70% of the country's area (Giurescu C., 1976), or 80% according to more recent studies. Heavily capitalized upon since ancient times, then extensively exploited, forests currently cover 27,3% of the national territory, according to the report *The State of the Forests 2011* drafted by the manager of the country's forests, Romsilva.

Since the emergence of silviculture (second half of the 19th century), forests represented the main subject of study of this science, many studies underlining the need for implementing certain measures in order to protect the national forest stock (Dracea M., 1937) . Eventually, forests regain the attention of geographers (Emil Pop) and even historians (Constantin C. Giurescu).

Current research, both national and international, bring to the forefront the chronic problems which humanity faces today – the demographic pressure,

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depletion of natural resources, global warming, all these putting an increasing pressure on forests (Brown L.. 2008; Schoene D., et al, 2012).

Functionally speaking, Romania's forests are divided, according to present forestry laws, into two main groups. Group 1 is comprised of the forest vegetation with the special function of protection and Group 2 includes the forest vegetation with the functions of production and protection. It has to be noted that forest vegetation includes the forests from the interior of the national forestry stock, including the land intended for reforestation, also the woodlands outside of this stock (forested pastures, forest belts protecting the farmland, trees sidelining traffic routes, etc.)

Group 1, the one which is the subject of our research, includes in turn a series of subgroups classified according to the main purpose of protection which that forested area holds: forests protecting waterways, forests protecting soil, forests protective against climacteric and industrial destructive elements, forests serving as leisure areas and forests serving a scientific interest and one of protection for the geostock and ecostock.

At the same time, we must emphasize the fact that the same forested area can serve multiple functions, its appointment into a certain subgroup being determined by its primary function (ex. a series of forested areas from the Ciurea forest district have a recreational purpose, comprised of green expanses from around residential areas, but the same ones are found on terrains with lithological substrates very vulnerable to erosion, thus accomplishing also a soil protection function).

Depending on the criteria of framing into these subgroups, we can determine the functional type of the forest. The importance of this functional type consists in the deployment of differential silvicultural interventions and six such functional types are encountered. The most restrictive is functional type 1; for this type of forest no intervention whatsoever is allowed unless one has the agreement of the Romanian Academy.

On the whole of Iasi county there are only four such areas, three of them being part of the National Reserve (protected area): Roscani forest - 33,6 ha, Ancient Beechwoodland Humosu - 73,3 ha and the Mircesti meadow - 29,2 ha. The fourth area is a scientific reserve with a surface of 53 ha, which is managed by the Pascani Forestry District, located south of Vâlcea, bordered to the north by Tigulea creek and to the east by Popii creek. For functional type 2 only conservation work is allowed; for functional types 3 and 4 intensive treatments are allowed which promote natural regeneration (as an exception clear felling can be applied only for certain species). Finally, for functional types 5 and 6 all kinds of treatments are allowed (these types encompassing all the forests from functional group 2, having as primary function the production of timber).

1.Data and methods

Regia Nationala a Padurilor (RNP or Romsilva) is the only authority in charge of the Iasi forests which are government property, managing them through 8 Forestry Districts: (Ciurea, Dobrovăț, Hîrlău, Iași, Grajduri (or Pădureni), Pașcani, Podu Iloaiei, Răducăneni). In Iasi county, in 1990, forests covered an area of 91.170 ha, all of them government property.

Even since 1991 we can see the emergence of the first private forests – 76 ha of forest in the Harlau district, the next decade the area of private forests reaching a total of 4.519 ha. Until 2012, almost a third of Iasi's forests were retroceded, along with this phenomenon the government losing control over them, particularly after 2005 when the first private forestry divisions emerged. Presently, the new owners have the right to make contracts to ensure the security and/or management of the forests both with Romsilva and the private forestry divisions.

Regarding the state-owned forests, the forestry districts lead every ten years a series of detailed studies named “forest management plans”, which deal only with the forest areas which were public property at the time of the execution of these management plans, with chapters focusing on their dynamics as a result of the retrocessions. From 1990 to 2012, 16 such studies were conducted: O.S. Ciurea in 1998 and 2009, O.S. Dobrovat in 1998 and 2008, O.S. Harlau – 1995 and 2005, O.S. Iasi – 1996 and 2006, O.S. Padureni - 1999 and 2009, O.S. Pașcani – 1994 and 2004, O.S. Podu Iloaiei -1998 and 2008 and O.S. Raducaneni in 1997 and 2007.

Although the last few management plans don't include any data regarding the retroceded areas up to the time the studies were made, through comparative analysis of these studies one can clearly see their location, and by overlapping the maps and the orthophotomaps the current state of development of the woody-vegetation can be clearly indentified for the retroceded administrative units.

At the macro level, forested areas are divided into the 8 districts referred to above. Every district divides the managed area into production units (their number varies between 4 and 6 units), then the smallest unit is the administrative one, their area varying from 0,2 ha up to 30 ha and even 60-70 ha (their number being rather low, most of them measuring between 0,7 ha and 5 ha).

In order to build the database, first and foremost was used the data provided by the districts “forest management plans” (provided by RNP as excel spreadsheets), but also the districts maps on a scale of 1:20.000, maps which include information on the form of ownership as well as the functional group of the administrative units at the moment when the management plans were made.

In order to build a cartographic base, first georeference was performed using the Global Mapper program, the maps provided by the forest districts and Iasi County's aerial imagery from 2010. Then, vectorization was needed in order to

assign to each administrative unit a series of characteristics, using the program TNT Mips for this purpose.

The approximately 10.000 administrative units of Iasi county were catalogued by the way they fit into functional group 1 (the type of protection they ensure), their dynamic (what's being tracked is the change in the type of ownership, the criteria used for framing – crossing from one subgroup to another or any other shift occurred in the time between the two studies), tracking the present stage of development of the forests as well.

2. Results and discussions

Because the year in which each of these studies (management plans) was conducted is different from one forestry district to another, an assemblage of the forest areas having as primary function that of protection for the county as a whole, for a certain year is impossible. That's why only two time periods were taken into consideration: 1994-1998 and 2004- 2008 in order to be included in all the 16 management plans carried out with regards to the Iasi County.

Between 1994 and 1998 (table1) the entire area of forests with protection function was 25.426,7 ha. Due to physical-geographic conditions present on the county's territory, most of these forests are appointed for land protection (11.523,9 ha), being located on land with lithological substrates very vulnerable to erosion and landslides, with slopes of over 35⁰; forests found on land impacted by landslides and forests found on degraded lands.

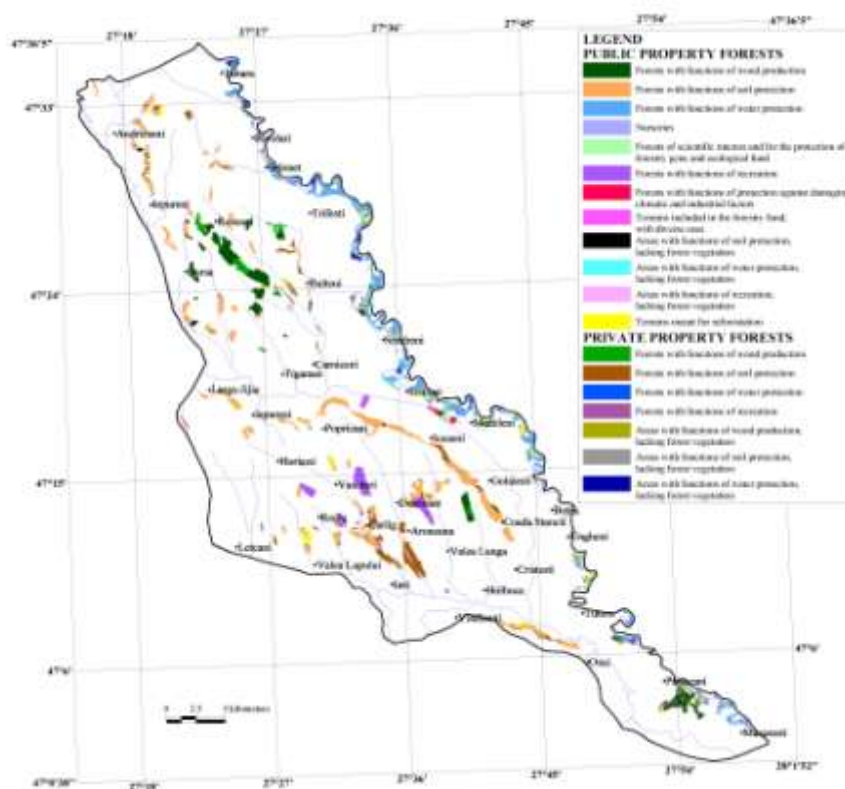
Tab.1. Areas covered by forests with production and protection function between 1994 and 1998 (public property) in forestry districts.

Forest District	Year	Water protection forests (ha)	Soil conservation forests (ha)	Woodland protection against climatic factors and industrial pollution (ha)	Forests designated for recreation (ha)	Forests of scientific interest (ha)	Forest designated for timber production (ha)
Ciurea	1998	0	834.4	0	5529.4	500.7	7560.9
Dobrovăt	1998	15.9	514.4	0	119	83	8108.4
Hirlău	1995	993.1	1239.2	0	29.8	82.2	8531.9
Iasi	1996	2179.1	3796.2	0	544.8	139.4	1708.7
Grajduri	1999	0	2592.2	0	241.1	142.4	7585.6
Pascani	1994	944	458.2	0	591.1	125.4	10104.8
Podu Iloatei	1998	230.6	1160	0	109.6	298	14280.4
Răducăneni	1997	825.4	929.3	0	111.8	67	6341.6

Iasi forestry district (map 1) is distinguished first of all by the total area allocated to forests with protection function: from a total of 8.368,2 ha of forest, 6.6659,5 were classified in 1996 in functional group 1, with a majority of those designated for soil protection (tab.1). Typical for these forests is their arrangement mainly on the north west-south east line, the northern border being represented by a body of woods situated east of Galvanestii Vechi (near the administrative border of Iasi County with Botosani County). Thus, almost all the forests situated on the

Andresieni-Iasi line are classified into this subgroup, their classification being made based on several criteria.

The second subgroup in the Iasi County, based on surface share, is the one which includes forests designated for leisure, such as forests developed for recreational purposes, the ones set up as green areas around residential areas, the ones positioned along traffic routes, etc. From a total of 11.523,9 ha allocated for these purposes for the whole county, the ones managed by O.S. Ciurea are prevailing, most being positioned along traffic routes located to the south of Iasi town (DN24, DJ248A).



Map 1. The main dynamic of forest surfaces in the Iasi County between 1990-2006

Forests with the function to protect bodies of water are prevalent in O.S. Iasi, being positioned in the dyke-bank area of Lunca Prutulului, from around Tabara up to near Coltu Cernii, most of these having also a soil protection purpose. The same

classification is enjoyed by the forests positioned south of this locality up to Podu Hagiului, which is managed by O.S. Raducaneni.

Around the Parcovaci body of water, an area of 900 ha, managed by O.S. Harlau, is designated for the protection of this accumulation, including forests positioned on the slopes of the accumulation or of the tributaries fueling it.

Until 2008 (and even 2012 for some districts), the process of retrocession was particularly active, the forests mainly targeted being the ones with a production function, which don't benefit from such a restrictive legislation in regards to their exploitation.

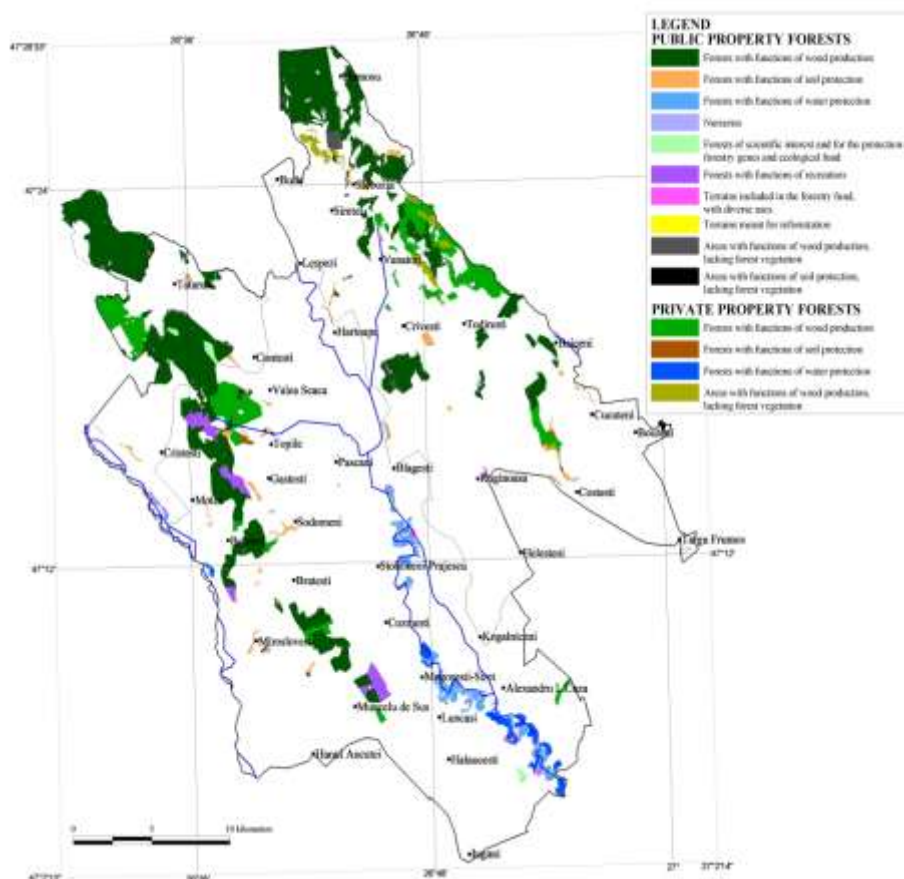
The right of the new owners to receive land as compensation in other areas than those originally intended led to many of them choosing forests which they could exploit much more easily, such that the next period studied by us (2004-2008) shows us an area of only 3.810,4 ha of retroceded forest with functions of protection as compared to the 10.620 ha of retroceded forest with the main function of protection. However, the same subgroup ranking remains, the greatest areas continuing to be the ones designated for soil protection (tab.2).

Tab.2. Total area occupied by forests with protection and production functions between 2004 and 2008 (public property) by forestry district

Forest District	Year	Water protection forests (ha)	Soil conservati on forests (ha)	Woodland protection against climatic factors and industrial pollution (ha)	Forests designated for recreation (ha)	Forests of scientific interest (ha)	Forest designated for timber production (ha)
Ciurea	2008	0	620.8	0	3853.3	504	7343.9
Dobrovăt	2008	15.2	526.7	0	118.8	85	7591.6
Hirdău	2005	961.7	1277.2	0	29.8	73.3	7925.4
Iasi	2006	2026.1	3226.4	45.5	521.7	94.8	1394.4
Grajdui	2009	0	2041.3	0	308.9	146.7	5572.1
Pascani	2004	725.5	536.1	0	488	109	8821.2
Podu Iloaiei	2008	70	1088.8	0	29	197.3	8701.2
Răducăneni	2007	824.4	882.2		111.8	77.2	6252.5

What's interesting though is the fact that although they're more numerous, it's not the forests designated for soil protection that are the most struck by the retrocession process, but the ones designated for recreation, much more valuable due to the fact that they are placed near towns, in areas suitable for real estate development. Thus, from this subgroup were retroceded (between 2004 and 2008) 1.815,3 ha, most of them belonging to O.S. Ciurea which manages most of the forests located in the Iasi town range, particularly in its southern area (the northern area being managed by O.S.Iasi). In this forestry district, the latest forest management plan reveals also the functional classification change of an area of 610, 9 ha of forest. Classified in 1998 as forests with recreation function, set up as green areas around towns and situated in their buildable perimeter, 24 parcels located south-east of Paun, between the Paun and Culmea Tiganului streams,

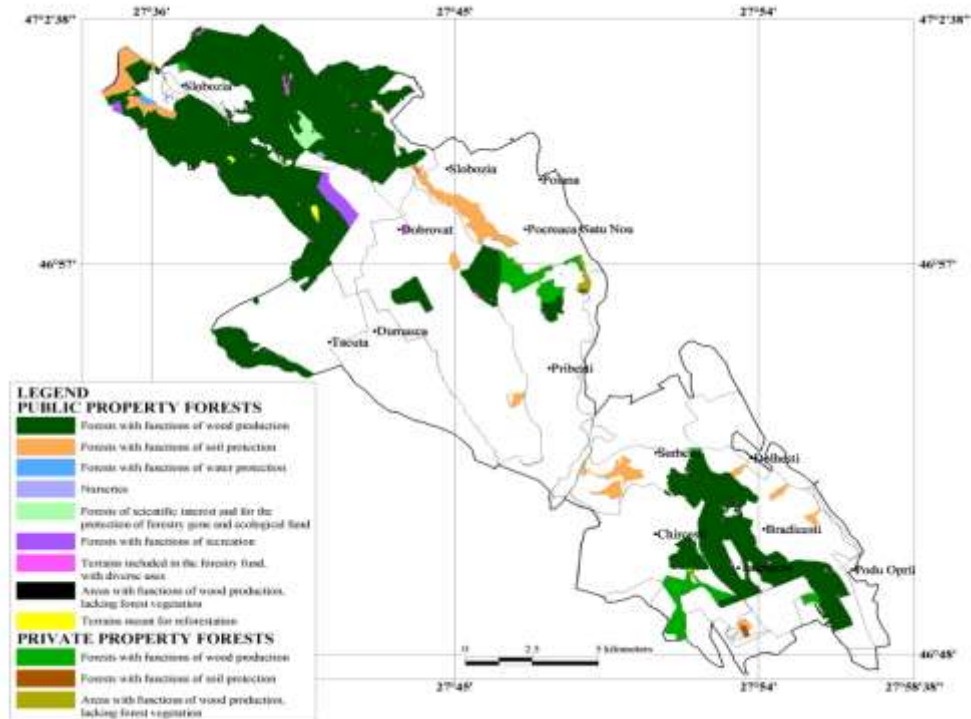
become in 2008 forests with main functions of production, along with the shift in their functional group changing also the forestry treatment applied.



Map2. The main dynamic of forest surfaces in the Pascani County between 1990-2004

Once retroceded, the trend was for these areas to stay for a period of time under the management of the forestry district, to which they belonged initially, after which they could pass under the management of a private forestry district, districts which answer to a different state organ – ITSRV (Territorial Forest and Hunting Inspectorate), such that Romsilva is exempted from responsibility in regards to them. In 2012 there were only three such districts involved in the management of forests in the Iasi county area: private O.S. Falticeni (there's a similarly named public district), O.S. Bisericesc and O.S. Prokonhit Timber SRL,

which managed together no less than 10.482 ha of forest, only 1.660 of these having protection as a primary function.



Map3. The main dynamic of forest surfaces in the Dobrovat County between 1990-2008

After retrocession, the owners have the obligation to keep the initial functional classification of the forests, forestry treatments being applied in accordance with it. In reality though, recent geometrically rectified aerial imagery show clear differences between state-owned forests and private ones, these being easy to notice especially in areas where these two types border each other. Although physical-geographical features remain the same (soil, slope, exposure, altitude etc.), privately owned forests lose their consistence/density, become more vulnerable and many times even their original border is changed, phenomenon encountered increasingly more often in all of Iasi's forestry districts, especially O.S. Iasi, Hîrlău, Ciurea, Grajduri and Pașcani. The same phenomenon of degradation is encountered also in isolated bodies of forest, wholly retroceded or not, regardless of their functional classification.

In O.S. Iasi, between 1996 and 2006, took place a change of the classification of forests in groups, subgroups and functional categories, without a significant impact on the type of forestry treatments applied. It's the case of an area of 45,5 ha of forest positioned on the Sculeni-Medeleni line, north-east of DJ249, classified initially in 1996 as a forest of scientific interest, subsequently changed as well showing up as a forest part of the internal forest-steppe, with a function of protection against damaging climatic and industrial agents (functional type 3). In Iasi County, there's a noticeably faster retrocession pace for some forestry districts such as: Podu Iloaiei, Ciurea and Pascani (map2), districts where the great landowners held massive areas of forest before the 1945 nationalization. Unlike these, the Raducaneni and Dobrovat (map3) districts are the most stable, retroceding only small areas over the considered time period, also keeping them under their management.

Conclusion

The main dynamic of forest areas in Iasi County is determined by the retrocession process, process which occurred since the very first few years after 1990 and which clearly impacted the span of the areas occupied by forests in the country, regardless of their functional classification. Even since 1881, the most important law including regulations was The Forestry Code. At the same time, the Agricultural Real Estate Law established methods through which former owners can regain their land, also the conditions to be fulfilled for entering into possession. Seemingly, there is a certain legal support in order to fulfill the needs of both parties (society vs. forest), but actually, things are a lot more complicated, especially due to the legislative chaos.

The last 25 years saw the issuing of two Forest Codes (Law 26/April 1996 and Law 46/2008), the third one already in the works. At the same time, 3 main laws concerning the retrocession process were drafted with approximately 30 subsequent additions, the first such law dating back to 1991. Rules change frequently, boundaries still not drawn.

In the chaotic context created by the frequent legislative changes, the dynamic of the analyzed areas follows a certain pattern in certain key years: 1991- which marks the start of the retrocession process, 1997 – immediately following the issuing of the first Forestry Code, 2003-2006, when the pace of the retrocession accelerated significantly, 2010- when the manager of a massive part of Iasi's forest fund changed, each new law making its effects felt almost immediately.

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