USING SPATIAL DATABASES FOR OPTIMIZATION OF THE FOREST-OWNERSHIP ACTIVITIES

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Abstract

The administration and management activities of private forest stock involve the management of a considerable amount of data and information on specific activities in the forestry sector. Since in most cases, the representatives of private forest stock owners are not qualified for activities related to the forestry sector, it is necessary that technical accounting records to be sufficiently explicit and accessible for their proper use.

Therefore, by carrying case study analyzes and studies, the possibility of efficiency and optimization of administration and management activities related to private forests and forest respectively optimally utilize its potential, using graphical and textual databases. Development of complex databases, including data and information appropriate to the activities of the forested private property requires the collection and analysis of the field data and the elaborated specialty (forest management plans, maps, landscape planners, currency papers, progress reports, accounting records , statistical evidence periodic inspection documents, etc.) for the decade in progress and/or, where applicable retrospectively. The use of complex spatial databases, corresponding thematic maps of various aspects of forest, is one means of competent and efficient coordination of the activities currently taking place in the private forestry sector.

Key words: private property forestry stock, database, thematic map, forest land, planner map of the landscape, co-owners, forest potential.

INTRODUCTION

Managing the forest - undivided property - the case of the joint forestry relating to different localities, are made based on the management contracts concluded with state (forest districts) or private forest units (forest ranges private) under the Forest Code - Law 46 / 2008.

For optimum deployment of all related activities of the joint forest belonging to the ownership association, complex records are necessary to carry out these activities, something which can be done very effectively through a geographic information systems and related databases (Chezan M. et al., 2006).

Graphic and descriptive basics necessary to conduct complex databases can be retrieved from the existing forest management were subsequently extended and updated with information on the ongoing activities in the forest ownership association.

As a result, the database will contain information on:

- the location (site) for the forest ownership association;

- description stands;
- forestry works related stands;
- management and forest management;
- management strategies and forest management in the future, etc.

The databases can be realized with specialized programs, depending on the logistical base of ownership association or forest manager (Marton H., 2007).

MATERIAL AND METHOD

The case study was conducted in forest body Plopilor Valley, forest belonging to the Vîrfurile ownership association in Arad County, which comes from the former production unit (P.U.) II Leuca, from the former Forest Fold Hălmagiu, based on the reconstitution of ownership under law 1/2000.

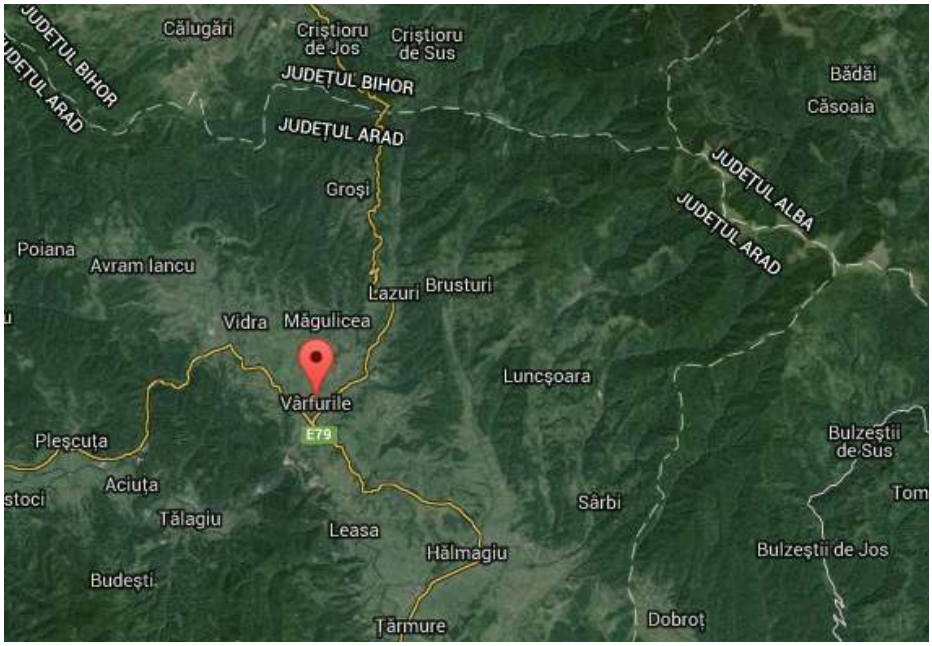


Fig. 1. Locating the case study (http://comuna.info/harta-varfurile-ar/)

Consequently, the elements and the structural elements of the site were analyzed in the plots 183, 184, 185, 186 and 187 (Tab. 1) and forestry aspects of the work proposed to be achieved through forest management in the current decade (2005-2015).

The elements analyzed were implemented in the form of textual attributes in the database of the geographic information system realized in the study case program with MapSys 8.0 programme.

To positioning of the studied stands, the landscape map was used to corresponding to Vîrfuri owners association at a scale of 1: 20.000 which was scanned (raster thereby obtaining related) and oriented relative. Following obtained vector of raster data, after the process of tracing, using 8.0 MapSys program.

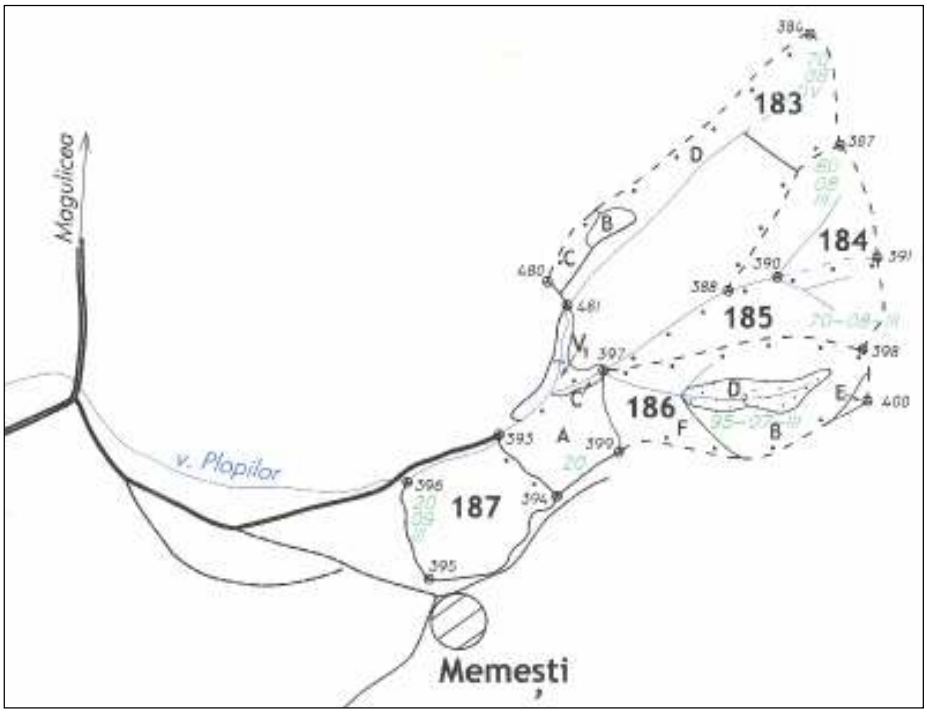


Fig. 2. Map stands in the landscape planner with which the case study

Table 1

Stands in the natural environment related subjects

U.A.	S	GF	SUP	TS	TP	Sol
183B	1,2	2-1B	A	6232	4281	2401
183C	1.8	2-1B	A	6232	4281	2401
183D	23.7	2-1B	A	5232	4281	2401
184	11.6	2-1B	A	6232	4281	2401
185	15.5	2-1B	A	6232	4281	2401
186A	9.2	2-1B	A	6232	4281	2401
186B	13.5	2-1B	A	6232	4281	2401
186C	0,3	2-1C	A	6232	9723	9501
186D	4.2	1-2L	A	6232	4281	2401
186E	0.6	2-1B	A	6142	5121	2407
186F	7.0	2-1B	A	6232	4281	2401
187	15.5	2-1B	A	6232	4281	2401

Out of the forest management plan of ownership association, a range of data was collected on: location, site conditions (Tab. 2), structural and qualitative elements of stands, organization of production process (Tab. 3), works and suggested works that were analyzed and verified in the field. Also, they considered the issues related to forestry exploitation potential for the forestry compossessorate analyzes and studies.

Table 2

Stands in the natural environment related subjects

U.A.	Relief	Exhibition	Tilt	Altitude
183B	Versant corrugated higher	SE	16	340
183C	Versant corrugated higher	SE	28	320-360
183D	Versant corrugated	V	25	300-420
184	Versant corrugated	SV	25	340-410
185	Versant corrugated	NV	22	300-430
186A	Versant corrugated	NV	22	300-400
186B	Versant corrugated	NV	22	300-380
186C	Versant corrugated lower	SV	8	300
186D	Versant corrugated lower	SV	33	310-380
186E	Versant corrugated higher	S	12	420
186F	Versant corrugated	NV	20	300-510
187	Versant corrugated	NV	22	290-340

Table 3

Qualitative elements of stands studied

U.A.	Composition	Age (years)	CP	D (cm)	H (m)	$V_{u.a}$ (m^3)	K
183B	5Mo3Ca2Fa	15	3	5	5.5	66	0.9
183C	7Fa3Fa	75/110	3	26/40	22/24	538	0.8
183D	5Fa3Fa2fa	70/70/105	4	24/26/38	20/22/25	6612	0.8
184	8Fa2Fa	80/110	3	26/40	23/25	3666	0.8
185	7Fa3Fa	70/105	3	26/40	22/24	4635	0.8
186A	3Fa2La2Mo2Str1Dt	20	3	4/8/10/14/8	4/7/8/14/7	653	0.9
186B	5Fa3Fa2Fa	120/95/95	4	42/28/28	24/23/24	3255	0.6
186C	10Ann	25	3	12	12	38	0.7
186D	4Fa3Fa3Fa	80/80/135	4	24/26/40	22/23/24	1445	0.9
186E	9Go1Fa	115	3	46/42	26/26	206	0.7
186F	8Fa2Dt	5	3	-	1	7	0.8
187	2Fa2La2Str2Mo1Ca1Pi	20	5	6/12/14/ 14/6/16	6/9/14/13/ 6/14	1845	0.9

RESULTS AND DISCUSSION

From the analysis and processing of data recorded in carrying out the research, a series of elaborations were developed (Fig. 3-12) related to the informatics systems and graphical and textual databases.

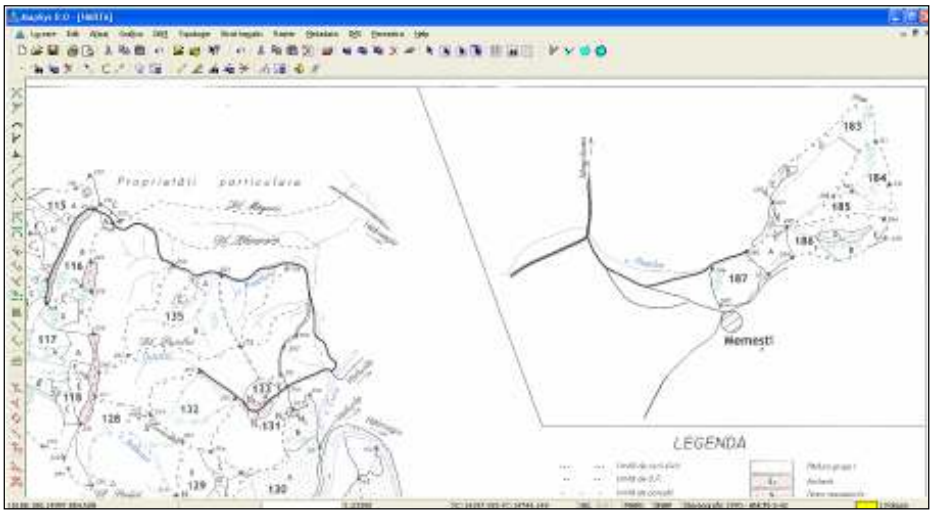


Fig. 3. The implementation process raster and vector obtaining

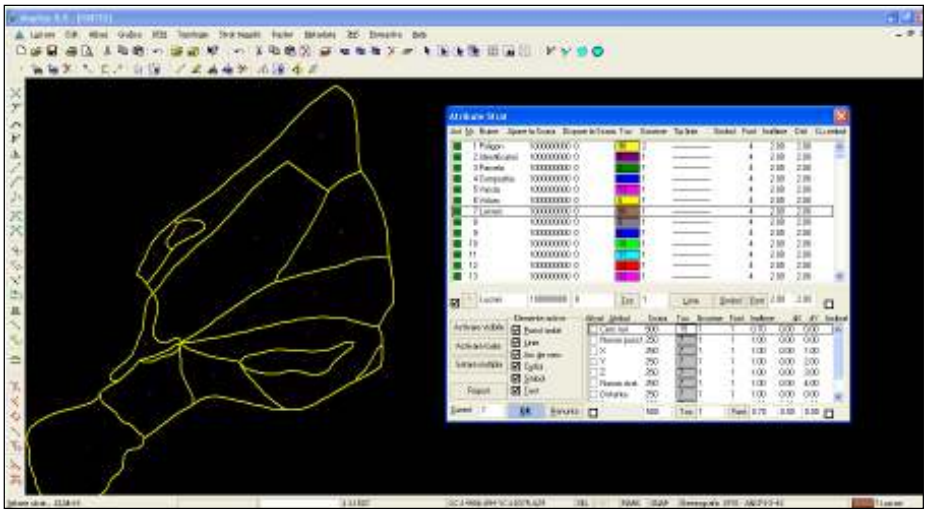


Fig. 4. Setting thematic layers

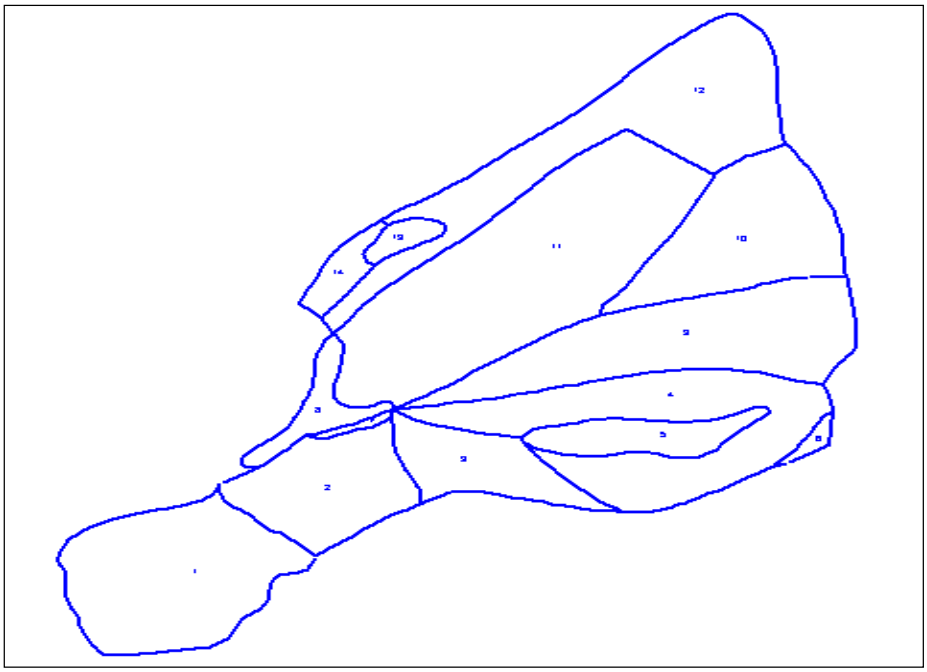


Fig. 5. Obtained vector from relatively oriented vector raster

Baza de date

Baza de date Tabel Interogare Extras

NR	IDLN	IDTX	NRCAD	SUPRAFATA	PERIMETRUL	Z	Parcela	Compozitia	Varsta	Volum	Lucrari
1	1	14	1	128832.3625	1422.16	0.000					
2	1	-1		-1071608.8646	5105.25	0.000					
3	3	15	2	73126.0029	1113.46	0.000					
4	7	21	8	22020.9985	1031.81	0.000					
5	8	20	7	2901.7125	370.48	0.000					
6	10	17	4	131806.9238	2866.06	0.000					
7	10	18	5	32889.6835	998.06	0.000					
8	12	27	14	14976.6526	630.54	0.000					
9	12	25	12	146825.3973	2832.38	0.000					
10	14	26	13	9260.7827	411.53	0.000					
11	18	16	3	49444.0793	1162.84	0.000					
12	25	19	6	4512.6144	377.59	0.000					
13	30	23	10	99887.3248	1402.89	0.000					
14	30	22	9	131553.0771	2010.05	0.000					
15	34	24	11	223571.2527	2129.88	0.000					

Fig. 6. Database configured for the attributes set

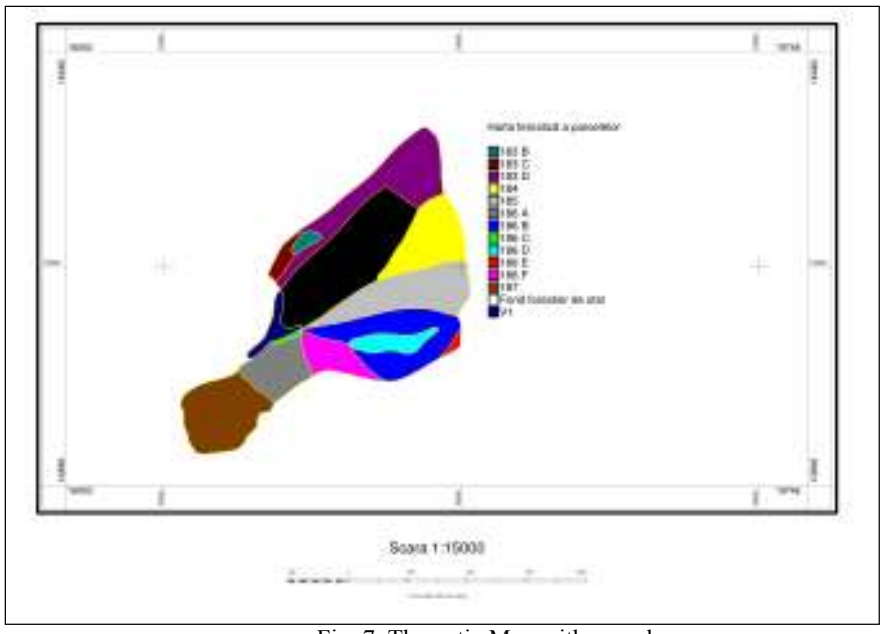


Fig. 7. Thematic Map with parcels

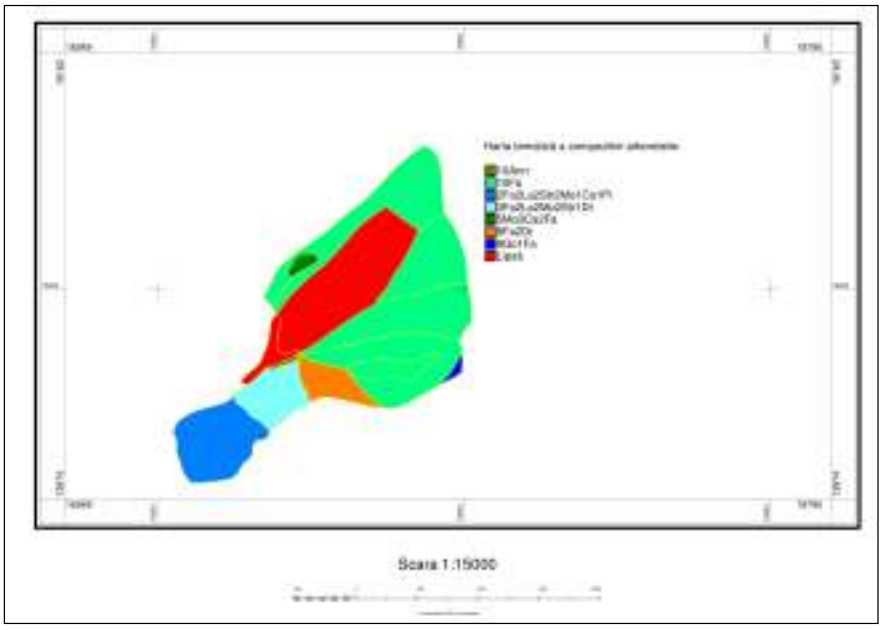


Fig. 8. Thematic map of the composition stands

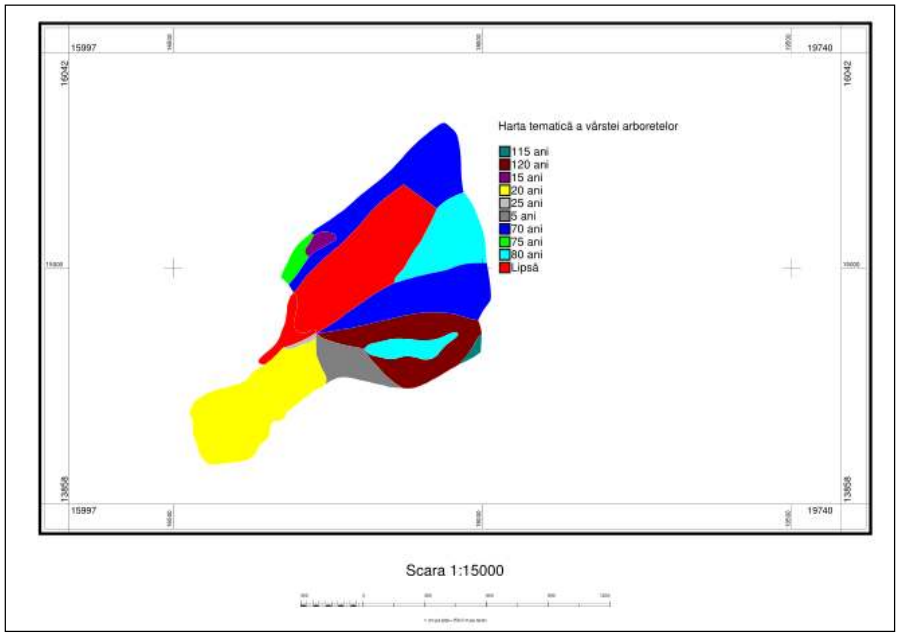


Fig. 9. Thematic Map of age stands

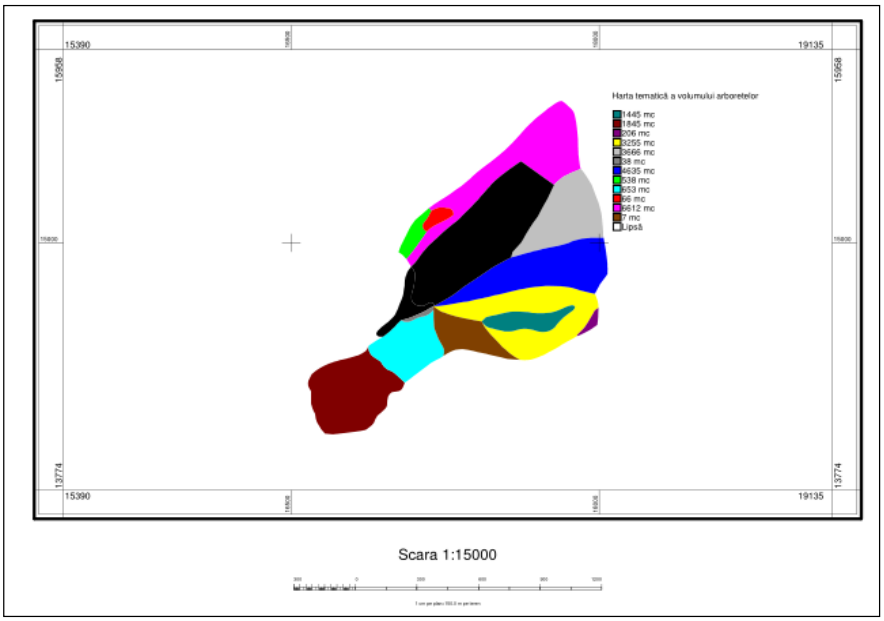


Fig. 10. Thematic Map volume stands

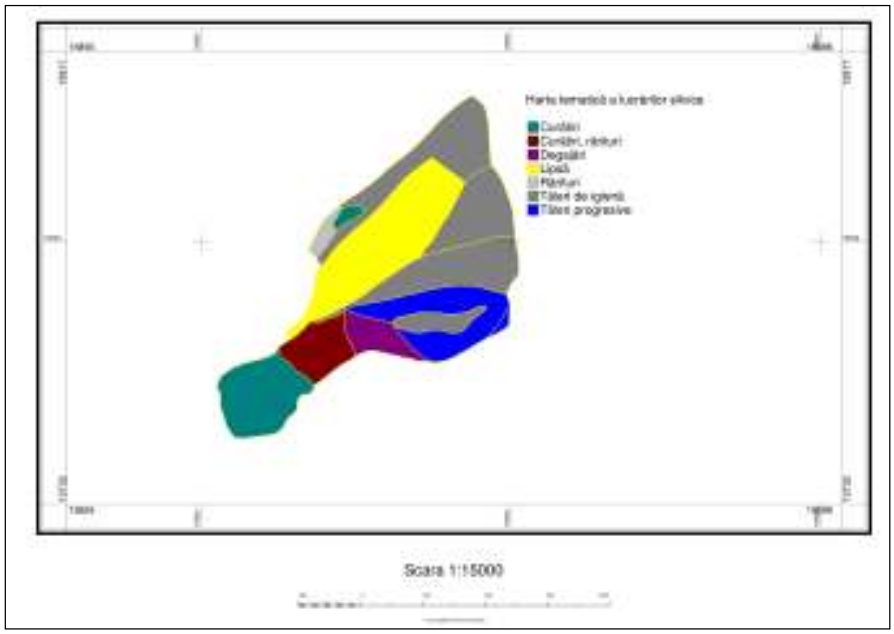
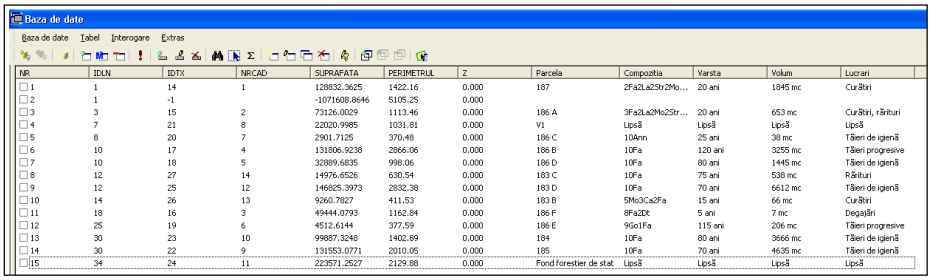


Fig. 11. Thematic map of forest work



NR	IDLN	IDTX	NRCAD	SUPRAFATA	PERIMETRUL	Z	Parcela	Compoztia	Varsta	Volum	Lucrari
1	1	14	1	128832.3625	1422.16	0.000	187	2Fa2La2Str2Mo...	20 ani	1845 mc	Curăţiri
2	1	-1		-1071608.8646	5105.25	0.000					
3	3	15	2	73126.0029	1113.46	0.000	186 A	3Fa2La2Mo2Str...	20 ani	653 mc	Curăţiri, răriturI
4	7	21	8	22020.9985	1031.81	0.000	V1	Lips&	Lips&	Lips&	Lips&
5	8	20	7	2901.7125	370.48	0.000	186 C	10Arn	25 ani	38 mc	Tăieri de igienă
6	10	17	4	131806.9238	2866.06	0.000	186 B	10Fa	120 ani	3255 mc	Tăieri progresive
7	10	18	5	32889.6835	998.06	0.000	186 D	10Fa	80 ani	1445 mc	Tăieri de igienă
8	12	27	14	14976.6526	630.54	0.000	183 C	10Fa	75 ani	538 mc	RăriturI
9	12	25	12	146825.3973	2832.38	0.000	183 D	10Fa	70 ani	6612 mc	Tăieri de igienă
10	14	26	13	9260.7827	411.53	0.000	183 B	5Mo3Ca2Fa	15 ani	66 mc	Curăţiri
11	18	16	3	49444.0793	1162.84	0.000	186 F	8Fa2Dt	5 ani	7 mc	Degajări
12	25	19	6	4512.6144	377.59	0.000	186 E	9Go1Fa	115 ani	206 mc	Tăieri progresive
13	30	23	10	99887.3248	1402.89	0.000	184	10Fa	80 ani	3666 mc	Tăieri de igienă
14	30	22	9	131553.0771	2010.05	0.000	185	10Fa	70 ani	4635 mc	Tăieri de igienă
15	34	24	11	223571.2527	2129.88	0.000	Fond forestier de stat	Lips&	Lips&	Lips&	Lips&

Fig. 12. Baza de date textuale, cu atributele stabilite implementate

Database query (Fig. 12) can be done using the corresponding commands in the program MapSys 8.0, or by using various specialized applications for working with online databases which works with specialized databases (Arc Explorer). The final products obtained after making the Geographic Information System and related database can be used differently according to the need and objectives to be achieved.

CONCLUSIONS

Realization of the databases and thematic maps from raster data (forest management plans, maps, landscape planners, etc.) can be made relatively easy using specialized work programs such as ArcGIS MapSys, etc. The usage of data corresponding to current activities in the forestry sector can properly complete the related database, given the specific technical and economic activities of the ownership associations.

Information systems and database respectively, corresponding thematic maps analyzed forestry activities within compossessorate can streamline the management and management thereof, if the data used is accurate and the field reality is objectively rendered. Also, these items related to geomatics technologies may constitute an appropriate infrastructure for management of time and perspective decisions.

A considerable help to solve various disputes related to identifying and materializing limits of the joint surface and forestry is to achieve appropriate use of geomatic applications based on raster data (maps landscape planner plans the old situation, etc.) and the information recorded with modern technologies.

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