OMNIA
DEVELOPMENT

Mun. București, str. Păușa, nr. 52, camera 1, sector 5
CUI RO 27871553, J40/40/2011
IBAN RO90 BTRLRONCRT0340779601, Banca Transilvania
E-mail: omniadevelopment@gmail.com

Raport comun (Parcul Natural Comana și Parcul Natural Rusenski Lom)

2020

INTERREG V-A ROMANIA - BULGARIA
PROJECT CODE: ROBG-464
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Contract – număr, denumire, obiect:	***Contractul de prestări servicii nr. 45/ROBG464 / 635 / 04.10.2019 privind CS_01 - Elaborarea Studiilor de fundamentare necesare si a livrabilelor solicitate, inclusiv realizarea unui set de harti si a 2 baze de date GIS pentru Parcul Natural Comana necesare realizarii proiectului "Managementul verde pentru protejarea Parcului Natural Rusenski Lom si Parcului Natural Comana", cod eMs RO-BG 464 finantat prin Programul Interreg V-A Romania – Bulgaria 2014-2020***
Acte adiționale:	***Actul adițional nr. 1/30.03.2020***
Beneficiar:	***Asociația Centrul Ecologic Green Area*** Sediu social: Sos. Bucuresti-Alexandria 162, Ghimpati, Giurgiu, tel. 0723.172.100, fax: 031.817.52.35
Prestator:	***S.C. OMNIA DEVELOPMENT S.R.L.*** Sediu social: Strada Pausa, nr.52, camera 1, Sector 5, Bucuresti, e-mail omniadevelopment@gmail.com
Administrator prestator:	**Voinea Mihaela**
Reprezentant împuternicit/ Team leader:	**Olteanu Constantin Viorel**

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The purpose of this report is to summarize the outputs of the Green Management project for the protection of the Rusenski Lom Natural Park and the Comana Natural Park and to join the information obtained by Bulgarian experts for the Lomovete Natural Park.

In order to prepare the joint report, the following steps were taken:

- Comparison of information. Given that this report is prepared in collaboration with Bulgarian experts for the Lomovete Natural Park, it is necessary to compare the information obtained from the implementation of the project activities.

- Selection of information. Reviewing the large amount of information that was collected from the field, from both areas of project implementation: Rusenski Lom Natural Park and Comana Natural Park, a selection thereof is required. In this context it was decided by mutual agreement which are the most important results that are selected to be integrated in the joint report.

- Preparation of the report. The third step is the actual preparation of the report by the experts, after having reviewed the entire material produced in this project.

The main outputs obtained in this project are:

Comana Natural Park

- Creation of a GIS database for the Comana Natural Park and for the Natura 2000 sites ROSPA0022 - Comana, respectively ROSCI0043 - Comana together with the reservations 2.418 - Oloaga - Gradinari forest and 2.419 Padina Tatarului Forest, included in the area of the Comana - Lomovete Ecological Corridor

- Detailed study on the degree of connectivity and local invasiveness within the cross-border ecological corridor Comana-Lomovete, the part located in Romania, carried out to be used as support in developing the updated form of the Integrated Management Plan of the ecological corridor Comana - Lomovete

- Action Plan for the jackal (Canis aureus) in the Comana Natural Park and the protected natural areas with which it overlaps, developed to be used as a support in the decision-making process aimed at managing the Canis aureus species in the territory of protected natural areas

- Revised strategy for visiting the Comana Natural Park

- Inventory study - detailed mapping of the population of jackals and alien - invasive plant species, as well as habitats of community interest, in the context of species mobility, in the Comana Natural Park

- Report for the Comana Natural Park which will include the main information and results obtained from the studies (this report)

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Rusenski Lom Natural Park

- Study of alien-invasive plants of the Rusenski Lom Natural Park area;
- Management plan (updated) of Rusenski Lom Natural Park.

Information selection - Comana Natural Park

During this stage, all the reports/studies that were carried out within the project for the area found on the Romanian territory, namely the Comana Natural Park were taken into account and used, considering the fact that these studies/reports were prepared by interpreting the data from the field and the selection of relevant data.

Each of the outputs of the project, which targeted the Comana Natural Park, were addressed in this report so that for each of them the obtained main information was presented.

Creation of a GIS database for the Comana Natural Park and for the Natura 2000 sites ROSPA0022 - Comana, respectively ROSCI0043 - Comana together with the reservations 2.418 - Oloaga - Gradinari forest and 2.419 Padina Tatarului Forest, included in the area of the Comana - Lomovete Ecological Corridor

SUMMARY

The GIS database includes both the data collected from field trips and the data obtained from the study of the literature.

In order to create the database on the distribution, size and area occupied by alien - invasive species, a commercially licensed GIS database software package was used.

The general database consisted of two databases, namely:

- A database containing GIS mapping of the distribution of non-invasive plant species, as well as habitats of community interest;
- A database containing GIS mapping of the distribution of Canis aureus.

The database has the following characteristics:

- The digital data sets are made respecting the Stereographic 1970 projection system or other nationally approved systems. Apart from the STEREO 70 data, versions of INSPIRE compliant data were also produced in CRS ETRS 89
- The spatial data set was made, in a unitary way, in compliance with the provisions of GO no. 4/2010 on the establishment of the National Infrastructure for Spatial Information in Romania as well as the INSPIRE technical specifications on the implementation of data sets on protected sites (D2.8.I. INSPIRE Data Specification on Protected Sites);
- The format of the geospatial databases created is geodatabase and shapefile. A shapefile file is made for each species
- GIS databases were created with shapefile type files, comprising the distribution

areas delimited by polygons, with density/abundance attributes, not by "grid" type representations.

- Metadata input was performed in accordance with the INSPIRE Directive, following the specifications for the geospatial databases of protected natural areas and targeted invasive alien species
- *The GIS database* is defined according to the data integrated in the system so that it covers the entire specific domain of protected natural areas: Comana Natural Park, ROSPA0022 - Comana, ROSCI0043 - Comana, together with reservations 2,418 - Oloaga - Gradinari forest and 2,419 Padina Tatarului Forest
- The structure is of a geodatabase type and contains the spatial elements - points, lines and polygons - associated in data sets (habitats, distribution maps of alien - invasive species)
- The data entered/uploaded to the database are different for flora and fauna species and habitats, so that the database ensures, as a structure, the possibility to upload all quantitative and qualitative data regarding the species and habitats targeted by the project
- For the management of the GIS database, the following functions are allowed: exploration and querying of geographical information in order to display it on maps; searching and discovering GIS data on local networks and web environments; defining, exporting and importing geodatabase data models and data sets, respectively; creation and administration of geodatabase structures; adding database usage and administration connections
- *The database software system* allows the publication of the database, access to and management of the database in web environments
- The web component of the database allows the publication of map web services, geodata services, and a number of other types of services, which allow accessing and querying the online database. Using a *Geodata Service*, the database can be updated online from different locations through internet access
- *The format* of the cartographic database allows interoperability between different GIS analysis programs and complies with the specifications of the INSPIRE Directive for geospatial databases of protected areas
- *The* spatial data *sets* are made with a precision of 1:5000 scale and in compliance with the technical specifications available at EC level, in accordance with the INSPIRE Directive,

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Through the database management system (DBMS), database users have the possibility to perform several types of operations on stored data:

- Entering new data
- Delete existing data in the database
- Updating stored data
- Query the database to find certain information, selected according to a chosen criterion
- Generating reports and maps after choosing certain defining elements existing in the database.

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Detailed study on the degree of connectivity and local invasiveness within the cross-border ecological corridor Comana-Lomovete, the part located in Romania, carried out to be used as support in developing the updated form of the Integrated Management Plan of the ecological corridor Comana - Lomovete

SUMMARY

This document is a detailed study on the degree of connectivity and local invasiveness within the cross-border ecological corridor Comana - Lomovete, the part located in Romania and is made to be used as support in developing the updated form of the Integrated Management Plan of the Comana - Lomovete ecological corridor.

All over the world, ecological corridors are established for a wide variety of purposes. They may be designated for several species or may be intended to provide benefits to wildlife while also providing other environmental, recreational and social benefits. In our case we want to identify the main corridor for the dispersal of invasive species, which are connected by favourable habitats between the protected natural areas Comana and Lomovete.

Also, the scale at which ecological corridors are designated differs greatly in functionality, in the case of those that favour the dispersal of species, it can be small in size, from underground passages and short corridors to large ones, such as corridors extended by tens (hundreds) kilometres, in our case the ecological corridor Comana - Lomovete is about 35 - 40 km long. The size and shape of these connections and the problems that arise in their design and management vary substantially. The process of mapping corridors may involve the use of species distribution models, numerical tools that combine observations of species occurrence with variations in environmental characteristics. Species distribution models offer an innovative approach in identifying key determinants of current and future spatial patterns of species occurrence.

These models are used to obtain ecological and evolutionary perspectives and to anticipate distributions throughout the territory, sometimes requiring an extrapolation in space and time. In this context, it is neither possible nor desirable to provide uniform specific guidelines for the design and management of ecological corridors, as these will depend on the proposed scale and function of the corridor. Once the purpose and scale of the corridor have been clearly identified, the favourability of the land can be assessed and the biological and social aspects can be considered in accordance with the established purpose.

It is important to recognize that in reality there is rarely an opportunity to design an "ideal" system of corridors to maintain the connectivity of the landscape. Frequently the problems refer to: the management of the remaining corridors that have survived in the strongly disturbed

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landscapes; maximizing connectivity by using preserved habitats primarily for other purposes; restoring connectivity between the remnants of natural habitats that remain after anthropogenic development.

Local ecological corridors therefore ensure connectivity between key areas such as protected natural areas (of international, Community, national importance) and/or between their internal areas. They address different groups of species from invertebrates to large mammals and are usually established on small areas.

A first chapter of this study contains the location and description of protected natural areas: Comana Natural Park and Rusenski Lom Natural Park being presented both the conservative elements for which they were designated and the characteristics of the biotic and abiotic environment in the two protected areas studied.

The second chapter presents the methodology for identifying the cross-border ecological corridor Comana - Lomovete in terms of alien-invasive species. The steps and criteria for identifying the cross-border ecological corridor are described. At the same time, the data and tools used in the process of identifying the cross-border ecological corridor are presented.

The Comana - Lomovete cross-border corridor is represented graphically by a complex map that includes several elements.

The potential habitat used by *Canis aureus* in the Comana protected natural area is represented in red on the map, and in the Lomovete protected natural area, it is represented in blue.

These habitat areas, used by the species *Canis aureus* are joined by an ecological corridor that ensures the dispersion of the species between the two protected natural areas.

The ecological corridor is represented as a percentage of the landscape permeability. Thus, the ecological corridor 1% represents the most permeable 1% of the entire landscape. Practically the most permeable 1% habitats, for the golden jackal, from the selected study area, which unite the two protected natural areas.

The ecological corridor between the two protected natural areas, connects the Comana protected natural area in the area of Puieni locality, goes south to Puieni Baltă forest, then continues south through Grindul Muscelului, to Inichiu Forest from Danube Meadow. From here the corridor climbs upstream on the Danube, through the meadow forest of the Danube, on the technical left bank to the area of Giurgiu. One arm of the corridor separates in Grindu Penciu - Ostrovu Mocanu forest and crosses the Danube towards Marten, continuing from here the connection with the Lomovete protected natural area, and another arm continues, through the Danube Meadow, towards Giurgiu, crosses Slobozia and crosses the Danube through

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Ostrovul Liuleak and connects with the Lomovete protected natural area in the area of Sredna Kula.

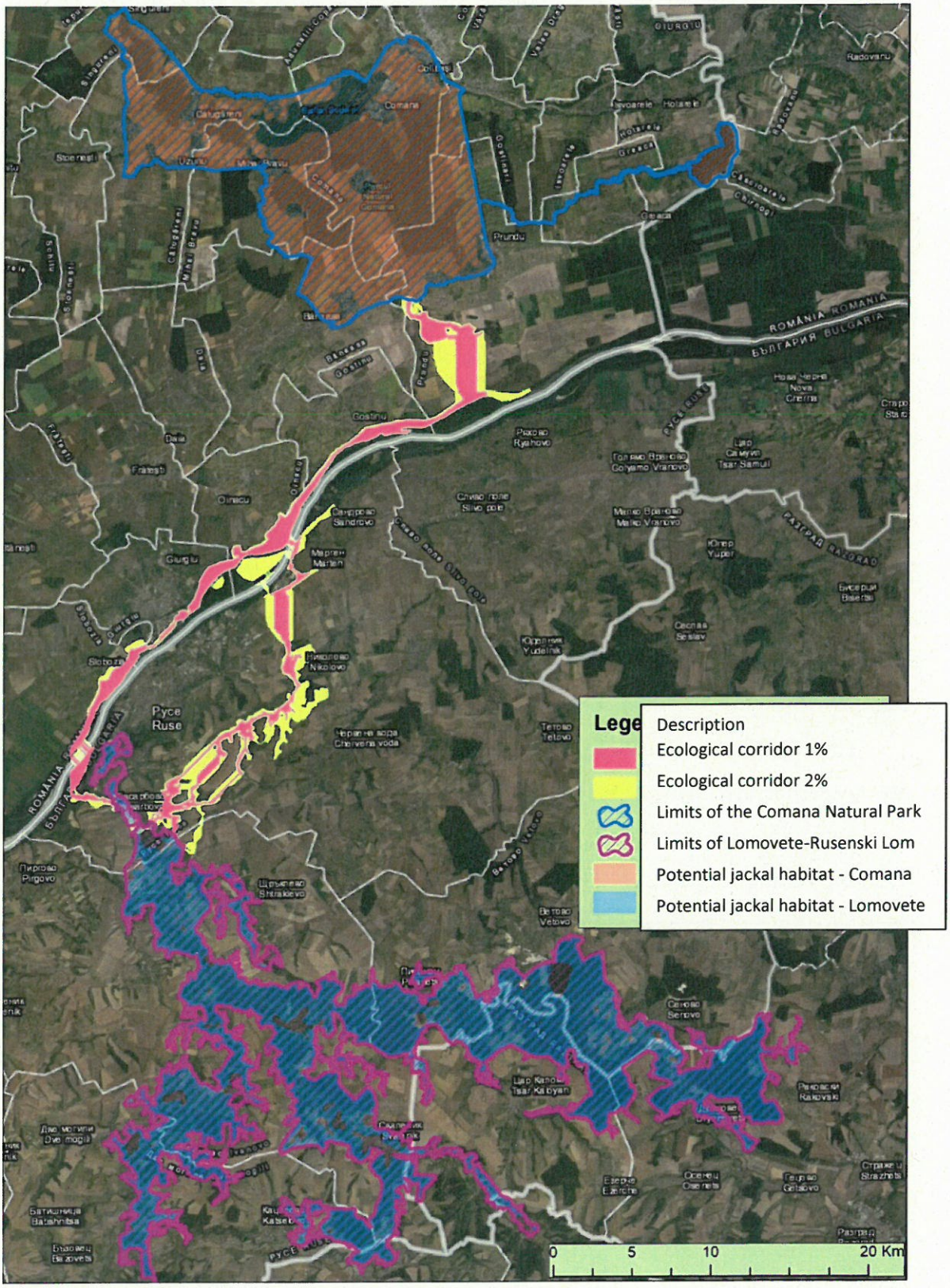

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Figure 1. Map of the ecological corridor Comana - Lomovete

The third chapter contains the description of the invasive species from the two protected natural areas targeted by the project and their dispersal capacity within the cross-border ecological corridor that unites the two protected natural areas.

The alien and/or invasive species described, inventoried, mapped and reviewed in terms of dispersal capacity are: *Ailanthus altissima, Amorpha fruticosa, Ambrosia atemisiifolia, Erigeron annuus subsp. annuus, Erigeron canadensis, Phytolacca americana and Canis aureus.*

Regarding the species *Canis aureus* we notice a higher density of signs of presence and also of families in the following areas: the northe-astern part of the park, the right bank of Neajlov, the Strambeasca Forest and the neighboring agricultural lands, the Călugăreni Forest; northwest of the park, the confluence of Neajlov and Argeș in Comana Forest, the southern half of the protected natural area: Mihai Bravu forest and neighbouring agricultural lands, Ciompu Forest with Valea Cucului and the surrounding agricultural lands, Puieni - Prundu area with Puieni Deal, Valea Nichitei, Valea Barbului and the neighbouring areas and in the extreme west of the protected area: Măgura Forest, mainly the shore areas of the facilities on pr. Zboiu and the edge of the forest.

Figure 2. Adult golden jackal - Comana Natural Park

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The presence of the jackal was signalled in the field, in a complex of ecosystems present in the vicinity of the Neajlov river, from its entrance in the protected natural area, north of the Singureni forest body and near the area where it flows into the Argeş river. Also, in the forest bodies located between the localities of Comana, Mihai-Bravu, Prundu and Puieni, as well as in the forest body of Măgura, the jackal is signalled in the remaining forest ecosystems in semi-natural regime. If in the case of the meadow area, the seasonal conditions are very uneven, ranging from white poplar Frasinet and Plopis, highly productive, located on dead waterless branches in summer, to forests dominated by *Alnus glutinosa*, mixed with ash and willows, in areas where water persists throughout the year, in areas with quercinea forests, from the transit area from the stalks with pedunculate oak to the one with cereto-garnitet and fluffy oak, in a region with a rather xeric climate, they are relatively uniform, permanently having a dense undergrowth necessary for camouflage. At the same time, the jackal is present in the forest body belonging to the Production Unit IV - Islaz, taking advantage of the special local humidity conditions, created by the northern exposure of the terrace towards Lunca Câlniştei. In the forest body from the Production Unit V - Padina Tătarului are reported concentrations of jackals in quiet areas, lacking forestry works, represented by the Forest Peony Reservation and the Integral Protection Area of the park - Puieni.

Knowing that the golden jackal prefers reeds, a significant period in a year, located near lakes or ponds can be concluded, as well as based on data obtained from the field, on its presence and behaviour on the surface of the Comana Natural Park, we can restrict significantly the area where it can be observed during the breeding period of the youngsters. These areas are represented by surfaces located in the vicinity of the forest floor, being covered with spontaneous woody vegetation (especially acacia, pigeon, rosehip, hawthorn and liana), difficult to access during the growing season. The targeted areas are located in the eastern part of the forest body from Production Unit IV - Islaz and a naturally forested area, which is located between the forest body Puieni (from UP V Padina Tătarului) and Puieni locality, the area being named by locals Valea Nichita.

The main anthropogenic factors responsible for the explosion of the jackal population in Europe could be the following:

A. Deforestation;

b. Road network development;

c. Generation of additional food sources, related to human activities: settlements with villages that produce large amounts of food waste and agricultural activities;

d. Decreasing wolf population

e. Climate change.

According to the literature, jackals prefer habitats close to human settlements where there are feeding opportunities (Giannatos et al., 2018). However, the data collected in a bioacoustic study in Bulgaria and confirmed by the sound stimuli performed in this study in the Comana Natural Park area, show that the proportion of positive response of jackals does not depend on the distance from human settlements. According to jackals' responses to sound stimuli, it suggests that this species avoids places with a higher density of human population (over 1000 inhabitants), as the highest proportion of response was recorded in areas close to villages with between 200 and 1000 inhabitants. Areas where intensive farming is practiced provide a favourable environment for the jackal, which is why there is a frequent response from such areas. Thus we can say that the jackal prefers open areas with agriculture and mosaic landscapes (meadow forests, reed ponds, areas with bushes, pastures, forest bodies and agricultural land), as they are encountered along the ecological corridor Comana - Lomovete.

Regarding the alien invasive plant species, this study highlights the special anthropogenic impact on natural habitats and especially on the forest floor. Many of these species have been introduced directly, intentionally, for ornamental purposes, through agricultural practice, through the use of seed from unauthorized sources from a phytosanitary point of view.

It should be noted that in spring, the areas included in the Comana Natural Park are affected by increasing levels and flows of Neajlov, especially riparian areas located in low areas, prone to floods, flooding the pastures and natural meadows, arable land, fields, forest floor. In this way a series of invasive species have taken root in the forest floor of the area and in the other natural habitats.

It is considered that the introduction of new plant species has a very negative impact on the natural and semi-natural ecosystems of the researched territory, given that the intentional introductions of certain species were not done correctly and the potential impact on biodiversity was not taken into account.

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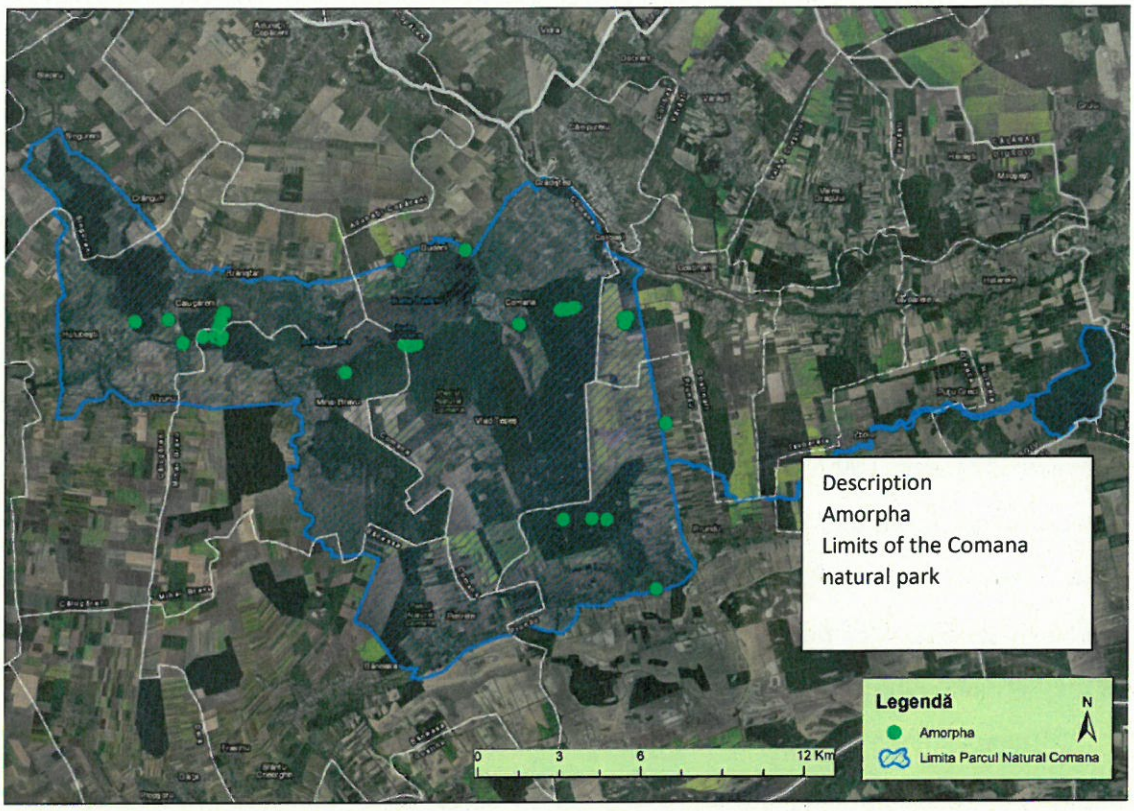

Figure 3 Map of the distribution of the species *Amorpha fruticosa* in the Comana Natural Park - point

Other species of vascular flora have been introduced unintentionally, but this is considered to be a consequence of human negligence, especially when phytosanitary regulations are not followed.

Invasive plant species are recognized as some of the main threats to biodiversity, the structure and functions of ecosystems in the conservation of protected areas and cause enormous losses in forestry, agriculture, fishing and other activities, as well as in human health. These species cause economic and environmental damage. Despite growing concerns about research into the structure of adventitious flowers and the negative effects of invasive plants in natural ecosystems or the human economy, understanding of the factors that determine the spread, distribution and abundance of these species locally or regionally is limited.

Following the field research carried out at the level of the cross-border ecological corridor Comana - Lomovete, it was observed that the degree of invasiveness regarding vascular plants increases due to the following factors:

- anthropogenic factors resulting from tourist activities;
- anthropogenic factors resulting from household activities;
- anthropogenic factors resulting from forestry activities;
- Anthropogenic factors resulting from transport networks;

- Anthropogenic factors resulting from agricultural activities and works.

Invasive species of vascular flora encountered in the cross-border ecological corridor Comana - Lomovete can be divided into the following categories:

- invasive vascular plant species from the forest floor;
- invasive vascular plant species on the edge of agricultural crops (in view of state-of-the-art herbicide treatments, these species are found only sporadically within crops; they are nevertheless met at the edge of crops and in agricultural corps belonging to locals, which are not correctly worked and occupy much smaller areas);

invasive vascular plant species on national and county roads, communal roads;

- species of invasive vascular plants in the vicinity of households, in close connection with the activity of the locals;
- invasive vascular plant species from the Comana Lake area and recreational areas;
- species of invasive vascular plants from islets, ravines, canals, dams, wastelands, from the floristic composition of the vegetation of shrubs and meadows;
- species of invasive vascular plants that have a direct connection with the Danube Valley;
- invasive vascular plant species that are closely related to grazing activities or domestic animal breeding (e.g. sheep herds in the area of Crucea de Piatră, Călugăreni; fruits and seeds of invasive vascular plant species cling to the fur of animals and are easily spread) .

Following the studies undertaken during the vegetation season of 2020, it was found that the following species have the highest degree of connectivity and aggression: *Amorpha fruticosa, Erigeron annuus*. They have a very high anthropogenic impact on biodiversity and especially on woody vegetation, trees and shrubs. *Ailanthus altissima also* has a negative effect on forest habitats, but is found in fewer areas.

Figure 4 *Amorpha fruticosa* near the ponds in the Călugăreni area

The fourth chapter presents the management measures of the cross-border ecological corridor Comana - Lomovete on different areas of development: Spatial planning and urbanism; Development of transport infrastructure; Water management; Forestry; Hunting management; Agriculture.

In the last chapter of the study are presented the methods of monitoring the cross-border ecological corridor Comana - Lomovete. The development of a methodology for monitoring ecological connectivity is a necessity in the conditions of fragmentation of habitats (ecosystems) of different species, with direct consequences on their ability to adapt to environmental changes (including climate change).

Action Plan for the jackal (Canis aureus) in the Comana Natural Park and the protected natural areas with which it overlaps, developed to be used as a support in the decision-making process aimed at managing the Canis aureus species in the territory of protected natural areas;

SUMMARY

The main objective of this activity is to develop a viable tool for jackal management in the Comana Natural Park, thus increasing the long-term maintenance potential of the species, as the number of humans-jackals conflicts is diminished.

This action plan is implemented:

- Based on current scientific knowledge,

- Based on the national legislation in force, the existing sectoral strategies and in accordance with the provisions/recommendations of the international conventions ratified by Romania,

- In direct correlation with the administrative framework (especially the hunting and protected natural areas), territorial organization and the socio-economic context present in Romania.

The action plan of the species *Canis aureus* from Comana Natural Park promotes the management of a species of hunting interest but also conservative, based on combining information generated by modern science and the experience of those involved in direct management of the species in the field, at the level of hunting areas or protected areas.

Figure 5 Daytime family activity of the golden jackal (*Canis aureus*) - 2 adults

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The implementation of the action plan for the jackal (*Canis aureus*) from the Comana Natural Park and the natural areas with which it overlaps is made to be used as a support in the decision-making process aimed at managing the *Canis aureus* species on the territory of protected natural areas.

Summarizing the information presented in the paper, a number of primary conclusions can be drawn, based on which the main management measures regarding the species in the park area are based.

The implementation of the measures is programmed through the subsequent actions, scheduled in a reasonable time, thus resulting in a first substantiated and consolidated planning at the level of protected area, not hunting area.

Relating the non-restrictive ecological requirements of the species to the territory's ability to provide shelter and food resources, Comana Natural Park meets the conditions necessary to maintain a local population with high potential for proliferation in the absence of adequate monitoring and correlated with hunting management.

In the period 2003 - 2019, the population of golden jackal from Comana registered a percentage increase by 650%, after an exponential trend and with a relative stagnation in the last 3 years. The temporary stagnation and the general rhythm lower than the one manifested at national level, where the increase was by 1398%, indicate the local intensification of the hunting management actions in the sense of repressing the ascending trend, with an efficiency superior to the national average.

No cases of individuals with obvious morphological abnormalities were identified.

The craniometric indices of the sample of jackals in the park have higher average values compared to those recorded in Bulgaria (2.77-20.36%).

The jackal population in the Comana Natural Park presented a number of 17 diseases caused by internal and external parasites, in different stages of development; In none of the cases sampled did the detected parasites determine death or the state of obvious physiological decline.

The increase in the jackal population can pose a major risk for the spread of a significant number of diseases to animals and further to humans.

The increase of the jackal population may represent a risk of diminishing the populations of some species of hunting interest.

The increase in the jackal population is not an obvious risk for rodent, bird or amphibian populations in the park.

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Statistically, there is no direct correlation between the frequency of the jackal's presence in the territory and the distance to the nearest food source resulting from anthropogenic activities.

Statistically, there is a direct correlation between the frequency of the jackal's presence in the territory and the distance to the nearest natural source of water.

Data on jackal herds, provided annually by hunting associations that manage hunting floors totally or partially superimposed on the park, are tested and validated in terms of accuracy, being consistent with the results of the study.

Local animal breeders are insufficiently informed about the existence of legal ways to recover the alleged damage.

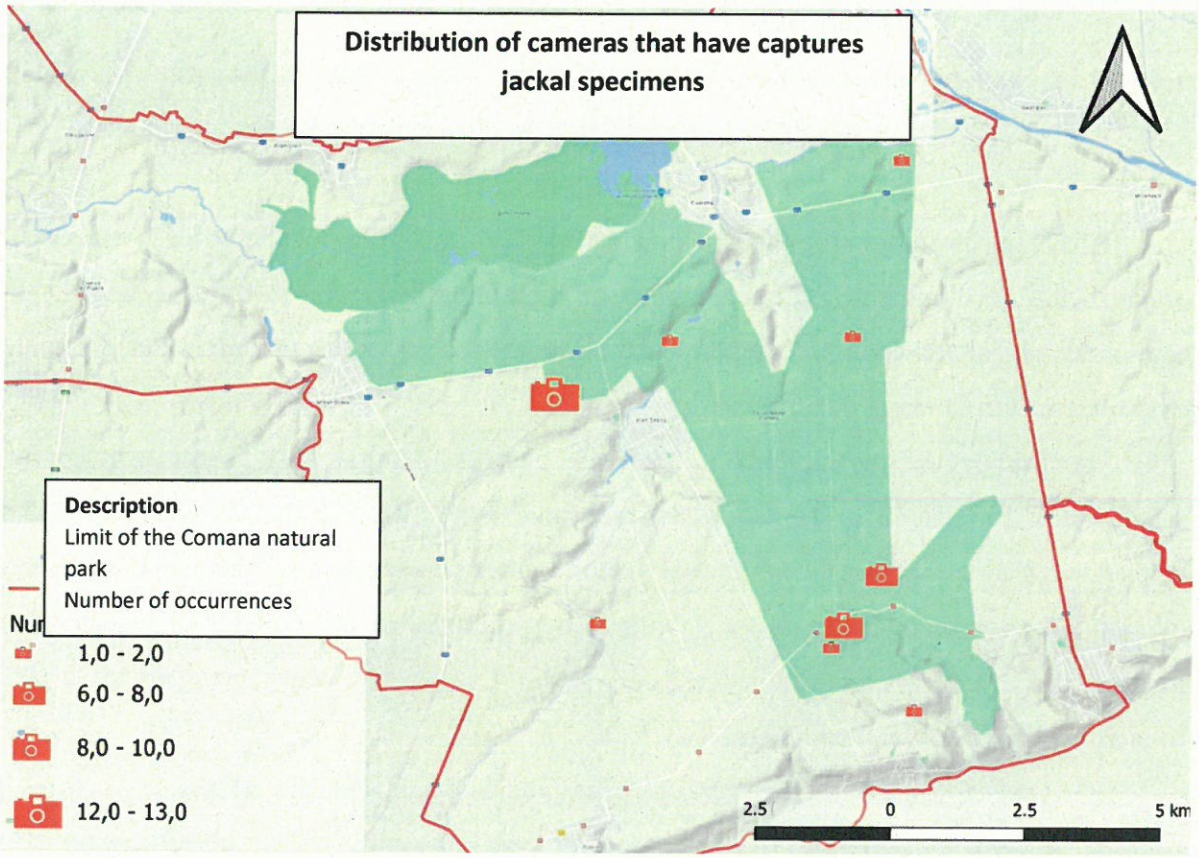

Figure 6 Distribution map of monitoring cameras that captured jackal images

The main management measures for the golden jackal population in the Comana Natural Park in the Action Plan are:

M.1. Monitoring the jackal population in the Comana Natural Park for a period of at least 5 years;

M.2. Periodic health check, by survey, of the jackal population;

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M.3. Strengthening the institutional capacity in order to increase the efficiency of the implementation of the legislative provisions in force for the cases of poaching targeting the jackal;

M.4. Increasing the identification rate of hunting poaching cases;

M.5. Preventing the degradation of golden jackal populations due to the impact of stray dogs;

M.6. Monitoring trophic resources available to jackals;

M.7. Monitoring social acceptance and regular analysis of public and stakeholder attitude;

M.8. Stakeholder education and information campaign;

M.9. Actions to popularize, among animal breeders, the procedures for recovering the damage caused by the jackal.

M.10. Public awareness of diseases at risk of being transmitted by the jackal.

Revised visit strategy of the Comana Natural Park;

SUMMARY

This Strategy for visiting the Comana Natural Park was developed in order to holistically organize the development and management of ecotourism activities in order to amplify the ecological, social and economic benefits and eliminate the anthropogenic pressures associated with them in the Comana Natural Park.

The purpose of the strategy to visit the Comana Natural Park is the efficient and sustainable capitalization of the natural and anthropic tourist potential that is a source of income at local level, by increasing the number of visitors, coherent integration of tourism development objectives at local and regional level with those promoted in the policies of conservation, landscaping, urbanism and sustainable development, forestry and water management in order to increase the potential for tourism.

The general goals of the strategy of visiting the Comana Natural Park are:

a) Organizing tourist activities in order to achieve the conservation objectives set in the Comana Natural Park, but also to ensure the sustainable development of local communities;

b) Development of information and visiting infrastructure in Comana Natural Park;

c) Promoting the area from a tourist point of view at county and regional level, including through ecological education activities;

d) Monitoring the impact on the environment related to the tourist activities in the Comana Natural Park.

The specific goals of the Comana Natural Park visit strategy are:

Organization and sustainable arrangement of tourist infrastructures in relation to other sectoral plans;

Proper identification and capitalization of the elements with existing tourist potential in the Comana Natural Park;

Regulation and development of tourism activities and those associated with them;

Signalling of tourist infrastructures in UAT at the level of Comana Natural Park;

Development of visiting and information infrastructure in Comana Natural Park;

Encouraging the development of related infrastructures (transport, water supply, sewerage, etc.) in the Comana Natural Park;

Promoting local tourist attractions;

Development of the capacity to inform the visitors in relation to the tourist attractions, the possibilities of accommodation and food, the modalities of transport from the local plan and from the space of the protected area;

Developing local entrepreneurial capacity by promoting and supporting examples of best tourism practices (especially accommodation)

Promoting the area through education promoted at different age categories.

The vision of the strategy to visit the Comana Natural Park is to plan economic activities in the field of tourism so that they have as little impact on the valuable elements of the natural environment and a positive impact on human communities. In other words, the role of implementing a visiting strategy is to integrate the socio-economic and environmental protection fields to create an efficient visiting plan. The organized character promoted by the strategy of visiting and tourist information is likely to harmonize the goals of conservation and those of economic development of the targeted area.

The territory related to the Comana Natural Park is characterized by very strong contrasts related to naturalness, artificialization, anthropic capitalization, anthropic impact, accessibility and tourist capitalization. Thus, between the landscapes of the Comana Natural Park, there are areas in different stages of naturalness (streams, ponds, sandy beaches, natural meadows, swamps, bodies of water, deciduous forests, etc.) with heavily anthropogenic areas (for example, built-up areas, agricultural land, gravel pits).

Tourism activities fall into the tertiary sector, which requires the existence of high quality human and economic resources, which can be directed to the development of activities to capitalize on the beauties of nature, cultural traditions and customs, elements of conjunctural attraction or brands developed over time. The development of tourist activities in the Comana Natural Park is conditioned by: (i) the need to improve the quality of public services; (ii) the

general accessibility of the territory, and in particular of the representative, unique and rare tourist facilities, services and values; (iii) visitor's perception of attractive and restrictive elements; (iv) local and regional interest in the development and promotion of this branch of the economy; and (v) the general image of the area and in particular of the elements of attractiveness.

The natural heritage of the Comana Natural Park highlights the presence and scientific importance of natural ecosystems with great diversity, typical of the southern plain area, with strong specific characteristics, sometimes even unique, identified in a structure close to optimal. Forests and meadows alternate with wetlands, agricultural lands and rural settlements where traditional economic activities take place. The area is a tabular plain, high and fragmented, made by lake and fluvio-lake accumulations and covered by loess. Due to the rich diversity of the micro-relief (sinkholes, marshes, sediment accumulation areas) and the presence of abundant springs and watercourses in a sector of temperate-continental climate with shades of excess, here are numerous habitats that concentrate and support a significant number of plant and animal species. The forest bodies shelter wood species typical of the swarms, such as the pedunculate oak, the grey oak, the Austrian oak, the linden, the Hungarian oak, the ash, the hornbeam, the elm, the field maple, the Tartar maple, etc. At the edges of the forests there are xeric meadows, also fragmented, and along the rivers and ponds there are wet, well-represented meadows, as well as salty meadows that during the summer can take the form of fluorescent lands, popularly called "bald".

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Figure 7 Bilingual information panels from Comana Natural Park

Remarkable for their scientific value are the two nature reserves: Oloaga Grădinari (248 ha), delimited for the protection of the species Ruscus aculeatus and the forest habitat; Padina Tătarului (230 ha), designated for the protection of the species Paeonia peregrina ssp. Romanica and the forest habitat. Along with the three mentioned natural areas, there are seven more protected areas considered to have a particular landscape, floristic and faunal importance. These are: Comana pond (1206.4 ha), characteristic habitat for waterfowl - wetland, Fântânele - 163.6 ha (forest), Măgura-Zboiu - 106.6 ha (forest and brook valley), Puieni - 15.3 ha, Valea Hoţilor - 25.6 ha (forest), Valea Gurbanului - 110.4 ha (forest and brook valley) and Sărăturile Comana - Grădiştea - 99.6 ha.

Comana pond includes freshwater habitats, currently having the appearance of a delta with inland puddles, water holes, river arms and ridges with abundant reed vegetation. These habitats are a favourable living environment for many species of birds, especially geese.

The forestry and hydrological component ensures the most attractive fund of the Comana Natural Park, having an important role in:

a) creating the conditions for the development of natural habitats and populations of species of wild flora and fauna, some of them currently exploited by hunting and fishing;

b) outlining special areas for carrying out recreation and leisure activities in areas with a high degree of naturalness;

c) the high potential for fish exploitation;

d) reduction of the climatic discomfort specific to the warm season;

e) creation of an offer for navigation with small boats. Nature reserves, areas of concentration of wild bird populations, forest and aquatic areas, areas with diversity of landscape elements (microforms, vegetation, aquatic areas) are tourist attractions.

Along with the natural heritage presented above, the cultural - historical elements of the area have an important role in the tourist development of the Comana Natural Park.

The importance of the area was based on the richness of natural resources and on its strategic location and configuration. However, the polarization took place around the cultural, military, religious and historical center represented by the Comana Monastery, which left its mark on the development of a wider socio-cultural area.

Comana Monastery, built in the 16th century on the foundation of a wooden church built in the time of Vlad Ţepeş and endowed with the Călugăreni estate, is a center around which the whole area revolved from a historical and cultural point of view. Next to it, the secular village

orthodox churches represent points of attraction: Grădiştea from 1657 and Fălăştoaca from 1784.

The existence of a Gellu Naum memorial museum, in the writer's home village, gives visitors the opportunity to know the life and work of this writer who loved so much these places that inspired him. Also, the existence of the museum from Călugăreni, a cultural objective that includes historical vestiges of great antiquity, completes the picture of the area. Also in the same register can be mentioned the archaeological sites identified on the whole area, sites rich in elements of scientific interest and in the records of the Giurgiu County History Museum.

In the historical locality of Călugăreni, there is the Cross of Mihai (Crucea lui Mihai), a historical monument made in 1913 and restored in 1993 on the occasion of the 400th anniversary of the accession to the throne of Wallachia of the ruler Mihai Viteazul. In the locality of Goştinari are the ruins of the Royal Palace founded by Radu Şerban.

Areas with tourist potential due to the conservation of the landscape and traditional customs (plant culture, free animal husbandry, traditional architecture, folk costumes, folk customs, religious holidays, etc.) are located throughout the Comana Natural Park.

From a material point of view, one can notice the traditional architecture, present through examples of old houses, more or less well maintained, present in all localities in the area. Given the rural character of the Comana Natural Park, the life of the locals is closely correlated with the main agricultural activities: vegetables and horticulture, cultivation of medicinal plants, plowing, sowing, harvesting, or raising animals. The specific way of carrying them out is of a real tourist interest, provided that subsistence agriculture is still practiced here, based on the use of traction animals and human physical force. Thus, it is not surprising that small smitheries, blacksmithing, woodworking workshops with tools and traditional procedures can still be found. Of particular note is the Village of Crafts, a center where you can experience different types of local crafts.

The current visiting and information infrastructure is deficient and requires significant development.

There are signs warning of the status of the area or of traffic restrictions on different categories of roads (23 road signs located on the access roads to the park), as well as 5 barriers to direct the flow of tourists.

There are resting areas (for example the Fantana cu Nuc, equipped with wooden benches and tables and fireplaces, the arrangements in the area of the Măgura forest body) and there are real problems related to the vandalism of these facilities.

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There are currently ten marked tourist routes in the forest (57 km), being set up so that the visitor can benefit from images that contrast deeply with the anthropized areas located at a short distance. The current arrangements are brief, addressing a kind of nature-loving and hiking public. There are 17 tourist panels made of lacquered wood arranged at the entry and exit points of the routes, which contain information on the suggestive name of the route, its length and, where appropriate, the area or reservation to be crossed.

Two sources of drinking water in the form of a public fountain with a surface spring, two public ornithological observatories and four for researchers, a wooden walkway for access to Comana pond, four pedestrian alleys for tourists' access to attractions and a pontoon were arranged, made of wood, built near the park's visiting pavilion, to facilitate the launching of kayaks into the water in case of requests from visitors and tourists.

The Comana Adventure Park stands out with a very high attractiveness, which includes 6 routes for children, 3 routes for adults of progressive difficulty (easy, medium and difficult), a zip line over the lake and a zip line waterfall. The park includes a series of elements suspended at different heights.

Figure 8 Observatory for wildlife observation in Comana Natural Park

For boat trips there are two jetties (Casa Comana and Lebăda), there is a boat (capacity of 20 seats) and various light boats that can be used for walks on the Comana pond.

Comana pond can also be used for fishing, there are several places arranged (for example, inside the resort Casa Comana).

The Paper Mill - Crafts Village from Comana Ensemble is also remarkable, which aims to revive, preserve and pass on Romanian and universal manufacturing traditions (handmade paper, bookbinding, manual printing, seven traditional crafts within the Crafts Village: loom weaving, rush weaving, blacksmithing, pottery and ceramic modelling, woodworking, milling, processing of vegetables, fruits and medicinal plants).

The most common categories of visitors encountered in the park are the following:

Weekend visitors spending their free time in natural areas for picnic recreation and walking. The preferred places are in the forest bodies Călugăreni, Fântânele, Comana, Măgura or near the forest, near the Comana pond or near the river as close as possible to a road with direct access to a county or national road. Specifically, the favourite places to spend time in the middle of nature on weekends are Fântâna cu Nuc, Strâmba (La Anin) and Măgura, locations that meet all the requirements mentioned above. The core activity revolves around spending time outdoors, engaging in sports and relaxation. People in this category are residents of Bucharest mainly or in nearby areas who either through acquaintances or relatives have known the places and prefer them, coming here frequently.

Visitors interested in nature, especially the forest, Balta Comana and bird species. At the heart of these visitors' attention is information and protection related to comprehensive protection areas. They found out about the Comana Natural Park from the promotion made on the internet or through leaflets, from the awareness actions carried out together with various institutions, schools or non-governmental organizations with which the Comana Natural Park Administration works.

Visitors who practice scientific tourism in trips organized by universities and research institutes or in scientific research activities carried out by specialists. The location for this category is mainly the integral protection area, namely the reservations, where the specific flora and fauna can be studied. These visitors may include specialists from the Institute of Biology who studied elements of flora in the Comana Natural Park, numerous non-governmental organizations interested in studying species with special representation in the Comana Natural Park and specialists from Bulgaria interested in geological studies.

Pupils and students in camps and excursions organized on their own or in collaboration with the Comana Natural Park Administration. Together with the schools in the park, non-governmental organizations, extracurricular education institutions, numerous events were organized, greening actions, public awareness actions in which participated students belonging

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to age groups 8-18 years and students at specialized faculties. A special category in this group is represented by those interested in practicing different sports outdoors, but also by those who choose to carry out the activities of the School differently in the area of the Comana Natural Park. For this last category, the activities with the representatives of the Comana Natural Park Administration, those from the Paper Mill - Crafts Village Ensemble and those from the Adventure Park are the most frequent.

Amateur fishermen who practice sport fishing in the permitted areas. The existence in the area of artificial or quasi-arranged watercourses and ponds attracts enthusiasts of sport fishing during the period allowed by law.

Visitors who practice hunting organized in accordance with the law and delimited as a location by hunting associations, on the hunting floors managed in the park. Hunting in the area is a well-established tradition, the proximity to Bucharest facilitating the access of even foreign hunters attracted by the existence of exceptional specimens in terms of the score obtained over time by the medal trophies.

According to the estimates made by the Comana Natural Park Administration during 2018, it is estimated that the number of people who visited the Comana Natural Park was approximately 30,000.

Visitors generally stay in the area for 1-3 days, usually on weekends, but there are more and more cases when they spend a whole week or more, especially during the holidays.

Figure 9 Comana Natural Park visiting infrastructure

Visitors who practice picnic tourism generally come from Bucharest (80%), Giurgiu (10%) and from the communes adjacent to the park (10%), in most cases with personal cars, coaches on organized trips, bicycles or means of public transport. Those looking for recreation in the middle of nature come on a trip by bicycle or public transport.

In conclusion, the peculiarities of tourism in the Comana Natural Park are related to some factors specific to the area:

- The existence of attractive natural and cultural-historical values for visitors;
- Neighbourhood of large urban centers; Bucharest, Giurgiu and Ruse from the neighboring country - Bulgaria, is another feature of the Comana area.
- Tradition in biology research conducted in the area;
- The tradition of hunting and fishing;
- The existence of an infrastructure still underdeveloped, given that there are currently not many adequate, modern accommodation spaces and also few facilities for the development of equestrian tourism and cycling.

Inventory study - detailed mapping of the population of jackals and alien - invasive plant species, as well as habitats of community interest, in the context of species mobility, in the Comana Natural Park;

SUMMARY

Inventory report - detailed mapping of alien invasive vascular plant species in the Comana Natural Park

Following the geobotanical research carried out in the Comana Natural Park 45 species of alien invasive vascular plant species have been identified.

They are presented in a systematic order, and not by invasive energy and its effects.

The rapid development of trade, tourism, transport and human travel in the last century has dramatically intensified the spread of invasive plant species, allowing them to cross natural geographical barriers. Invasive species are some of the main threats to agrobiodiversity, causing very high losses in agricultural production. Invasive plants also have a negative impact on silviculture, and can affect the entire natural heritage of the country. Some species can even affect the health of the population, such as *Ambrósia artemisiifólia*, which causes severe allergies. In the last decade, new invasive plant species have been reported on the Romanian territory, present especially in segetal and ruderal habitats.

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Figure 10 Ailanthus in UP V Măgura, in habitat 91M0*

Intensive anthropogenic activity, but not only, has caused the invasion of allochthonous (non-native, alien) species in natural and semi-natural degraded ecosystems in our country.

Invasive plants are one of the current threats to biodiversity, with an impact that can become major and irreversible, leading to habitat damage and on a larger-scale damage to ecosystems, unbalancing species relations and even leading to the extinction of native species.

The Romanian blacklist includes 435 taxa, included in 82 families. In December 2003, at the initiative of the Council of Europe, the Standing Committee of the Bern Convention adopted the European Strategy on Invasive Species (Genovesi & Shine, 2004). More recently, in 2014, Regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species was issued, which has become mandatory for all Member States from 1 January 2015.

The invasive taxa identified in the perimeter of the Comana Natural Park are divided into two large groups: woody - 7 species and grassy - 38 species.

The invasive non-native woody plants identified in the Comana Natural Park are: *Acer negundo, Rhus typhina, Ailanthus alissima, Morus alba, Juglans nigra, Amorpha fruticosa, Lycium barbarum.*

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Figure 11 *Amorpha fruticosa* - Crucea de Piatra area

The invasive non-native herbaceous plants identified in the Comana Natural Park are: *Azolla filiculoides, Consolida ajacis, Phytolacca americana, Portulaca oleracea, Amaranthus deflexus, Amaranthus albus, Amaranthus powellii, Amaranthus retroflexus, Reynoutria japonica, Oenothera biennis, Oenathera glazioviana, Oxalis corniculata, Oxalis stricta, Parthenocissus quinquefolia, Euphorbia marginata, Abutilon theophrasti, Echinocystis lobata, Sicyos angulatus, Datura wrightii, Datura stramonium, Cuscuta campestris, Veronica persica, Ambrosia atemisiifolia, Erigeron annuus, Conyza canadensis, Galinsoga quadriradiata, Bidens frondosa, Artemisia annua, Xanthium orientale, Xanthium spinosum, Coreopsis tinctoria, Cosmos bipenatus, Galiardia pulchella, Helianthus tuberosus, Iva xanthiifolia, Solidago canadensis, Hemerocalis fulva, Juncus tenuis, Panicum miliaceum, Panicum capillare, Sorghum halepense.*

Some species identified in it develop explosively, even building well-defined plant communities. These are quite common in the reviewed territory. Many vegetal communities built by invasive species with exuberant development in the researched territory have been identified. Most invasive species identified are ruderal. A large part of them were introduced directly, intentionally, for ornamental and forestry purposes, especially by the staff of the Forestry Ranges in the area. We consider that this has a very negative impact on the natural and semi-natural ecosystems of the researched territory, considering the fact that the intentional introductions of certain species were not done correctly and the potential impact on biodiversity

was not taken into account. Other species have been introduced unintentionally, but we consider this to be a consequence of human negligence, especially when phytosanitary regulations are not followed.

Figure 12 *Parthenocissus quinquefolia* - Islaz Comana

It should be noted that in the studied area it was found that the degree of connectivity and invasiveness can increase in some species due to the fact that the locals cultivate for ornamental purposes certain invasive species: *Oenothera biennis, Euphorbia marginata, Cosmos bipinnatus, Hemerocallis fulva, Coreopsis tinctoria, Rhus typhina, Rudbeckia laciniata, Solidago canadensis*, which then spread very easily.

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Inventory report and mapping of the distribution area of the Canis aureus species in the Comana Natural Park

Considering the size of the Comana Natural Park and the overlapping protected natural areas, respectively the biology and ecology of the jackal, it is expected that the families present in the protected natural area will use territories significantly larger than the surface of the protected area.

The average density of jackal families reported for habitats similar to those in the Comana Natural Park is between 0.46 - 2.64 families/10 km² (Banea et. al. 2012; Šálek et al. 2013). A 2012 study identified a density of about 1.41-1.74 jackal families/10 km² in the hunting grounds of Giurgiu County, located at a distance of about 15 - 20 km from the eastern limit of the Comana Natural Park (Banea et al. 2012).

The potential distribution area of golden jackal in Comana Natural Park is about 204 km2, so considering the densities previously reported and those identified as a result of field activities in this project, the golden jackal population is estimated at about 32 families, made of about 64 adults and about 90 to 120 juveniles or youngsters.

Figure 13 Jackal imprint in the saddle at the edge of Ciompu forest in Comana Natural Park

The presence of the jackal in the Comana Natural Park is approximately uniform. However, we notice a higher density of signs of presence and also of families in the following areas: the north-eastern part of the park, the right bank of Neajlov, the Strambeasca Forest and

the neighboring agricultural lands, the Călugăreni Forest; northwest of the park, the confluence of Neajlov and Argeş in Comana Forest, the southern half of the protected natural area: Mihai Bravu forest and neighbouring agricultural lands, Ciompu Forest with Valea Cucului and the surrounding agricultural lands, Puieni - Prundu area with Puieni Deal, Valea Nichitei, Valea Barbului and the neighbouring areas and in the extreme west of the protected area: Măgura Forest, mainly the shore areas of the facilities on pr. Zboiu and the edge of the forest.

The northern area of the Comana Natural Park with the Comana Pond and the left bank of the Neajlov do not represent the preferred habitat of the *Canis aureus* species in the site.

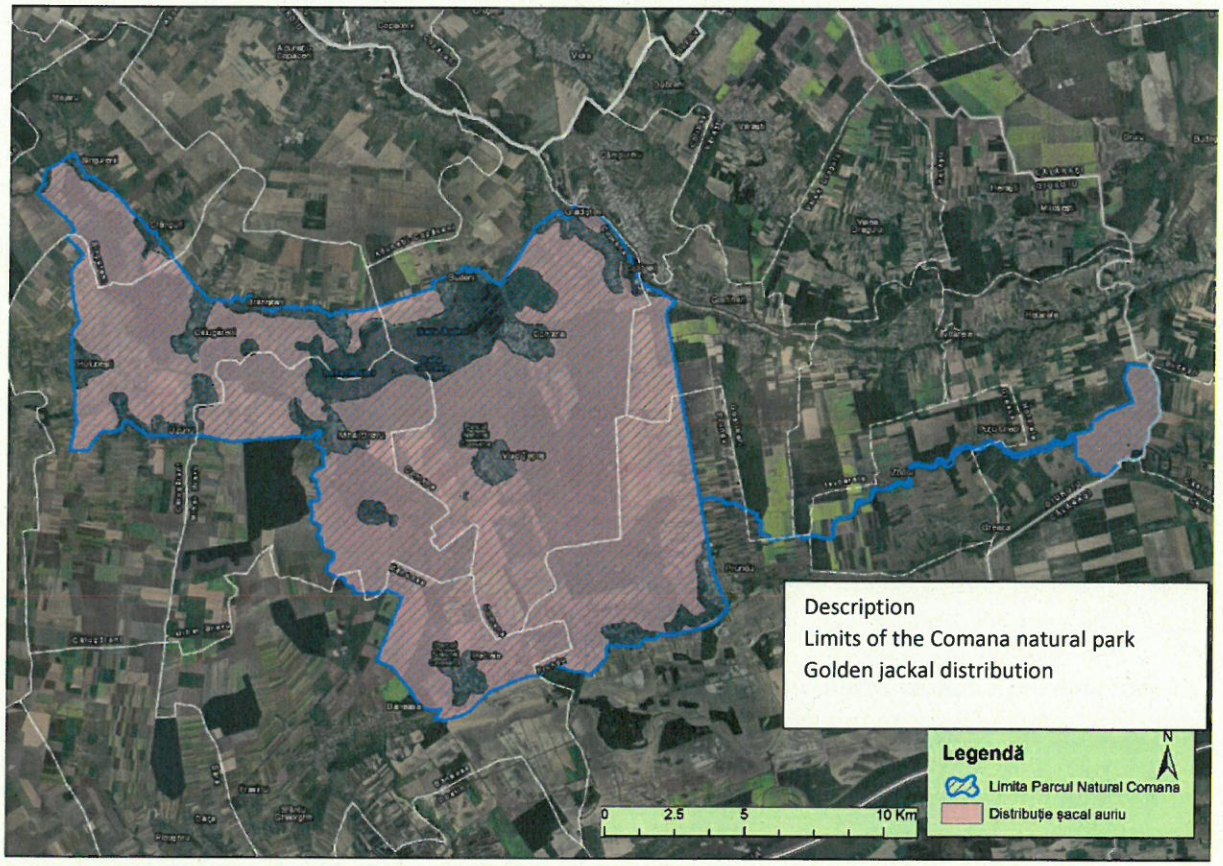

Figure 14 Map of the distribution of *Canis aureus* species in Comana Natural Park

We notice a higher density of signs of presence and also of families in the following areas: the north-eastern part of the park, the right bank of Neajlov, the Strambeasca Forest and the neighboring agricultural lands, the Călugăreni Forest; northwest of the park, the confluence of Neajlov and Argeş in Comana Forest, the southern half of the protected natural area: Mihai Bravu forest and neighbouring agricultural lands, Ciompu Forest with Valea Cucului and the surrounding agricultural lands, Puieni - Prundu area with Puieni Deal, Valea Nichitei, Valea Barbului and the neighbouring areas and in the extreme west of the protected area: Măgura Forest, mainly the shore areas of the facilities on pr. Zboiu and the edge of the forest.

The presence of the jackal was signalled in the field, in a complex of ecosystems present in the vicinity of the Neajlov river, from its entrance in the protected natural area, north of the Singureni forest body and near the area where it flows into the Argeș river. Also, in the forest bodies located between the localities of Comana, Mihai-Bravu, Prundu and Puieni, as well as in the forest body of Măgura, the jackal is signalled in the remaining forest ecosystems in semi-natural regime. If in the case of the meadow area, the seasonal conditions are very uneven, ranging from white poplar Frasinet and Plopis, highly productive, located on dead waterless branches in summer, to forests dominated by *Alnus glutinosa*, mixed with ash and willows, in areas where water persists throughout the year, in areas with quercinea forests, from the transit area from the stalks with pedunculate oak to the one with cereto-garnitet and fluffy oak, in a region with a rather xeric climate, they are relatively uniform, permanently having a dense undergrowth necessary for camouflage. At the same time, the jackal is present in the forest body belonging to the Production Unit IV - Islaz, taking advantage of the special local humidity conditions, created by the northern exposure of the terrace towards Lunca Câlnișteі. In the forest body from the Production Unit V - Padina Tătarului are reported concentrations of jackals in quiet areas, lacking forestry works, represented by the Forest Peony Reservation and the Integral Protection Area of the park - Puieni.

Knowing that the golden jackal prefers reeds, a significant period in a year, located near lakes or ponds can be concluded, as well as based on data obtained from the field, on its presence and behaviour on the surface of the Comana Natural Park, we can restrict significantly the area where it can be observed during the breeding period of the youngsters. These areas are represented by surfaces located in the vicinity of the forest floor, being covered with spontaneous woody vegetation (especially acacia, pigeon, rosehip, hawthorn and liana), difficult to access during the growing season. The targeted areas are located in the eastern part of the forest body from Production Unit IV - Islaz and a naturally forested area, which is located between the forest body Puieni (from UP V Padina Tătarului) and Puieni locality, the area being named by locals Valea Nichita.

The average density of jackal families reported for habitats similar to those in the Comana Natural Park is between 0.46 - 2.64 families/10 km² (Banea et. al. 2012; Šálek et al. 2013). A 2012 study identified a density of about 1.41-1.74 jackal families/10 km² in the hunting grounds of Giurgiu County, located at a distance of about 15 - 20 km from the eastern limit of the Comana Natural Park (Banea et al. 2012).

The potential distribution area of golden jackal in Comana Natural Park is about 204 km2, so considering the densities previously reported and those identified as a result of field activities

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in this project, the golden jackal population is estimated at about 32 families, made of about 64 adults and about 90 to 120 juveniles or youngsters.

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Information selection - Rusenski Lom Natural Park

During this stage, all the reports/studies that were carried out within the project for the area found on the Bulgarian territory, namely the Rusenski Lom Natural Park were taken into account and used, considering the fact that these studies/reports were prepared by interpreting the data from the field and the selection of relevant data.

Each of the outputs of the project, which targeted the Rusenski Lom Natural Park, were addressed in this report so that for each of them the obtained main information was presented.

Study of alien-invasive plants of the Rusenski Lom Natural Park area; SUMMARY

The presence of numerous settlements in the area of the Rusenski Lom Natural Park and its location among man-made arable lands, makes it particularly vulnerable to the invasion of non-native invasive species.

The dense network of roads, the Danube valley, the Rusensky Lom river and its connection with the Danube river provide "favourable" corridors for the invasion and spread of invasive species. An additional element of the local flora, in Lomov are the acacia crops created in the past.

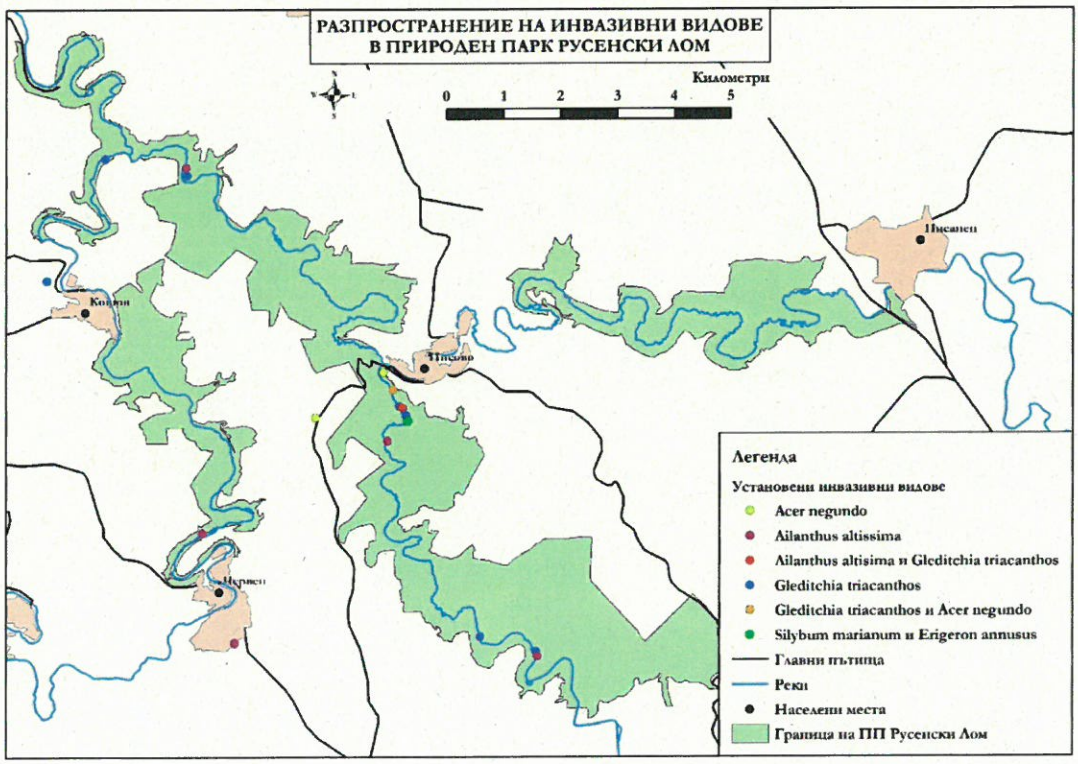

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Figure 15 Map of the distribution of invasive species in the Rusenski Lom Natural Park

On the territory of Rusenski Lom Natural Park were identified 7 species of invasive trees and shrubs, of which 4 belong to the category of the most dangerous invasive plants. Another 3 species are conditionally classified as "slightly invasive" and occur as an accidental element along roads, in riparian habitats or near crops.

There are also 6 species of invasive herbaceous plants in the Natural Park, of which 2 species belong to the category: "most dangerous invasive plants." The rest are categorically classified as: "slightly invasive", although one of them (*Erigeron annuus*) should also be classified at regional level as belonging to the category: "most dangerous invasive plants" due to its widespread distribution and significant degradation of the quality of riparian grassland habitats.

List of invasive tree and shrub species in the Rusenski Lom Natural Park.

№	Species	Origin	Use and introduction	Category
1.	*Acer negundo* L.	North America	decorative plant;	strongly invasive
2.	*Ailanthus altissima*	China	decorative plant;	strongly invasive
3.	*Amorpha fruticosa* L.	North America	To reduce erosion on sloping flanks; Decorative and honey plant;	strongly invasive
4.	*Gleditsia triacanthos* L.	North America	forest crops; Decorative and honey plant;	slightly invasive
5.	*Lycium barbarum* L.	China	decorative plant;	slightly invasive
6.	*Parthenocissus quinquefolia* (L.) Planch.	North America	decorative plant;	slightly invasive
7.	*Robinia pseudoacacia* L.	North America	forest crops; Honey plant;	strongly invasive

List of invasive herbaceous species in the Rusenski Lom Natural Park.

№	Species	Origin	Use and introduction	Category
1.	*Bidens frondosus* L.	North America	Unintentionally introduced	strongly invasive
2.	*Erigeron annuus* (L.)	North America	Unintentionally introduced	slightly invasive
3.	*Erigeron canadensis* L.	North America	Unintentionally introduced	slightly invasive

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4.	*Paspalum distichum* L.	Tropical Africa and America	Unintentionally introduced	slightly invasive
5.	*Phytolacca americana* L.	North America	Deliberately introduced; technical plant	slightly invasive
6.	*Symphyotrichum novi-belgii* (L.) G.L. Nesom	North America	Deliberately introduced decorative plant	strongly invasive

Features of invasive species established in the Rusenski Lom Natural Park

Acer negundo (American Maple)

The American maple is most commonly found along paved roads that connect villages in the Rusenski Lom Natural Park. It was established in the section between Svalenik village and Nisovo village (because the densest population is formed at the descent of the road before Nisovo village), in the section between Ivanovo village and Ivanovo rock churches and between Cherven village and Cherven fortress. Although less common, it also enters natural habitats in the Rusenski Lom Valley, where it is established between the village of Nisovo and the Malak Nisovski Monastery, near the Park Visitor Center and in the area between Ivanovo and other places.

The species is found both in the periphery between oak forests and riparian meadows (where soil moisture is favourable) and in the composition of riparian forests in natural habitat 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salnion incanae, Salnion incanae albae). In the Rusenski Lom Natural Park, the first floor of the trees in the Forest Habitat 91E0 consists mainly of *Salix alba*, whose proportion of occurrence is between 4 and 6 tenths. The species *Salix triandra*, *Ulmus laevis* and *Ulmus minor* appear individually in the composition of the tree or with a share of up to 10%. The latter are gradually displaced by the Yasenolistovo maple, which in some places reaches 25% on the first and second floors, which breaches the natural character of this habitat. Another disadvantage of this invasive species, although to a lesser extent, is the decrease in the area of riparian meadows in the natural habitat 6510 Plain hay meadows.

The main vectors for the spread of the species are the road network in the Rusenski Lom Natural Park, where the invasion most often affects the easement of the road. The species also quickly captures meadows. In natural habitats the dissemination of the American maple is carried out by the wind, as well as to some extent by the waters of the Rusenski Lom River.

Ailanthus altissima (ailanthus)

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The ailanthus is most often found individually or in strips along paved roads connecting the villages of Rusenski Lom or at the edge of settlements. It is located in the section between the villages of Svalenik and Nisovo, the most significant being the population on the descent of the road before the village of Nisovo and at the western end of the village of Nisovo above the bed of the river Beli Lom. Separate solid clusters were recorded south of Cherven village (along the dirt road for telecommunication operators' antennas), near Cherven fortress, at the exit of Nisovo village to Shtraklevo village and along the Mali Lom river (at the beginning of the route to the Golyam Nisovski monastery and in the section between the village of Svalenik and the pumping station). Trees alone are also found in the section between Ivanovo village and Ivanovo rock churches and between Cherven village and Cherven fortress.

Ailanthus is often found as a single tree in gallery-like riparian forests as part of natural habitat 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae). The increase of its share in the composition of these forests leads to the gradual movement of the typical tree species and to the modification of the natural aspect of this habitat.

Another habitat directly affected by ailanthus is habitat 8210 hazmophytic vegetation along the rocky limestone slopes. The dense growths above the holes in the Mali Lom river valley are on rocky terrain, the species settling in the cracks along the rocky outcrops, except for the base of the rocks. With its aggressive rhizomes, the ailanthus causes the destruction of the rock mass, and with its crown shadows the typical rock plants, most of which are usually heliophiles (needing light), thus changing the composition and natural appearance of the habitat.

Figure 16 Excessive growth of ailanthus (*Ailanthus altissima*) along rocky habitats along the Mali Lom River near the village of Nisovo.

The extension of the ailanthus affects, to some extent, the habitat 6110 * Open calcic or basilic meadows made of white Alysso-Sedion, which occupy more or less flattened rocky areas, near the edge of the rock. On the one hand, the location of species on open rocky slopes results in shading and thus changing the composition of the specific species, and on the other hand, there is a potential threat to some species of conservation plants in this habitat, such as: *Polygala sibirica, Verbascum dieckianum* and *Genista tetragona.*

The main vectors of ailanthus dispersal are the road network in the Rusenski Lom Natural Park, where the invasion most often affects the easement of the road. In natural habitats, the movement of ailanthus is carried out by the wind and, to a certain extent, by the waters of the Rusenski Lom River.

Amorpha fruticosa (desert false indigo)

Desert false indigo is one of the most widespread invasive species in the Rusenski Lom Natural Park. It is most commonly found along paved roads connecting villages in the Rusenski Lom Natural Park. It is established in the section between the village of Svalenik and the village

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of Nisovo, where in some places it forms dense bands impassable along the road and even exceeds it. Similar dense galleries were formed along the road in the section from Cherven village to the branching for Nisovo and Svalenik and in the section for Nisovo-Batakliya-Svalenik village. The desert false indigo species has settled permanently in some of the natural habitats in the Rusenski Lom valley, the most affected being the riparian galleries of the habitat 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae), Salicion albae. Alone or in small groups, the species is found throughout the Rusenski Lom river valley. Being a light-needing species, the amorphous has successfully settled along the Lomov riverbed, in places where there is no riparian forest or where the riparian forest has a very weak structure. Rarely, the species can capture riparian grass cenosis from the habitat of 6510 plain hay meadows, leading to a decrease in its area.

The light fruits of the desert false indigo are easily spread through the waters of the Rusenski Lom River, which is the main vector of the distribution of species on the territory of the Rusenski Lom Natural Park. To a lesser extent, the species is carried by wind and animals.

Gleditsia triacanthos (honey locust)

The honey locust is found as a single tree, most often along the roads that connect the villages in the Rusenski Lom Natural Park. It was observed in the sections of the rocky churches Nisovo-Svalenik, Nisovo-Batakliya - Svalenik, Ivanovo-Koshov and Ivanovo-Ivanovo. Like the single trees, the species is found in riparian meadows and riparian forests in many places in the Rusenski Lom Valley. It was established along the Mali Lom River in the section from the village of Svalenik to the pumping station and from the village of Nisovo to the Golyam Nisovski Monastery, along the Beli Lom River in the Obretenka area. The invasion of this species has been low so far. Habitats such as: 6510 Plain grasslands and 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) are minimally affected.

Birds and mammals are the main vectors of propagation of the honey locust, which feed on its fruits and transport them over long distances. Another vector is humans, through the cultures created in the past.

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Figure 17 *Gleditsia triacanthos* along the riparian grasslands of the Mali Lom river valley.

Lycium barbarum (Chinese wolfberry)

It grows in grassy areas, along roads, rivers and settlements. On the territory of Rusenski Lom, Merdjana is found mainly in deserted places near the settlements, as it was probably cultivated in gardens and later became wild. Overall, its invasion is weak. It minimally affects riparian habitats 6510 Plain hay meadows and 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae). As it prefers sunny places, it is housed in riparian forest galleries with a disturbed structure or small cover.

The main vector of distribution is the humans who cultivate Chinese wolfberry in rural gardens, and the secondary vector of movement is the animals that feed on its fruits and transport it over longer distances.

Parthenocissus quinquefolia (Canadian vine)

It occurs in forest edges, abandoned and disturbed habitats, rocky places, along the fences and walls of buildings, along roads, railways, arable land.

In the Rusenski Lom Natural Park it is found mainly near settlements and mainly on rocky terrain. It affects habitat 8210 Hasmophytic vegetation on rocky limestone slopes.

preferring sunny rocky outcrops, but can also be found in shady areas where it competes with ivy. Thick, overgrown vines that endanger and gradually displace the local hemophytic flora. The invasion of this species in the Rusenski Lom valley is still weak, but timely monitoring should be carried out to protect the vulnerable rocky terrain.

Figure 18 *Parthenocissus quinquefolia* in rock habitats in the Rusenski Lom valley

Robinia pseudoacacia (acacia)

An extremely dangerous invasive species, occupying large areas of the country, which has led to the suppression of the development and destruction of natural flora and vegetation, as well as the irreversible loss of habitats currently occupied by acacia. Acacia is the most widespread invasive species in the Rusenski Lom Natural Park. On its territory there are large areas occupied by acacia crops created in the recent past, areas that could be ecologically restored, through the reconstruction of oak habitats in the Cera-Gorun 91M0 Balkan-Pannonian forests and Euro-Siberian steppe forests 91I0 * with Quercus spp.

Acacia is also abundant along the road network that connects the settlements in the Rusenski Lom Natural Park and especially in the Svalenik-Nisovo and Nisovo-Shtraklevo sections. On the edge and on the outskirts of the settlements, acacia also invades along with the ailanthus. Changing soil conditions and, in particular, the high nitrogen content, where acacia grows, make it difficult to restore native vegetation.

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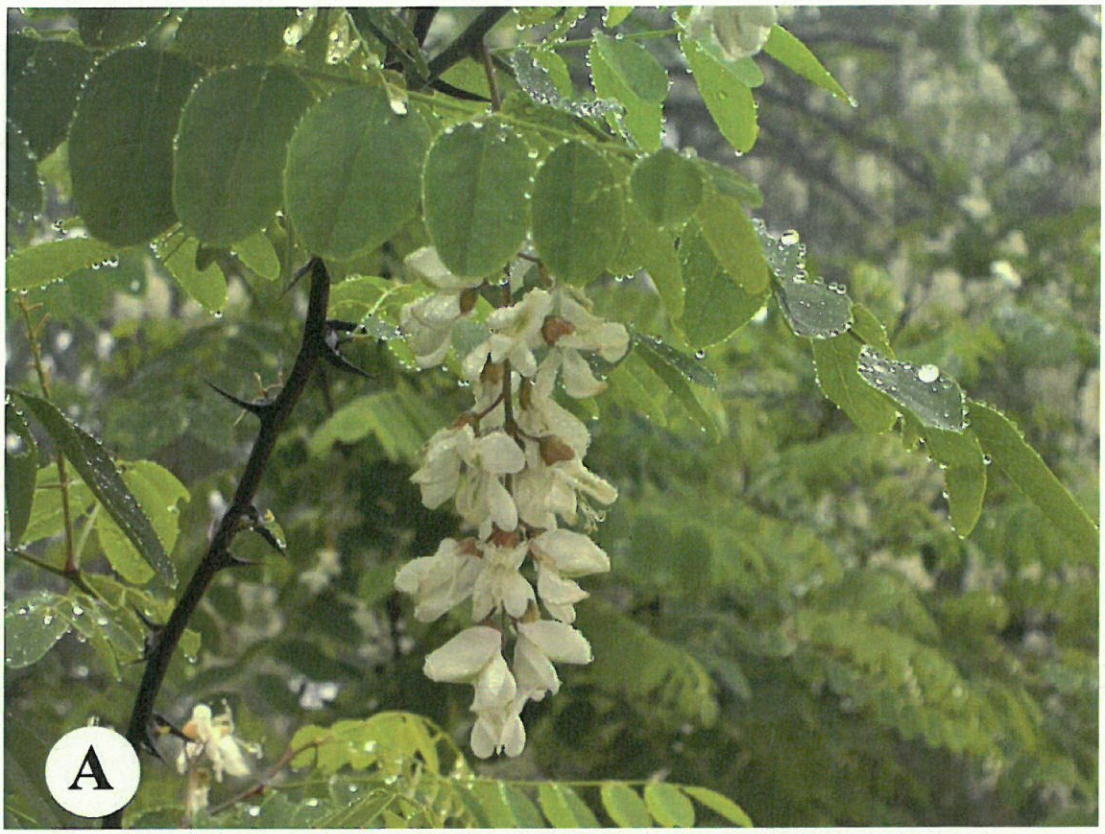

Figure 19 Acacia in the Rusenski Lom Valley

Bidens frondosus

It grows in wet places along canals, rivers, wetlands, dams, railways and roads, wasteland.

As a typical hygrophyte, the species *Bidens frondosus* is found everywhere in riparian habitats in the Rusenski Lom river valley. It is most often an element of soil cover in the forests of the natural habitat gallery 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae), but generally prefers illuminated river sections or riparian forests.

Occasionally, the habitat 6510 plain hay meadows can penetrate some of the wetter areas of the habitat. It grows with the native species *Bidens tripartitus*. At present, no dense outcrops have been observed, which are characteristic of the Danube coast.

The main distribution vector of the *Bidens frondosus* species is the river course of the Rusenski Lom River, which spreads easily through light seeds. Due to the strength of its fruits, it is attached and displaced by animals and humans, which are a secondary vector of distribution of the species.

Erigeron annuus

In Bulgaria, it occurs in forests, meadows, pastures, abandoned arable land, near settlements, roads and railways, embankments, dams, terraces on the river.

In the Rusenski Lom Natural Park, the species is found in moderately moist riparian pasture communities in the habitat of 6510 hay meadows. The common composition of the species of this habitat includes the species *Festuca pratensis*, *Alopecurus pratensis* and *Arrhenatherum elatius*, but in many places their share is significantly reduced, to about 30%, while the daisy fleabane sometimes reaches 50%. This deterioration of the typical character of the habitat can be overcome only by restoring the grassland regimes of these grasslands, which will reduce the share of annual species. Although less abundant and dense, the American species is found in some dry meadow habitats 6210 Semi-natural grass and shrub communities and 6210 Semi-natural dry meadows and facies with bushes on calcareous substrate *(Festuco - Brometalia)* (* major habitats of orchids) and 6240 * sub-steppe meadows.

The main vectors for the distribution of the daisy fleabane are the course of the Ruse Lom River and the wind, which easily transports light seeds. Secondary the vector of distribution of the species are animals and humans. Human multiplication can be achieved both by means of transport and by contamination/mixing of the seeds of cultivated plants with the small and discreet seeds of daisy fleabane.

Erigeron canadensis (horseweed)

The Canadian species is found predominantly in man-made or severely disturbed habitats - wasteland, abandoned and untreated along roads, railways, settlements, crop weeds, vineyards, gardens, fodder crops, heavily used pastures, sand dunes, floodplains on the river bank and others.

In the Ruse Lom Natural Park, the horseweed is found mainly on the outskirts of settlements and in abandoned arable land. As for the native vegetation, it affects, although to a lesser extent, the riparian meadows of the habitat 6510 Low altitude meadows (*Alopecurus pratensis, Sanguisorba officinalis*). As a richer and more drought tolerant species, it can also enter the dry herbaceous phytocoenoses of 6210 Semi-natural dry meadows and facies with shrubs on calcareous substrate (*Festuco - Brometalia*) (* important orchid habitats) and 6240 sub-steppe communities.

The main vector for the spread of horseweed is the wind. Humans and animals can also help move seeds.

Paspalum distichum

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On the territory of the Rusenski Lom Natural Park, the species *Paspalum distichum* is found in natural and semi-natural hygrite grasses and hydrophytes. One of the affected habitats is 3150 natural eutrophic lakes with *Magnopotamion* or *Hidrocharition vegetation*, which occupy the periphery and the water surface of the fish farms in the village of Svalenik. The second threatened habitat is 7220 hard water springs, with tufted formations, which have a punctual distribution in the valley of the Mali Lom river. Thick aquatic thickening leads to changes in the optimal composition of species and the movement of native species, thus degrading the quality of these vulnerable aquatic habitats.

Phytolacca americana (pokeweed)

The pokeweed is most often found on the outskirts of settlements, probably cultivated as a garden plant where it has become wild. In riparian habitats in the Rusenski Lom river valley, it is most often an element of land cover in the forests of the natural habitat gallery 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae), but in general it preferred illuminated sections of river or plain river forests. Sometimes the pokeweed can also enter the habitat of 6510 meadows of plain hay, but, in general, its invasion is weak and usually appears as a single plant or grows in small groups.

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Figure 20 Pokeweed in the Rusenski Lom Natural Park

The main distribution vector is the birds that feed on the fleshy fruits of the pokeweed. Man also contributes to his movement, as it has decorative qualities and people cultivate it in their gardens. Mechanical removal before ripening of fleshy fruits is the safest way to combat this invasive species.

Symphyotrichum novi-belgii (New York aster)

The species occurs along rivers and canals (in meadows and at the edge of alluvial forests), vats, gardens, abandoned arable land, railway lines and roads.

As a typical hygrophyte, the New York aster is found everywhere in riparian habitats in the Rusenski Lom river valley. It is most often an element of soil cover in the forests of the natural habitat gallery 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae), but generally prefers illuminated river sections or riparian forests. Occasionally, the habitat of 6510 plain hay meadows can enter some of the wetter areas of the habitat. At present, no dense outcrops have been observed, which are characteristic of the Danube coast.

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Figure 21 *Symphyotrichum novi-belgii* in riparian habitats in the Rusenski Lom river valley

Management plan (updated) of the Rusenski Lom Natural Park.

SUMMARY

In line with international best practices and the requirements of European and Bulgarian legislation, this management plan sets out the vision for land use, nature protection and ecologically sustainable social and economic development, shared by the main stakeholders in the protected area and adjacent territories.

Therefore, the management planning process included a series of meetings and actions, namely:

- the administration, which is able to implement the management plan in terms of competent staff (in terms of number and skills) and resources (equipment, current expenditure and capital expenditure);

- the mechanism of active participation of stakeholders, involving all levels of management: state, local and civil society;

- encouraging the community and small and medium-sized enterprises, which would organize the use of natural resources in territories in an environmentally sustainable way;

- a sound internal and external monitoring system using key ecological, social and economic indicators, as well as those from the environmental sphere, in order to be able to assess the achievement of the park's managerial vision and whether it meets national and international perspectives.

Management planning is not an isolated process. The park was established in 1970 in order to protect the unique nature of the picturesque canyon valleys of the Lom rivers in combination with the cultural and historical complex Cherven - Ivanovo.

For this reason, the Management Plan is fully in line with the location of the park in a border area and cross-border cooperation with neighbouring institutions in Romania. In line with many international, national and local commitments made by Bulgaria in recent years and especially after 2007 as a member of the European Union, we have developed a number of proposals for accessing complementary EC funding for sites that are specially protected areas part of the NATURA 2000 network.

At local level, the Management Plan addresses issues such as regional development programmes, sustainable agriculture, the application of forestry practices, pollution limitation, protection of cultural heritage, and the development of tourism and recreation.

MISSION

The preparation of the management plan was preceded by an official mission, adopted by the Bulgarian Ministry of Environment and Water in 2016. It sets out the scope and content of the plan. The content and structure are in accordance with the Ordinance for the elaboration of management plans for protected areas (Decree of the Council of Ministers of 8.02.2000, published in the State Gazette No. 13/15.02.2000, amended and supplemented by the State Gazette No. 55/20.07 .2012) and common European standards for the planning of protected areas within the European environmental network NATURA 2000.

Figure 22 Map of the Danube green corridor and Comana and Rusenski Lom Natural Parks

STUDIES AND INVOLVEMENT OF STAKEHOLDERS

The management plan is a result of studies and planning designed between April 2019 and November 2019.

The overall management planning process for the Rusenski Lom Natural Park has placed a strong emphasis on stakeholder involvement in all planning phases. The main users of the tender results are: Rusenski Lom Nature Park Directorate, a specialized structure of the Executive Forestry Agency; the Executive Forestry Agency itself; regional forestry in Ruse; Central-Nordic State Forestry Enterprise, Gabrovo State Enterprise; Dunav - Ruse state hunting domain; Ministry of Environment and Waters; Regional Inspectorate of Environment and Waters - Ruse; Pleven Basin Directorate; Ivanovo Municipality; Vetovo Municipality; Ruse Municipality; Ruse District Administration; Bulgarian Academy of Sciences; academic communities; tourism, cultural and educational institutions, NGOs and others. Among the participants were the owners and users of land in the park, as well as representatives of non-governmental tourism and environmental organizations and others.

The management plan of the Rusenski Lom Natural Park aims to contribute to increasing the added value of the park as a result of tourism development, efforts in ecological education for children and young people, provision of ecosystem services by forests - clean water, preserved biodiversity, unpolluted air.

BASIC FEATURES AND ASSESSMENTS

ABIOTIC FACTORS

This part includes data on climate, geology, geomorphology, hydrology, hydrobiology and soils. To characterize abiotic factors, we first used existing studies.

ECOSYSTEMS AND BIOTOPES

For the classification of ecosystems, we used the EUNIS classification system, and the plant communities were presented using the floristic method.

Appropriate habitat types have been inventoried to establish climate change monitoring.

VEGETATION

The information on the features of the forest vegetation is according to the current Forest Management Plan of the state hunting property Dunav - Ruse and the GIS database of the Rusenski Lom Natural Park itself.

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FLORA

The phyto-geographical structure of the flora reflects the specific geographical location, the impact of the bedrock on the environmental factors and the historical development of the vegetation in the area.

FAUNA

Studies, reviews and assessments of wildlife species and their habitats are the basis for defining significant territories for the protection of certain groups of animals, which in turn has helped to correctly define the regimes and rules for the protection of species in the park.

CULTURAL, SOCIAL AND ECONOMIC FEATURES

This characteristic is directly related to the use of resources in the park, respectively to the way of life and thinking of the people in the area. In this task, we selected an approach to the long-term vision for the future of the park, including:

(a) improving local, national and international conservation principles and standards;

(b) clarifying exactly what is protected and demonstrating how the condition and quality of the park will be maintained and improved;

(c) acceptance by all users of the territory in social, economic and nature protection aspects;

(d) a presentation of how the protected area will contribute to improving the daily lives of the locals.

LONG-TERM GOALS AND LIMITATIONS

LONG-TERM GOALS

During the updating of the plan, the setting of goals was made based on the potential opportunities of the territory described in p.2.4. The established ideal goals can be used as indicators for achieving those opportunities (part 5). The evaluations by the experts from the project team were taken into account, as well as the results of the discussions with the stakeholders during the series of meetings.

This plan for the development of the Rusenski Lom Natural Park by 2030 sets the following long-term goals:

- ✓ Protecting and maintaining biological and landscape diversity.

✓ Achieving a balance between conservation and sustainable use of resources

In turn, the goals (and sub-goals) and limitations were formulated to guide managerial decisions and to ensure specific activities for the next 10 years. In order to achieve the defined goals, a series of programmes and projects have been developed. Each project is formulated based on: (a) the scope; (b) expected results; (c) methodology.

RULES, REGIMES, CONDITIONS AND RECOMMENDATIONS FOR THE IMPLEMENTATION OF ACTIVITIES

The proposed regimes and rules aim at preventing or limiting the impact of identified threats, as well as ensuring the conditions for control and management decision-making.

FUNCTIONAL ZONING OF THE TERRITORY

The management plan of the Rusenski Lom Natural Park establishes the following areas:

Area number	Name of the area and purpose	According to the AP Law, art. 19	Surface ha	% of the park territory
I	Area for tourism and protection of cultural and natural heritage	p. 2	3059.1	87.3
II	Area of buildings and facilities	p. 3	446.8	12.7
Total			3505.9	100

OPERATIONAL TASKS AND PROVISIONS FOR PROTECTION AND USE

PROGRAMMES AND PROJECTS

The purpose of formulating programmes and projects is to lobby and stimulate responsible and environmentally friendly behaviour among all owners and users.

Based on the evaluation of the responsibilities of the park management, the following programmes were defined for the period of the management plan:

I. Programme:	Long-term monitoring of biological and landscape diversity in the Rusenski Lom Natural Park
II. Programme:	Management of forests and agricultural land, aimed at protecting the biological diversity of the Rusenski Lom Natural Park

III. Programme:	Increasing the economic benefits for the local population through the balanced use of Rusenski Lom Natural Park resources
IV. Programme:	Creating the conditions for the development of sustainable tourism in Rusenski Lom Natural Park and its adjacent territories
V. Programme:	Improving the management policy and specialized guarding of the park

Some of the planned projects and activities that will be implemented directly by the administration employees, have been listed in their job descriptions p.4.4 "Operational tasks".

WORK PLAN

The medium-term work plan (for 3 years) includes priority projects that must be carried out right from the beginning of the implementation of the Management Plan. Some priority projects in the programmes for which the park administration needs to raise additional funds have also been included here.

REVIEW OF IMPLEMENTATION OF GOALS AND TASKS

We have considered a review of the management goals defined for the park in the fourth year after its adoption. The review will be based on constant monitoring by park staff and annual reports. A special scheme has been proposed for this process, which defines the participants, the methods of public involvement, a list of indicators for projects and project management activities that must be evaluated in order to achieve the defined goals.

Comparison of information

Rusenski Lom and Comana Natural Parks are located in the lower Danube area, being among the most valuable freshwater ecoregions in the world. The hydrological dynamics of the Danube River, its destructive and constructive forces that are constantly acting, combined with periods when the terraces are completely flooded, the level and variable frequency of water, determine the formation of the lower Danube area, and also the unique vegetation and rich biodiversity.

Both nature parks protect particularly important typical wetlands with a wide variety of elements of conservative interest.

Given the connectivity of these areas along the Danube valley, there are negative effects, such as the spread of invasive alien species, which contributes to the degradation of habitats with high conservation value but also the degradation of the conservation status of protected species.

Figure 23 Map of the study area of the two natural parks and the ecological corridor

Among the studies carried out within this project, the most important common points are found in the studies related to the inventory and mapping of alien invasive plant species in the area of Rusenski Lom Natural Park and Comana Natural Park.

Following the geobotanical research carried out in the Comana Natural Park **and** the Rusenski Lom Natural Park, 51 species of alien-invasive vascular plants were identified.

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The species of vascular plants identified in both natural parks are: *Acer negundo, Ailanthus altissima, Amorpha fruticosa, Lycium barbarum, Parthenocissus quinquefolia, Erigeron annuus* and *Phytolacca americana.*

Some species have been identified as invasive species only in the Rusenski Lom Natural Park, these being: *Gleditsia triacanthos, Robinia pseudoacacia, Bidens frondosus, Erigeron canadensis, Paspalum distichum* and *Symphyotrichum novibelgii*. Although the species *Robinia pseudoacacia* is also present in the Comana Natural Park, it does not show an invasive behaviour.

Some species of invasive non-native woody plants have been identified only in the Comana Natural Park, these being represented by the following species: *Rhus typhina, Morus alba, Juglans nigra.*

The invasive non-native herbaceous plants identified only in the Comana Natural Park are: *Azolla filiculoides, Consolida ajacis, Portulaca oleracea, Amaranthus deflexus, Amaranthus albus, Amaranthus powellii, Amaranthus retroflexus, Reynoutria japonica, Oenothera biennis, Oenathera glazioviana, Oxalis corniculata, Oxalis stricta, Euphorbia marginata, Abutilon theophrasti, Echinocystis lobata, Sicyos angulatus, Datura wrightii, Datura stramonium, Cuscuta campestris, Veronica persica, Ambrosia atemisiifolia, Conyza canadensis, Galinsoga quadriradiata, Bidens frondosa, Artemisia annua, Xanthium orientale, Xanthium spinosum, Coreopsis tinctoria, Cosmos bipenatus, Galiardia pulchella, Helianthus tuberosus, Iva xanthiifolia, Solidago canadensis, Hemerocalis fulva, Juncus tenuis, Panicum miliaceum, Panicum capillare, Sorghum halepense.*

Many of the common invasive species in both protected areas occupy and degrade similar conservative habitats.

For example, ailanthus (*Ailanthus altissima*) is found in the Comana Natural Park and in the Rusenski Lom Natural Park in the habitat of priority community interest 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae). At the same time, this invasive species degrades another habitat of conservation interest in the Rusenski Lom Natural Park (8210) and 3 other habitats of conservation interest in the Comana Natural Park: 91M0*, 92A0, 91I0*.

The extension of the desert false indigo (*Amorpha fruticosa*), affects in both parks the habitat of priority community interest 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae). But sometimes the desert false indigo extends into the Rusenski Lom Natural Park and the 6510 habitat. But in the

Comana Natural Park the species *Amorpha fruticosa* was found both inside and on the edge of four other habitats of conservative interest: 6430, 92A0, 91M0*, 91I0*.

Pokeweed was found in both natural parks on the outskirts of the settlements, but also in the habitat of community interest 91E0 * Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) and 6510 plain hay meadows in the Natural Park Rusenski Lom, and in the Comana Natural Park, in two other habitats of priority conservative interest: 91M0 * and 91I0 *.

The rapid development of trade, tourism, transport and travel in the last century has dramatically intensified the spread of invasive plant species, allowing them to cross natural geographical barriers. Invasive species are some of the main threats to biodiversity and agriculture, causing very high losses in terms of biodiversity and agricultural production in the area of the two natural parks: Rusenski Lom Natural Park and Comana Natural Park, but also along the cross-border ecological corridor that unites them.

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