



Operational plan for IMMP – Grmoščica – Zagreb, Croatia



Imprint

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1 INTRODUCTION	
1.1 The aim and purpose of OP	
<ul style="list-style-type: none"> The aim of OP 	<p>The main goal of operational plan is implementation of selected strategies for urban forest development in the City of Zagreb, on the selected polygon park forest Grmoščica where are the all of the strategic development goals included. Operational plan will present the way of implementation and responsibility of different stakeholders in implementation of objectives pursued.</p>
<ul style="list-style-type: none"> The purpose of the plan 	<p>The goals of the General urban plan in Zagreb (GUP) are protection of historic and natural values and continuous registration and restoration of endangered historical and other city identities like morphological diversity and park forests. City park forests could be improved with management that preserves their natural forest structure and with equipment in favour of recreational facilities as one of the non-wood forest functions. The plan for the focus area management is defined within city bodies' responsible for forest management and protection of specific nature protected areas in city area.</p> <p>Operational plan is a basic document for the company Croatian forest Ltd., working unit Horticulture, and for the City department for agriculture and forestry, who will be in charge for the implementation of the Operational plan.</p> <p>Main stakeholders are state forest company Croatian forests Ltd, City of Zagreb, local population (citizens) and Grmoščica Park Forest visitors.</p>
<ul style="list-style-type: none"> Link to the strategic part of integrated multi-use management plan 	<p>Operational plan is in line with selected aims in Strategic plan. There is a need to develop guidelines for urban forest planners and managers on how to implement new approaches with a connection of the environmental and social services in urban forests</p> <p>Negative impact of climate change and influence of urbanisation and construction sector on urban forests, there is a need to establish financial needs (funds) and smart regulation approach for reduction of many negative impacts.</p> <p>A need for improvement of urban forests benefits (products and services) and new innovative concepts (like art park, tactile park, education trails...), need to identify priorities for future research; revitalisation of existing recreation areas</p> <p>There is a need to increase understanding of the urban forest benefits together with science-based research and education as a tool for decision makers in the evaluation of the ecosystem services as benefits provided to the citizens</p>

1.2 The design of the plan, obligations and validity of OP

<ul style="list-style-type: none"> • Basis for OP 	<p>Forest management plan Park forest City of Zagreb, General urbanistic plan City of Zagreb and Spatial plan City of Zagreb.</p>
<ul style="list-style-type: none"> • Relation to forest management and other planning bases 	<p>Forest management plan Park forest City of Zagreb is valid from Jan. 01. 2014. until Dec. 31. 2023 year. Through their validity it is necessary to take evidence and follow the prescribed realisation. In case of the specific circumstances, procedure of exceptional revision should be provided according to the Forest Law and Ordinance of forest management. According to the proposals from the OP, forest management plan could be revised, if responsible Ministry of Agriculture accept the changes.</p> <p>Different institutions have influence on decision making process regarding management of urban forests. On the city level there is a state forest company Croatian forests which is responsible for the implementation of forest management plans. On the city of Zagreb level, there is a City department for the agriculture and forestry, and City department for strategic planning.</p> <p>On the national level, different ministries are involved in implementation of the development measures, like Ministry of Agriculture (approval of forest management plans for state and private forests) and Ministry of Environment and Energy (implementation of Natura2000 and biodiversity protection and mapping).</p>
<ul style="list-style-type: none"> • Obligation 	<p>Operational program is a basis for the participation of the city administration in forest management plan. According to that OP has direct and indirect influence (obligation) on work in Croatian forests Ltd. Working unit Horticulture USP Zagreb, who is responsible for forest planning, management and monitoring.</p> <p>Gudelines defined with this OP are not directly obligatory for the private forest owners but could be used is an instrument and model for the communication with private forest owners about the forest management issues, basis for the projects/consultations/subsidies which support ecosystem services in private forests.</p> <p>In the area of the park forest Grmošćica there is no private forests and private forest owners, but here are some private parcels in surroundings.</p>
<ul style="list-style-type: none"> • Preparation of the plan 	<p>Communication between the forestry administration and the city administration is important during the period of preparation of OP (City department for agriculture and forestry).</p> <p>During the creation and development of the OP, different working groups are organised.</p>

	<p>Target groups in Grmoščica area were invited in the workshops: local citizens, members of the Črnomerac and Kustošija City council, Kustošijana association, employees of the primary school Kustošija, members of the mountaineering association Vrapče, members of the bicycling club Vrapče, members of the rollerblade club, and Ministry of Agriculture.</p>
<ul style="list-style-type: none"> • Time validity 	<p>Time span for implementation of operational plan is 2 years with surveillance next 3 years.</p> <p>Responsibility for the plan revision is Working unit Horticulture Croatian forests Ltd.</p>
<ul style="list-style-type: none"> • Implementation and operational planning 	<p>Operational planning and implementation of the planned activities is responsibility of the Working unit Horticulture Croatian forests Ltd.</p>
<ul style="list-style-type: none"> • OP area 	<p>The area included in the OP is 28,71 ha</p> <p>The map of OP area Appendix Picture 1.</p>

2 THE IMPORTANCE OF URBAN FORESTS AND MAIN MANAGEMENT OBJECTIVES

2.1 Purpose of UPF

<ul style="list-style-type: none">• Ecosystem services/ forest functions/ importance of UPF	<p>Ecosystem services are defined according to the Forest Law (Official Gazette 68/18)</p> <p>According to the applied methodology in the project, the main ES in this focus area are recreation and tourism, following air quality and local climate mitigation. Erosion protection and nature protection are also important in whole area (17,53 ha).</p> <p>ES table Grmoščica Appendix 2, Table 1</p>
<ul style="list-style-type: none">• Target groups / users	<p>Target groups in Grmoščica area were invited in the workshops: local citizens, members of the Črnomerac and Kustošija City council, Kustošijana association, employees of the primary school Kustošija, members of the mountaineering association Vrapče, members of the bicycling club Vrapče, members of the rollerblade club, and Ministry of Agriculture. Besides the mentioned participants, future users of the area will be the tourists and other interested recreational visitors attracted with the new content.</p>

3 STATE OF FORESTS AND FOREST USE	
3.1 State of forests and forest management	
<ul style="list-style-type: none"> • Forest area 	<p>Total area of the park forest Grmoščica is 53,3 ha, without private forests (10,79 ha). In Operational plan included focus area has 28,71 ha (units 9a, d, b, e) (Focus area map in appendix, picture 3)</p>
<ul style="list-style-type: none"> • Ownership of forests 	<p>Park forest Grmoščica has only state property managed by state forest company Croatian forests Ltd.</p>
<ul style="list-style-type: none"> • Forests, site conditions, forest types, stand types 	<p>Focus area Grmoščica is on the second quality (soil productivity). According to the forest management classes there are mainly sessile oak stands from seeds and acacia from the seeds.</p> <p>Dominate fitocenosis is sessile oak and common hornbeam (16,21 ha). Middle age mixed stand of sessile oak, common beech, common hornbeam and acacia, with sweet chestnut and ash. Sporadically are maple, wild cherry and other species. Stand has middle quality, established from the seeds. Stand has middle density with some scares and dense tree groups, with heterogeneous age and thickness structure. In the southwest area of the park there is 0,3 ha of the acacia trees group.</p> <p>Upper oak tree level and beech trees are high, straight, long, with moderate curves, crowns are medium developed and in good health conditions and vitality. Soil is covered with litter.</p> <p>Forest management goals prescribe thinning or sanitary cut in even age stands.</p> <p>Average growing stock in focus area is 250-300 m³/ha, with average increment of 10%.</p>
<ul style="list-style-type: none"> • Forest operations 	<p>The management methods used for park forests and those for common forests should have different goals, taken in to account multifunctionality of the urban forests. In order to stimulate carbon sequestration and the release of oxygen in the process of photosynthesis, a high productivity of the ecologically balanced forest stand should be sustained and adjusted to the purposes of the Park Forest.</p>

	<p>In 10 years, period from 2014 – 2023, annual cut in Grmoščica focus area is prescribed with thinning regulation in Forest management plan “Park Forest City of Zagreb”, and it is 50 m³/ha in average.</p> <p>Other annual cut directions are: sanitary cut, removal of dry and less vital trees in units where annual cut is not prescribed. To support natural growth trend silvicultural and protection works will be implemented in stand, filling with seedlings where natural regeneration is not possible.</p> <p>In focus area, in unit 9 b, thinning is 170 m³, or 55,02 m³/ha. In unit 9d thinning is 779 m³, or 48,06 m³/ha. In unit 9e prescribed thinning is 173 m³, or 47,27 m³/ha. Map in appendix, picture 4.</p>
<ul style="list-style-type: none"> • Wood production 	<p>Because of the protection of the stand and decrease of the stand damage, natural regeneration and trees, in forest exploitation small eco track and mini forwarders are used. In specific cases like hard inaccessible areas or specific protected areas (water protection area, child playground etc), animal force (horse) will be used.</p> <p>In some specific situations, work on cutting and pruning in tree crowns climbers or car ladders are used.</p> <p>For the establishment of the forest stand order, besides the collecting the branches in some cases wood chipping machine is used.</p>
<ul style="list-style-type: none"> • Forest accessibility 	<p>Existed forest paths are used for the accession in the forest. After the forest works, roads are maintained on previous condition (aligned and rearranged soil paths or filling with gravel). The small eco track and mini forwarders will be used.</p>
<ul style="list-style-type: none"> • Impacts, problems 	<p>According to the strategy of City of Zagreb (Zagrebplan, ciljevi i prioriteti razvoja Grada Zagreba do 2020 godine), the main problems are: insufficient sensibility of public about the ecosystem services.</p> <p>Main problems in Grmoščica are creation of additional land slides, depriving property from the local population, uncontrolled visitors entrance by walk in forest land, waste disposal.</p> <p>Climate changes through the wind brakes had already influence in the stand. Unsolved waste water and rainwater drainage could cause additional problems.</p>

	<p>Inefficient cooperation and overlapping of responsibility from different institutions on city and state level are blocking development of potentially very attractive green urban areas and improvement quality of living for the citizens.</p>
<h3>3.2 Visit to UPF and infrastructure</h3>	
<ul style="list-style-type: none"> • Visit to forest 	<p>Grmoščica forest annually has 5000 visitors in average, mainly from the local population and occasionally bicyclists. It results with cca 160 korisnika/ha.</p> <p>Main structure of visitors in focus area are recreational visitors and walkers from the local population (surrounding settlements Vrapče, Kustošija, Ilica). There are no organised visits from the kindergarten or schools.</p> <p>Visitors are attracted in the forest because of the relaxation, escape from the city noise pollution</p> <p>The main potential conflict is among the bicyclists and walkers. There are also restaurant visitors (mainly during the weekend) in the centre of the forest. There is a need to split and mark different zones in the park to avoid possible injuries and clashes among the visitors. Additional possible conflict is poor communication between local NGO, local city authority and public. There is a need to improve communication and transparency between the authority and interested groups of users.</p> <p>In OP, different recreational zones for the different users will be informed to avoid contact points and conflicts.</p> <p>Because of the interest of the local population School in forest will be established.</p> <p>Zagreb has cca 3000 daily active bicyclists. Some of them use park forest Grmoščica daily for recreation and training, especially during the weekend where are 50 bicyclists daily in average.</p> <p>During the organised competitions around 100 to 150 bicyclists participated, with about 300 spectators.</p> <p>The plan is to provide conditions for “endure” bicycling class competition with more participants and spectators.</p>

<ul style="list-style-type: none"> • Already available infrastructure 	<p>Accessibility in the park through existing forest path length cca 1000 m</p> <p>1 View point</p> <p>6 benches</p> <p>Map with the existing paths (Picture 5)</p>
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3.3 Important objects in UPF

<ul style="list-style-type: none"> • Nature conservation 	<p>There are not nature conservation categories in the park</p>
<ul style="list-style-type: none"> • Cultural heritage 	<p>There are not cultural heritage categories in the park</p>
<ul style="list-style-type: none"> • Other objects 	<p>No</p>

3.4 Assessment of use, changes and influencing factors

<ul style="list-style-type: none"> • Damages, risks 	<p>Potential treats in the Grmoščica are landslides, wind brakes and waste disposal or land usurpation from the local population.</p>
<ul style="list-style-type: none"> • Issues of forest use 	<p>In Grmoščica area there are some inaccessible parts with steep slopes. Because of that forest thinning and cut cause additional efforts and costs. Forest area is close to the houses what need sensitive approach in forest management.</p>

4. GUIDELINES FOR FOREST MANAGEMENT

4.1 Subordinated guidelines

<ul style="list-style-type: none">• Forest management plans	<p>According to the forest management plan for Management Unit Park Forests City of Zagreb, multipurpose forestry will be provided to preserve ecosystem services, natural stand regeneration, biodiversity and stability of forest ecosystems with their positive influence on wider area.</p> <p>On the forest management unit level main work will be sanitary cut with thinning, and replacement with autochthonous vegetation.</p>
<ul style="list-style-type: none">• Strategic plan for UPF	<p>Strategic goals about the management of urban forests should be in line with National strategy of environment protection,</p> <p>Strategy about the water management, Strategy of sustainable development of Republic of Croatia, Strategy and Action plan about the protection of biological and landscape diversity of Republic of Croatia, and Strategy of energy development of Republic of Croatia.</p> <p>Strategic priorities are:</p> <ol style="list-style-type: none">1. Sustainable urban forest management2. Mitigation of negative impacts on forests3. Integrated forest management4. Recreation/aesthetic function5. Education
<ul style="list-style-type: none">• Spatial plans	<p>Spatial plans are defined on the city of Zagreb level.</p> <p>General urban plan city of Zagreb is in line with regulations of Spatial plan. In article 54. Grmoščica is defined as city park forest. Management is provided is defined in articles 66 and 78:</p> <ol style="list-style-type: none">1. Management should be in harmony with forest management plans2. Management goals are primary for silviculture and protection, with sustainable management, biological and landscape diversity, ecosystem protection3. Maintenance of the forest infrastructure, building for the forestry use, paths, roads, viewpoints, shelters, hygienic-sanitary facility and other equipment will be defined with project documentation, taking

	<p>in account to protect close to nature structure and other non-wood forest functions</p> <p>In city of Zagreb, non-wood forest products and services should be thoroughly investigated for their quantification in terms of planning forest protection (soil treading, tree damage, etc.). Considering the extremely unfavourable chemical impacts from pollution, the damage degrees on the selected bio-indicative points should be established before deciding about the appropriate measures.</p>
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4.2 Fundamental/basic concepts

<ul style="list-style-type: none"> • Forest land, forest area 	<p>Forest area in focus area Grmoščica will remain the same, there will be not conversions or changes in land use.</p>
<ul style="list-style-type: none"> • Structure and forest composition 	<p>Guidelines for the development of forest stands:</p> <ul style="list-style-type: none"> - silvicultural systems - harvesting - selection of tree species - monitoring of forest regeneration - salvage cutting after damages/disturbances - management of forest edges - stability of forest stands <p>This management unit belongs to the Pannonia sector Illyrian provenience, middle Europe vegetation region. Main characteristic is expressed height vegetation zonation. In sections 9a, b, c, d, f, g, h, i, j, there is a phytocenoses: Sessile oak and common hornbeam forest (national classification: Epimedio- Carpinetum betuli (Ht.1938) Borhodi 1963).</p> <p>Section 9e phytocenoze: sessil oak and sweet chestnut forest (National classification: Querco- castanetum sative Ht.1938).</p> <p>The main goals in forest management are replacement of dry and weaker vital trees, natural regeneration with introduction of seedlings where natural regeneration is missing. In sections where annual cut is prescribed, prescribed thinning will be provided. Management goals are prescribed with silviculture measures following close to nature management principles. Maintenance of the forest infrastructure should be defined with project documentation, following Forest Law and Law on Environment protection.</p>

	<p>Forest edges should be monitored because of the usurpation and possible waste disposal.</p> <p>After the natural disasters additional thinning and pruning should be made to protect stand quality and vitality.</p>
<ul style="list-style-type: none"> • Technology of wood production 	<p>Because of the stand protection and decrease of the stand damage, natural regeneration and trees, in forest exploitation small eco track and mini forwarders are used. In specific cases like hard inaccessible areas or specific protected areas (water protection area, child playground etc), animal force (horse) were used.</p> <p>In some specific situations, work on cutting and pruning in tree crowns, climbers or car ladders are used.</p> <p>For the establishment of the forest stand order, besides the collecting the branches in some cases wood chipping machine is used.</p> <p>Forest work will be maintained during the spring or autumn cutting period.</p> <p>Before the planned work, citizens and stakeholders will be informed via email and public information panels. Beginning of work and duration will be defined, as well as fences for working area, for the smooth forest work performance and assortments transport.</p>
<ul style="list-style-type: none"> • Nature conservation 	<p>There is no nature conservation area, monitoring for the invasive species appearance is provided, and suppression if it is needed.</p> <p>Integral protection measures are divided on: preventive, biologic, integral.</p> <p>Preventive measures include: conduction of regular forestry-hygienic measures (forest stand order especially in the conifer stands), lifting and maintenance of mixed structure, fauna protection, conduction of preventive measures in aim to decrease possibility for forest fire. Repressive measures are provided when some disease or pest occur. There is a need to provide most relevant diagnosis and forecast about the length and intensity of the disease. Biologic suppression methods were used only in harmful insects, like biological insecticides on fungi basis.</p> <p>Also, bird population should be maintained in the stand. Integrated methods are used in pest suppression with forest silviculture and technical measures to increase natural factors for pest's mortality.</p>

<ul style="list-style-type: none"> • Areas with emphasized ES (or forest functions) in the UPF area 	<p>The focus area beside the wood production, the highest importance has in climate protection, air pollution decreasing, erosion protection, recreational and aesthetic functions. The UPF area is not included in nature protection category. The main goals in forest management are replacement of dry and weaker vital trees, natural regeneration with introduction of seedlings where natural regeneration is missing. In sections where annual cut is prescribed, prescribed thinning will be provided.</p>
<ul style="list-style-type: none"> • The use of forests 	<p>Bicycling paths in Grmoščica were used unorganised mainly for training and recreational competitions in downhill discipline. The focus area with new bicycling paths will provide better conditions for international competitions and attract additional visitors.</p> <p>Because of the recreational visitors which are coming from the settlements on the border (in vicinity) with the park forest, the improvement of recreational use of this urban forest is in line with the established strategy for recreational use of focus area.</p> <p>In the middle of the focus area exists a restaurant which attract visitor especially during the weekend. According to the strategic goals, here could be information point about the recreational bicycle and walking paths, forest ecosystem services and playgrounds.</p> <p>There is a need to mark and arrange accession for different kind of users in park forest, according to the selected strategies for the improvement of the recreational, aesthetic and climate protection forest functions.</p>
<ul style="list-style-type: none"> • Infrastructure in the forest area 	<p>Infrastructure map is in appendix, picture 5.</p> <ul style="list-style-type: none"> • The lightest bicycle path 1 - green • Middle heavy bicycle path 2 - yellow • Heavy bicycle path 3 – red <p>Informational board with a map should be on a view point. Runners and bicyclist should be on a different path.</p> <p>Educational and green path should be separated with small wooden bridge.</p> <p>Maintenance of the dry and dangerous branches in crowns with pruning.</p> <p>Creation of visual signs with directions for users.</p>

<ul style="list-style-type: none"> • Communication / Informing the public 	<p>According to the project development plan, communication manager is selected in Croatian forests company, and one representative from the City of Zagreb. They are responsible to present the plan and development to the public with the institutional support (official spokesman and journalist's network).</p> <p>The City of Zagreb has PR service and established protocol for the organisation of the public conference for wider audience. Croatian forest Ltd company will continue with the public and journalist's education in monthly level as they arranged before with the support from the company headquarter.</p> <p>There is a need to create of communication plan with media, journalist education, education through social networks, and training/education of trainers.</p>
<ul style="list-style-type: none"> • Cooperation between stakeholders 	<p>During the project development process, different stakeholders were included. Beside the local citizens on the workshops participated members of the Črnomerec and Kustošija City council, Kustošijana association, employees of the primary school Kustošija, members of the mountaineering association Vrapče, members of the bicycling club Vrapče, members of the rollerblade club, Green action NGO and Ministry of Agriculture, Faculty of Forestry University of Zagreb, City of Zagreb representatives from City department for Agriculture and Forestry, Department for spatial planning, Croatian forest representatives.</p>
<h3>4.3 Guidelines for allocations with priority ES</h3>	
<ul style="list-style-type: none"> • Allocations for priority ES 	<p>Authors, Matić, S., Prpić, B., (Šumarski list 5-6, 1997), have ranked ES in park forest Grmoščica with grades of importance (1 =min, 10=max). The most important value is established protected area.</p> <ol style="list-style-type: none"> 1. Ecological functions: Hydrological -4, Anti-erosion – 3, Climatic – 3, Fighting air pollution -3, Windshield-road protective -2, Protected forests - 9 2. Social forest functions: Tourism-3, Aesthetic functions-3, Recreational functions-3, Medical functions-3 <p>Non-wood forest functions table 2 with national methodology in appendix table 2.</p>

<ul style="list-style-type: none"> Other multifunctional forests 	There are no other multifunctional forests in the area.
<ul style="list-style-type: none"> Overlapping of allocations 	According to the strategic planning in the project, recreational and aesthetic functions have overlapping through the whole focus area. Hydrological and protection from erosion have strong correlation in many management sections.

4.3.1 Allocations for priority ES

Ecosystem services	Climate protection	Air quality	Waste water treatment	Recreational and tourism
Importance	HIGH	MEDIUM	MEDIUM	HIGH
Surface (ha)	31,31	31,31	28,71	31,31
Guidelines	Protection measures: preventive, biologic, integral. Sustainable forest management principles should be implemented with mitigation of negative impacts, selection of autochthone species.	To stimulate carbon sequestration, a high productivity of the ecologically balanced forest stand should be sustained and adjusted to the purposes of the focus area.	Hydrological and erosion protection should be integrated in forest management plans, with focus on recreational area and paths. Steep and dangerous slopes should be mapped.	New infrastructure will be established for the development of the different recreational zones. There is a need to avoid contact points and conflicts between users.

4.3.2 Other multifunctional forests

There are no other multifunctional forests in the area

4.4 Detailed forest zoning

<ul style="list-style-type: none"> Zoning regarding the forest land use 	<p>Different forest land use zones are defined according to the future use of the park forest.</p> <p>Intensive and dispersive recreational use are defined. Mountain bike trails, bicycle polygon, small football playground, forest classroom and educational trail are planned in the ground. Quiet zones are also available in some areas. Appendix, picture 6, map with different land zone activities.</p>
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- Management regime

Zone	Bicycle area	Education area	Recreation area	Quiet area
Importance	HIGH	HIGH	MEDIUM	LOW
Surface (ha)	6,3	0,15	0,60	29,00
Guidelines	<p>Infrastructure for the bicycle and kids trail will be established in protected forest area with prescribed forest management goals, in favor of recreational use. Forest technology and development will take care about the user's needs to avoid possible conflicts during the forest work.</p>	<p>The new educational path will be established, following the specifics of the forest stand and urban forests benefits. School in forest will be established and marked on the maps, following infrastructure connection from park entrance. Before the forest work, users should be informed via email or public information panels. Beginning, duration and work area will be defined and marked.</p>	<p>Integral forest management, mitigation of negative forest damages, waste disposal, dry and potentially dangerous trees surveillance. Controlling of visitor's number and possible devastation. In time information about the future forest maintenance work. Trim path, football playground area and view point will be marked on the map and in the field.</p>	<p>Implementation of protection measures, with preventive, biologic, and integral management approach, without additional infrastructure and forest technology impact. Implementation of sustainable forest management principles with specific focus on area for relaxation and interaction with plant and natural wildlife.</p>

<h2>4.5 Activities</h2>	<p>Planned activities in Grmoščica are:</p> <ol style="list-style-type: none"> 1. arrangement of entry points, view point and info points, accessibility with public transport, promotion and informing the users, cooperation with tourist offices, 2. recreational paths, cycling polygons, marking cycling paths, marking, routing equipment, include the forest information in city maps 3. football playground and trim path, area for kindergarten and school in forest
<h3>4.5.1 A detailed plan for each of activities listed above</h3>	
<ul style="list-style-type: none"> • Area and map 	<p>Informative map with location(s) for activities in the UPF area is in Appendix 4.5.1.</p> <p>Arrangement of entry points, view point and info points, accessibility with public transport, promotion and informing the users, cooperation with tourist offices,</p> <p>Recreational paths, cycling polygons, marking cycling paths, marking, routing equipment, include the forest information in city maps</p> <p>Football playground and trim path, area for kindergarten and school in forest</p>
<ul style="list-style-type: none"> • Condition / problems 	
<ul style="list-style-type: none"> • Target state 	
<ul style="list-style-type: none"> • Purpose 	
<ul style="list-style-type: none"> • Priority 	
<ul style="list-style-type: none"> • Most important ES 	
<ul style="list-style-type: none"> • Possible activities 	
<ul style="list-style-type: none"> • Unwanted or prohibited activities 	
<ul style="list-style-type: none"> • Silviculture measures 	
<ul style="list-style-type: none"> • Measures for wood production 	
<ul style="list-style-type: none"> • Infrastructure measures 	
<ul style="list-style-type: none"> • Additional plan/sketch, if needed 	
<ul style="list-style-type: none"> • Costs 	
<ul style="list-style-type: none"> • Financiers 	
<ul style="list-style-type: none"> • Coordinators 	
<ul style="list-style-type: none"> • Stakeholders 	
<ul style="list-style-type: none"> • Legal basis 	
<ul style="list-style-type: none"> • Notes 	

5. GOVERNANCE	
5.1 Implementation responsibility	<p>During the project implementation, responsibility for the planned activities have City of Zagreb, Department for agriculture and forestry, and company Croatian forests Ltd Working unit Horticulture branch Zagreb</p> <p>Maintenance after the project will continue Working unit Horticulture Croatian forests branch Zagreb</p>
<ul style="list-style-type: none"> • A list of main managers, coordinators of activities and their responsibilities 	<p>Sergej Šimpraga, UrbForDAN project coordinator, Grad Zagreb Department for agriculture and forestry</p> <p>Ninoslav Matošević, Bsc. forestry – director working unit Horticulture Hrvatske šume d.o.o. UŠP Zagreb</p>
<ul style="list-style-type: none"> • Subsidy system 	<p>There are no subsidy models in this case</p>
5.2 Forest owner association	<p>No forest owner’s association.</p>

6. MONITORING	
<p>6.1 Indicators of monitoring and control</p>	<p>The all stakeholders in the process of preparation and project implementation will be informed about the new possibilities which park forest Grmoščica will offer. Implementation and supervision of defined activities Working unit Horticulture branch Zagreb will put in action, together with communal staff City of Zagreb.</p> <p>After the project duration survey among the users will be provided to evaluate their satisfaction with new products and services of urban forest.</p>
<p>6.2 Revision of the plan</p>	<p>In case of the unexpected and extraordinary situation on the field (landslides, natural disasters..), management plan revision will provide Working unit Horticulture, Croatian Forests Ltd. Branch Zagreb</p>

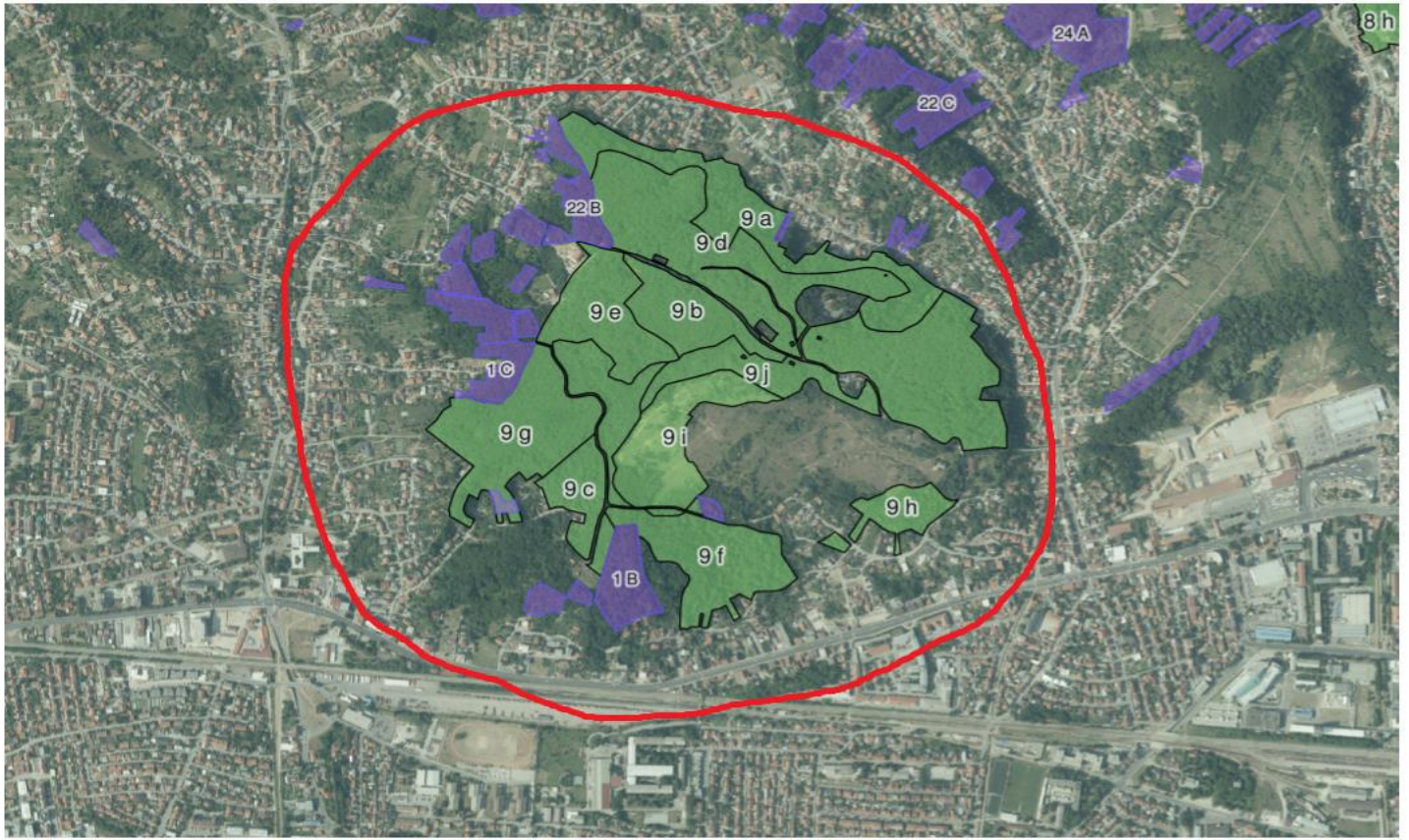
7. COSTS AND FINANCING

Assess the overall costs of the plan implementation. Costs must be shown separately for the duration of the project URBforDAN and after the end of it.

7.1. Implementation costs during the project duration

Operational staff	30,000.00 €
Materials necessary for construction of urban equipment (benches, tables, waste baskets, information boards, equipment for bike and trim trail, fences, crossings and similar)	10,670.00 €
Preparatory works in Grmoščica (cleaning the surfaces, cutting dry trees and similar)	12,990.00 €
	53,660.00 €

Picture 1 Grmoščica area map



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0 100 200 300 400m





Table 1: Summary of the most important ES (In the table, you should include all the ES you mapped with 1st and 2nd rank and the area in ha) FOCUS AREA

Ecosystem service (ES) – area (ha) and % of entire forest area – only 1 st rank and 2 nd rank	Individual objective/ES	Area (ha) and % of entire forest area
Provisioning ES	11_Timber production	22,96 ha, 64,2%
	12_Non-timber products	
	13_Provision of drinking water	
Regulating ES	21_Local climate mitigation	31,31 ha, 87,5%
	22_Local air quality	31,31 ha, 87,5%
	23_Protection against noise pollution	
	24_Regulation of floods	
	25_Protection against erosion	7,06 ha, 19,7%
	26_Waste-water treatment	28,71 ha, 80,3%
Supporting ES	31_Nature protection / habitats for species	
Cultural ES	41_Recreation and tourism	31,31 ha, 87,5%
	42_Scientific / educational	
	43_Cultural heritage	

Picture 3 Focus map Grmoščica park forest



Legend

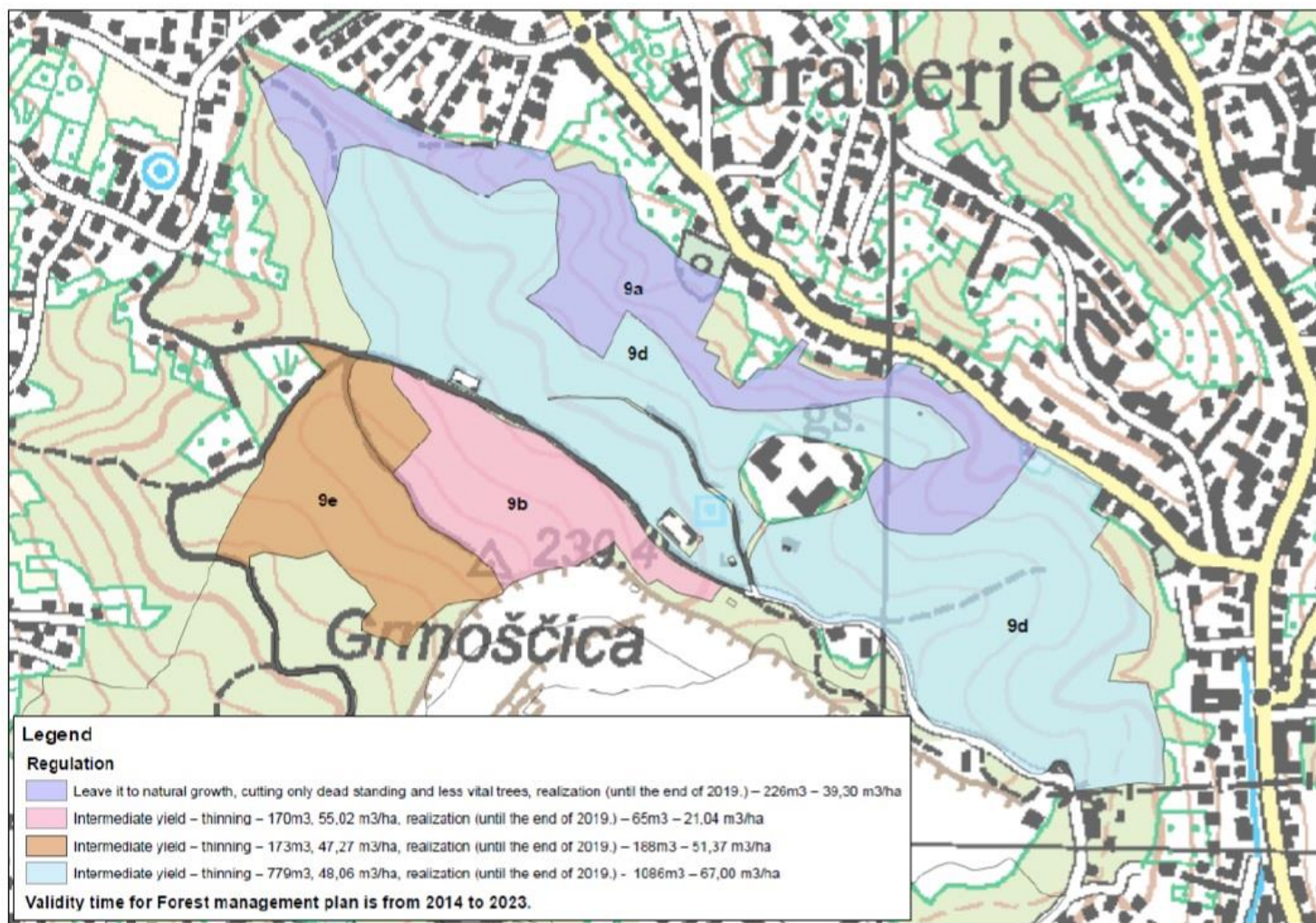
-  Grmoščica border
- Focus area- forest surface
-  Quercus petraea (22,96 ha)
-  Robinia pseudoacacia (8,35 ha)
-  Area covered with grassy vegetation (4,46 ha)

M 1:10000



Made by: Ivana Čirko, mag.ing.silv.

Picture 4: Prescribed forest management in Forest Management Plan



Picture 5 Map with existing and planned infrastructure



Legend

Focus area

- Very important effect on recreation and tourism (4)
- Area which does not provide this ES

Strategic area

- Very strong effect on recreation and tourism (4)

41_Recreation and tourism

Potential infrastructure

- Downhill biking polygon
- Outdoor gym
- The panoramic viewpoint

Existing infrastructure

- Downhill bike trail (1120m)
- Downhill bike trail (400m)
- Downhill bike trail (750m)

M 1:10000

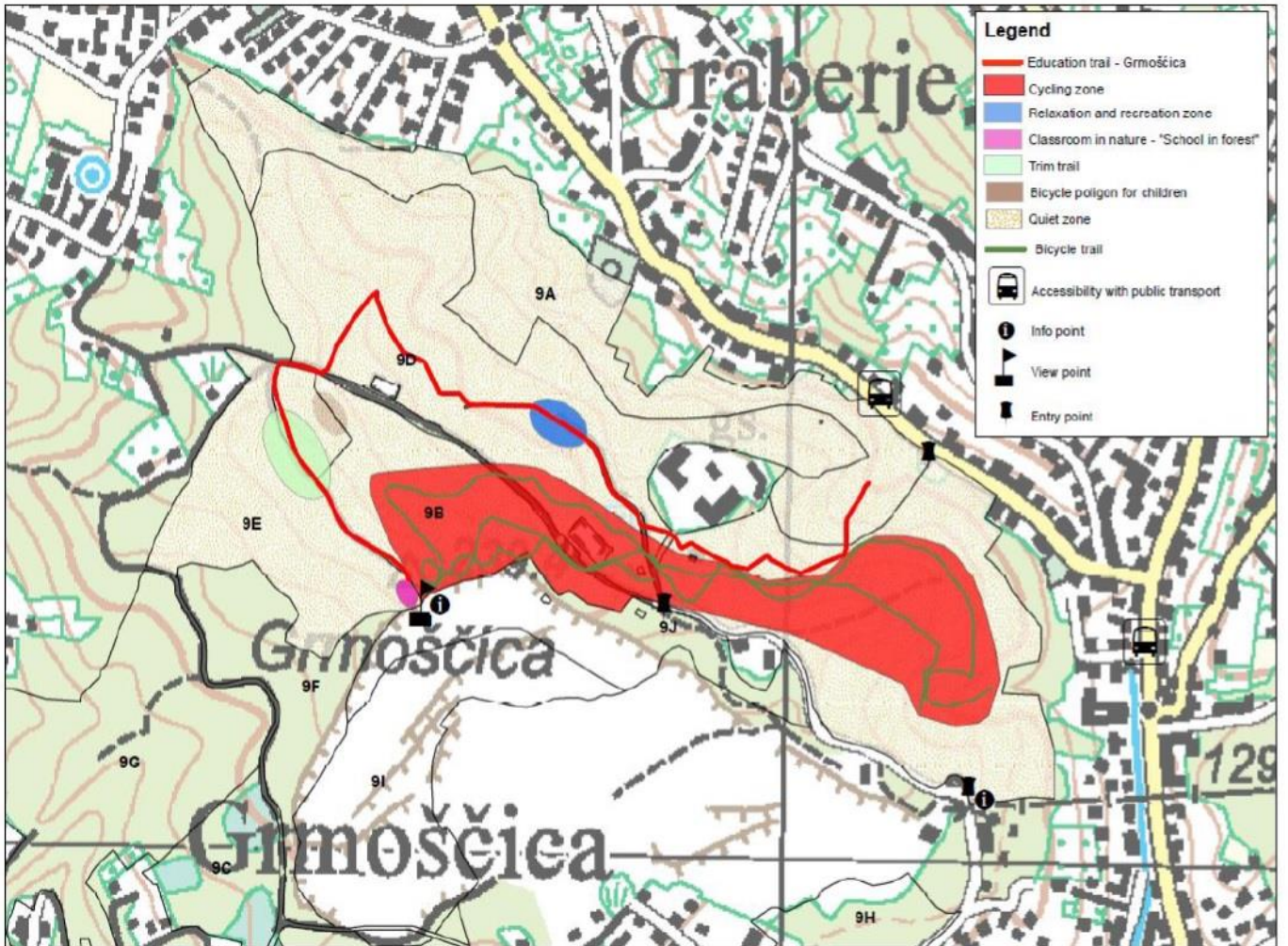


Made by:
Ivana Čirko, mag.ing.silv.

Table 2: Evaluation of NWF functions in Grmošćica with national methodology

ODJEL	ODSJEK	POVRŠINA	OPĆEKORISNE FUNKCIJE ŠUMA									UKUPNO	
			ZAŠTITA ZEMLIŠTA I PROMETNICA OD EROZIJE, BUJICA I POPLAVA (1-5)	UTJECAJ NA VODNI REŽIMI HITROENERG E-TSKI SUSTAV (1-4)	UTJECAJ NA PLODNOST TLA I POLJODJELSKU PROIZVODNJU (1-4)	UTJECAJ NA KLIMU (1-4)	ZAŠTITA I UNAPREĐENJE ČOVJEKOVA OKOLIŠA (0-3)	STVARANJE KISIKA I PROČIŠĆAVANJE ATMOSFERE (1-4)	REKREATIVNA, TURISTIČKA I ZDRAVSTVENA FUNKCIJA (1-4)	UTJECAJ NA FAUNU I LOV (1-5)	ZAŠTITNE ŠUME I ŠUME S POSEBNOM NAMJENOM (8-10)		
		ha	OCJENA										
1	2	3	4	5	6	7	8	9	10	11	12	13	
9	A	5.75	3.0	3.0	2	4	3	4	4	4	2	25.00	
	B	3.09	3.0	3.0	2	4	3	4	4	4	2	25.00	
	C	2.28	2.0	1.8	2	4	3	4	4	4	3	23.80	
	D	16.21	3.0	3.0	2	4	3	4	4	4	3	26.00	
	E	3.66	3.0	3.0	2	4	3	4	4	4	2	25.00	
	F	7.27	3.0	3.0	2	4	3	4	4	4	3	26.00	
	G	6.30	2.0	2.5	2	4	3	4	4	4	2	23.50	
	H	1.68	2.0	0.9	2	4	3	4	4	4	3	22.90	
	I	4.46	4.0	0.5	1	1	2						8.50
	J	2.60	4.0	2.1	2	4	3	4	4	4	2	25.10	
		53.30	53.30	53.30	53.30	53.30	53.30	48.84	48.84	48.84			
		CRO	2.9	2.6	1.9	3.7	2.9	3.7	4.0	2.6			
		FAO	2.0	2.0	3	1	1	1	1	2			

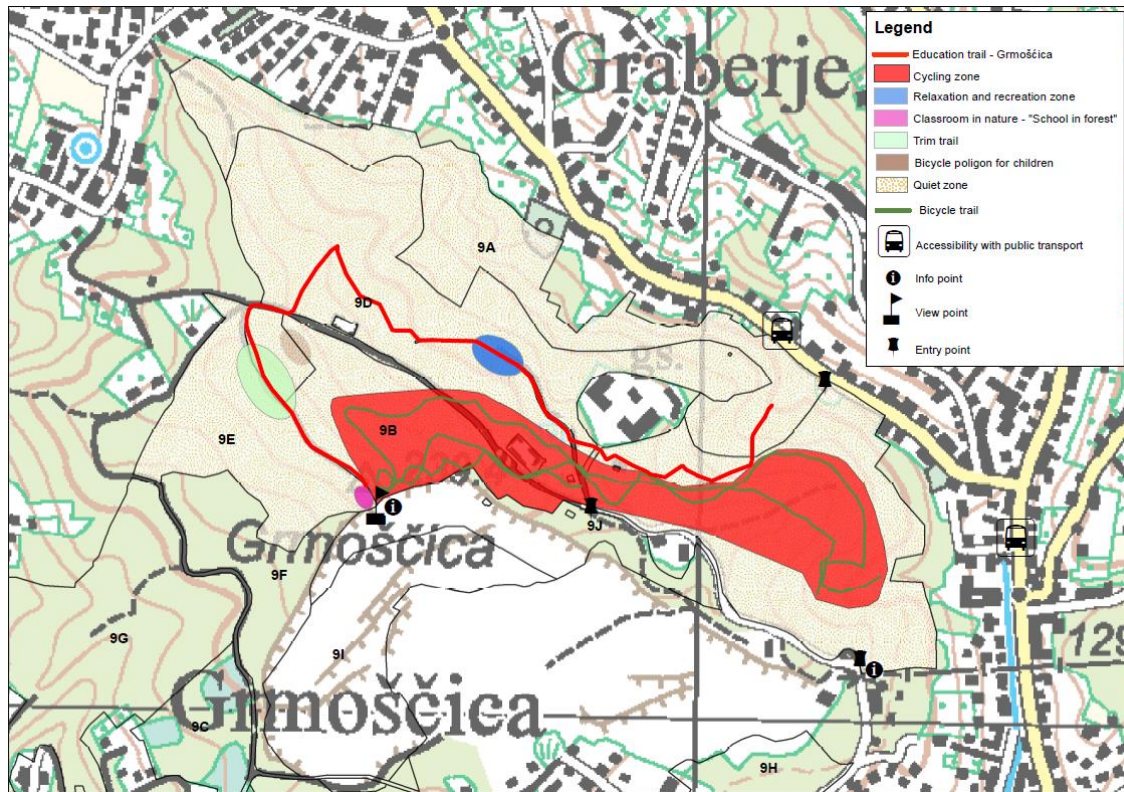
Picture 6: Zonal division map for different activities



Activities

- Area and map

4.5.1.1. Arrangement of entry points, view point and info points, accessibility with public transport, promotion and informing the users, cooperation with tourist offices,



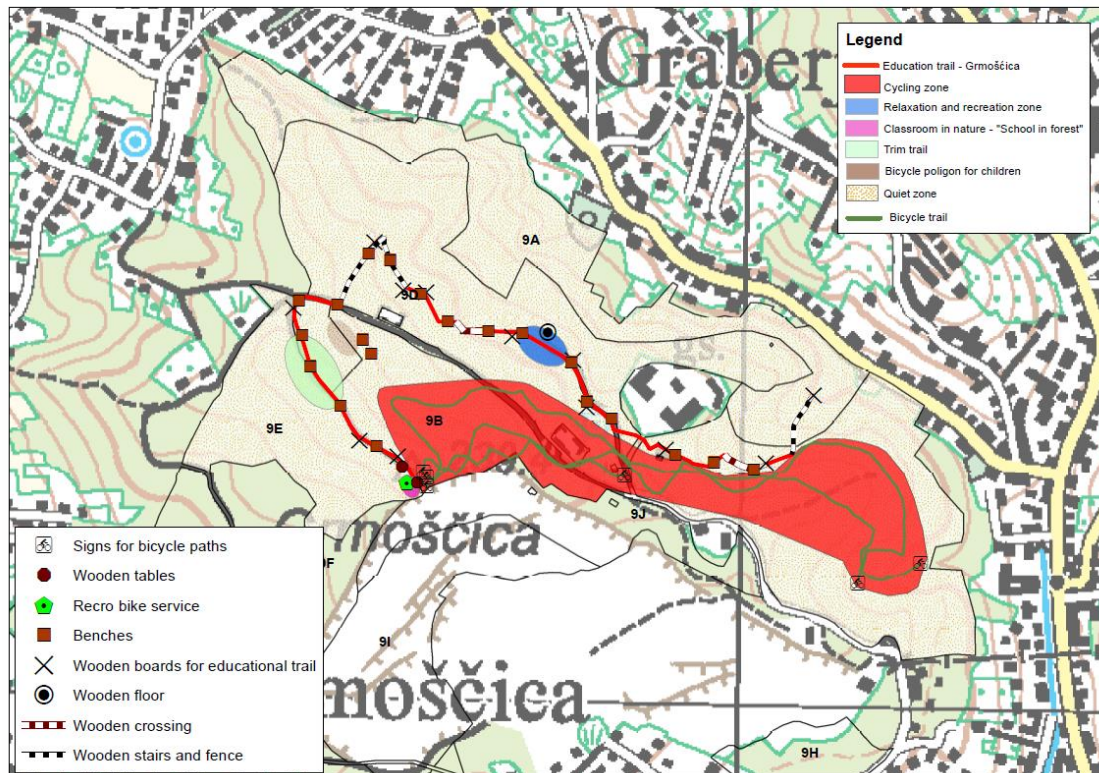
<ul style="list-style-type: none"> • Condition / problems 	<p><i>At the moment there are no marked formal entrance points and info points. Also, there is no organized public transport to the site and parking place close to the focus area. Additional information about the forest are missing in city maps and touristic offices.</i></p>
<ul style="list-style-type: none"> • Target state 	<ul style="list-style-type: none"> ○ <i>Visible entrance points with relevant information about the focus area, accessibility for the different category of users, detailed maps in touristic offices with distances and services</i>
<ul style="list-style-type: none"> • Purpose 	<p><i>To increase recreational function of the park forest, to promote protection role of the forest and attract new visitors.</i></p>
<ul style="list-style-type: none"> • Priority 	<p><i>This is high priority level, better visibility will attract new and traditional users, and inform the citizens about the new project implementation.</i></p>

<ul style="list-style-type: none"> • Most important ES 	<p>-recreation and protection function (noise reduction, educational)</p>
<ul style="list-style-type: none"> • Possible activities 	<ul style="list-style-type: none"> ○ <i>Possible (planned) use of forests</i>
<ul style="list-style-type: none"> • Unwanted or prohibited activities 	<ul style="list-style-type: none"> - waste disposal, illegal use of forest, fire ignition, devastation of park infrastructure and nature
<ul style="list-style-type: none"> • Silviculture measures 	<ul style="list-style-type: none"> - stand cultivation with thinning, outgrowth cultivation after final cut - Other works which increase aesthetic and productive value of the trees and stands in park forest (like pruning, crown formation...)
<ul style="list-style-type: none"> • Measures for wood production 	<p>Before the beginning of the work in the forest, main stakeholders should be informed about the start and length of the planned work. Area should be protected from the uncontrolled access (especially recreational users) with implementation of the work safety measures.</p>
<ul style="list-style-type: none"> • Infrastructure measures 	<p>In valid forest management plan for Park forest City of Zagreb (2014.-2023.) there are no plans for the roads construction.</p>
<ul style="list-style-type: none"> • Additional plan/sketch, if needed 	<p>-</p>
<ul style="list-style-type: none"> • Costs 	<ul style="list-style-type: none"> - Planned costs for these activities are 4300,00 EUR. - equipment costs 3400,00 EUR, costs for preparation and forest works 900,00 EUR.
<ul style="list-style-type: none"> • Financiers 	<p>Project is funded with 15% EU support, and 85% of the Croatian forests Ltd budget.</p>
<ul style="list-style-type: none"> • Coordinators 	<p>Ninoslav Matošević, B. sc. Forest – director Working Unit Horticulture Hrvatske šume d.o.o. UŠP Zagreb</p>
<ul style="list-style-type: none"> • Stakeholders 	<p>The main stakeholders in Grmoščica are primary local citizens, members of the Črnomerac and Kustošija City council, Kustošijana association, employees of the primary school Kustošija, members of the mountaineering association Vrapče, members of the bicycling club Vrapče, members of the rollerblade club, and Ministry of Agriculture club. Besides the mentioned participants, future users of the area will be the tourists and other interested recreational visitors attracted with the new content.</p>
<ul style="list-style-type: none"> • Legal basis • Notes 	<p>Forest management plan is based on the Forest Law (Official gazette 140/05, with last amendments in 2018), and Forest management regulations.</p>

	<p><i>Other laws and bylaw acts are included in the preparation of the management plan:</i></p> <p><i>Law on nature protection - (Official gazette 80/13)</i></p> <p><i>Law on forest reproductive material (Official gazette 75/09, 61/11, 56/13, 14/14);</i></p> <p><i>Law on game management (Official gazette 140/05, 75/09.,153/09, 14/14)</i></p> <p><i>Law on fire protection (Official gazette 92/10)</i></p> <p><i>Law on water (Official gazette 153/09.,63/11.,130/11, 56/13, 14/14)</i></p> <p><i>Law on roads (Official gazette 84/11, 22/13, 54/13, 148/13)</i></p> <p><i>Law on spatial planning (Official gazette 153/13)</i></p> <p><i>Law on state measurement and cadastre (Official gazette 16/07, 124/10, 56/13)</i></p> <p><i>Law on waste management (Official gazette 94/13)</i></p> <p><i>Regulation of tree marking, wood assortments, transport document and forest order (Official gazette 116/06, 74/07, 55/0925/11)</i></p> <p><i>Regulation on fire protection (Official gazette 33/14)</i></p> <p><i>Regulation on forest protection (Official gazette 121/06, 25/11)</i></p> <p><i>Regulation on land cadastre (Official gazette 84/07,148/09)</i></p>
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- Area and map

4.5.1.2. recreational paths, cycling polygons, marking cycling paths, routing equipment, include the forest information in city maps



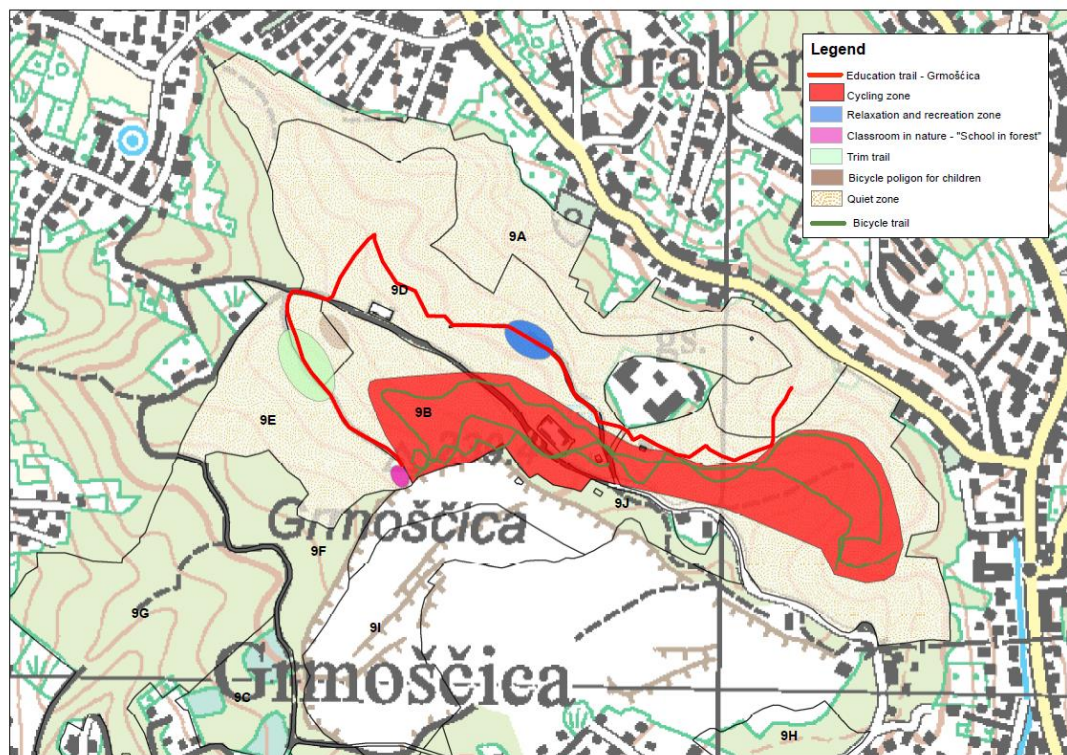
<ul style="list-style-type: none"> • Condition / problems 	<ul style="list-style-type: none"> - In Unit 9a - steep terrain with some active landslide fragments, intersected with many trenches which cause land instability. Units 9 f, h, i, j are active landslides with inclined trees, which cause damages on neighbouring houses.
<ul style="list-style-type: none"> • Target state 	<ul style="list-style-type: none"> - Forest roads will have educational path equipment, bicycling paths will be marked, and relevant information about the activities will be included in the city maps.
<ul style="list-style-type: none"> • Purpose 	<ul style="list-style-type: none"> - To increase recreational role of the focus area for different users and interests.
<ul style="list-style-type: none"> • Priority 	<ul style="list-style-type: none"> ○ High priority for regulation of the bicycling paths and other zones to avoid overlapping with different users. Should be done in the first part of the planned activities.
<ul style="list-style-type: none"> • Most important ES 	<ul style="list-style-type: none"> -recreation and protection function
<ul style="list-style-type: none"> • Possible activities 	<ul style="list-style-type: none"> ○ Possible (planned) use of forests

<ul style="list-style-type: none"> Unwanted or prohibited activities 	<p><i>-waste disposal, illegal cut of forest, fire ignition, devastation of park infrastructure and nature</i></p>
<ul style="list-style-type: none"> Silviculture measures 	<p><i>Cultivation work in park forest could be divided on: - work on soil to improve edaphic conditions for existing and future young generation (soil loosening, weeds suppression, drainage...)- Young stands protection from different pests (herbs, animals, microorganisms.), and unfavourable ecological factors (frost, dryness.)</i></p> <p><i>Tree health control especially for the dry branches and potentially danger trees above and close to the bicycle paths.</i></p>
<ul style="list-style-type: none"> Measures for wood production 	<p><i>Before the beginning of the work in the forest, main stakeholders should be informed about the start and length of the planned work. Area should be protected from the uncontrolled access (especially recreational users) with implementation of the work safety measures.</i></p>
<ul style="list-style-type: none"> Infrastructure measures 	<p><i>In valid forest management plan for Park forest City of Zagreb (2014.-2023.) there are no plans for the roads construction.</i></p>
<ul style="list-style-type: none"> Additional plan/sketch, if needed 	<p>-</p>
<ul style="list-style-type: none"> Costs 	<p><i>Implementation costs are 37000,00 EUR.</i></p> <p><i>- equipment costs 30800,00 EUR, costs for preparation and forest works 6200,00 EUR.</i></p>
<ul style="list-style-type: none"> Financiers 	<p><i>Project is funded with 15% EU support, and 85% of the Croatian forests Ltd budget.</i></p>
<ul style="list-style-type: none"> Coordinators 	<p><i>Ninoslav Matošević, B. sc. Forest – director Working Unit Horticulture Hrvatske šume d.o.o. UŠP Zagreb</i></p>
<ul style="list-style-type: none"> Stakeholders 	<p><i>The main stakeholders in Grmoščica are primary local citizens, members of the Črnomerac and Kustošija City council, Kustošijana association, employees of the primary school Kustošija, members of the mountaineering association Vrapče, members of the bicycling club Vrapče, members of the rollerblade club, and Ministry of Agriculture club. Besides the mentioned participants, future users of the area will be the tourists and other interested recreational visitors attracted with the new content.</i></p>
<ul style="list-style-type: none"> Legal basis Notes 	<p><i>Forest management plan is based on the Forest Law (Official gazette 140/05, with last amendments in 2018), and Forest management regulations.</i></p>

	<p><i>Other laws and bylaw acts are included in the preparation of the management plan:</i></p> <p><i>Law on nature protection - (Official gazette 80/13)</i></p> <p><i>Law on forest reproductive material (Official gazette 75/09, 61/11, 56/13, 14/14);</i></p> <p><i>Law on game management (Official gazette 140/05, 75/09.,153/09, 14/14)</i></p> <p><i>Law on fire protection (Official gazette 92/10)</i></p> <p><i>Law on water (Official gazette 153/09.,63/11.,130/11, 56/13, 14/14)</i></p> <p><i>Law on roads (Official gazette 84/11, 22/13, 54/13, 148/13)</i></p> <p><i>Law on spatial planning (Official gazette 153/13)</i></p> <p><i>Law on state measurement and cadastre (Official gazette 16/07, 124/10, 56/13)</i></p> <p><i>Law on waste management (Official gazette 94/13)</i></p> <p><i>Regulation of tree marking, wood assortments, transport document and forest order (Official gazette 116/06, 74/07, 55/0925/11)</i></p> <p><i>Regulation on fire protection (Official gazette 33/14)</i></p> <p><i>Regulation on forest protection (Official gazette 121/06, 25/11)</i></p> <p><i>Regulation on land cadastre (Official gazette 84/07,148/09)</i></p>
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- Area and map

4.5.1.3. Football playground and trim path, recreation area for kindergarten and school in forest



<ul style="list-style-type: none"> • Condition / problems 	<p><i>-there is no additional services in the focus area at the moment. Users from the schools are searching for the recreation area suitable for their needs and category.</i></p>
<ul style="list-style-type: none"> • Target state 	<p><i>-The small football playground will be arranged, with place for the school in forest.</i></p>
<ul style="list-style-type: none"> • Purpose 	<p><i>-to develop educational function of the forest and attract new younger visitors which will be introduced with the different forest functions and services.</i></p>
<ul style="list-style-type: none"> • Priority 	<ul style="list-style-type: none"> ○ <i>Medium priority to perform this activity (can be done in the second half of the planning period)</i>
<ul style="list-style-type: none"> • Most important ES 	<p><i>Education and recreation function</i></p>
<ul style="list-style-type: none"> • Possible activities 	<ul style="list-style-type: none"> ○ <i>Possible (planned) use of forests</i>
<ul style="list-style-type: none"> • Unwanted or prohibited activities 	<p><i>-waste disposal, illegal cut of forest, fire ignition, devastation of park infrastructure and nature</i></p>
<ul style="list-style-type: none"> • Silviculture measures 	<p><i>- stand cultivation with thinning, outgrowth cultivation after final cut</i></p>

	<p>- Other works which increase aesthetic and productive value of the trees and stands in park forest (like pruning, crown formation...).</p> <p>Tree health control especially for the dry branches and potentially danger trees above and close to the recreational and educational areas.</p>
<ul style="list-style-type: none"> Measures for wood production 	<p>Before the beginning of the work in the forest, main stakeholders should be informed about the start and length of the planned work. Area should be protected from the uncontrolled access (especially recreational users) with implementation of the work safety measures.</p>
<ul style="list-style-type: none"> Infrastructure measures 	<p>In valid forest management plan for Park forest City of Zagreb (2014.-2023.) there are no plans for the roads construction.</p>
<ul style="list-style-type: none"> Additional plan/sketch, if needed 	-
<ul style="list-style-type: none"> Costs 	<p>Implementation costs are 12500,00 EUR.</p> <p>Equipment costs 10750,00 EUR, costs for preparation and forest works 1750,00 EUR.</p>
<ul style="list-style-type: none"> Financiers 	<p>Project is funded with 15% EU support, and 85% of the Croatian forests Ltd budget.</p>
<ul style="list-style-type: none"> Coordinators 	<p>Ninoslav Matošević, B. sc. Forest – director Working Unit Horticulture Hrvatske šume d.o.o. UŠP Zagreb</p>
<ul style="list-style-type: none"> Stakeholders 	<p>The main stakeholders in Grmoščica are primary local citizens, members of the Črnomerac and Kustošija City council, Kustošijana association, employees of the primary school Kustošija, members of the mountaineering association Vrapče, members of the bicycling club Vrapče, members of the rollerblade club, and Ministry of Agriculture club. Besides the mentioned participants, future users of the area will be the tourists and other interested recreational visitors attracted with the new content.</p>
<ul style="list-style-type: none"> Legal basis Notes 	<p>Forest management plan is based on the Forest Law (Official gazette 140/05, with last amendments in 2018), and Forest management regulations.</p> <p>Other laws and bylaw acts are included in the preparation of the management plan:</p> <p>Law on nature protection - (Official gazette 80/13)</p> <p>Law on forest reproductive material (Official gazette 75/09, 61/11, 56/13, 14/14);</p> <p>Law on game management (Official gazette 140/05, 75/09.,153/09, 14/14)</p>

	<p><i>Law on fire protection (Official gazette 92/10)</i></p> <p><i>Law on water (Official gazette 153/09.,63/11.,130/11, 56/13, 14/14)</i></p> <p><i>Law on roads (Official gazette 84/11, 22/13, 54/13, 148/13)</i></p> <p><i>Law on spatial planning (Official gazette 153/13)</i></p> <p><i>Law on state measurement and cadastre (Official gazette 16/07, 124/10, 56/13)</i></p> <p><i>Law on waste management (Official gazette 94/13)</i></p> <p><i>Regulation of tree marking, wood assortments, transport document and forest order (Official gazette 116/06, 74/07, 55/0925/11)</i></p> <p><i>Regulation on fire protection (Official gazette 33/14)</i></p> <p><i>Regulation on forest protection (Official gazette 121/06, 25/11)</i></p> <p><i>Regulation on land cadastre (Official gazette 84/07,148/09)</i></p>
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