

RECREATIONAL FOREST LANDSCAPE MAINTENANCE: AN OBSERVATION ON SELECTED RECREATIONAL FOREST SITES IN HUNGARY

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Abstract

Recreational forest has being developed for the purposes of preserving and conserving natural forest from diminish. In order to make sure recreational forest sustainability and their existence is long-lasting, maintenance works need to carry out by the management. Furthermore, due to recreational forest landscapes is always the combine of natural landscape and human made elements, a proper and good maintenance plan need being established. Therefore, this study aims to understand how recreational forests being keep up towards sustainability in hungary. Objective of the study is to explore and understand landscape maintenance practices in keeping pace with user needs and demands in hungarian recreational forests. As a result, this study highlighted that landscape maintenance should include all landscape elements which are natural landscape and human made landscape elements in the maintenance program including park cleanliness. Maintenance works could be divides into three categories: daily, corrective and prevention. Their works need being planned according to daily, weekly, monthly and annually based on needs and requirements of landscape types. Proper and systematic landscape maintenance helps in increasing user satisfaction on recreational forest landscape development towards sustainability and long-lasting the park existence.

Keywords: recreational forest, landscape, maintenance, sustainability and hungary.

Introduction

Hungary is a country with relatively low forested cover, about 20 % of the territory (weiss et al 2012). Therefore, maintaining for conserving the existing forest is vital for the country. In line with that, there are many recreational forests being established starting from the period of the campaign for forest parks in the year 1970s. Today, 50 thousand hectares of recreational forest areas had been successful conserved in hungary (schiberna 2006). Most of the park located around tourist resorts, and large cities, especially around budapest. Survey in 2003 has shows that 5 % of people have visited forested area daily for the activities of forest walk, trip, bicycling, taking photos and nature observation (mészáros et al. 2005).

hungarian government has put a serious effort to support and provides services to the recreational forest management to meet public welfare function and high standard forest management. The aimed is to promote forests; the woods provide a pleasant environment for visitors and recreation activities (nebih 2014). This is because recreational forests in hungarian estimated on an annual basis contributed usd 140 billion to the country economy growth (nebih 2014). This had shown that recreational forest is likely to have an increasingly important role in the country development. Therefore, to make sure recreational forest function is continuously provides benefit to the environment, social and economy, landscape maintenance aspect was believe play an important role and need being focus by the management.

managing forest for recreational use often involves active planning, proper trail design and area use designations as well as maintenance management. The management should focus on reducing impacts on the resource while at the same time providing quality outdoor recreation opportunities, so that visitors can have quality outdoor recreation experiences (manning 1999). For instance, recreational trails need regular maintenance due to the impacts of erosion and injury to surrounding vegetation caused by improper use, the spread of invasive plants along

the corridors, and to keep up bridges or other human made elements. Recreational forest managers also need to enhance the aesthetic qualities of forests by implementing a good landscape maintenance approaches and tasks in the area.

landscape maintenance is the way an evolving landscape keeps pace with evolving human needs and demands (thompson & sorvig 2000). The works must need towards sustainability through good management and being according to the highest passable standards (sternloff & warren, 1977) and best management practices. Osman et al., 2006 claimed that proper recreational forest landscape maintenance and management system with clear and well-defined goals, objectives and targets is essential to make sure a quality landscape of recreational forest being achieved. Furthermore, studied by mohd kher (2012) had shown that landscape maintenance aspect is one of the factors affecting people perception towards recreational forest landscape. Keep in mind that most failure recreational site development including forest recreation has a relationship with low maintenance standards and weaknesses in planning (reeves 2000). Realize or not, when a good and proper landscape maintenance management being performed regularly, it helps in providing a comfort environment to the visitors and influencing their perception that indirectly increases the visitor arrival number (roshanim & fazidah 2008). Therefore, landscape maintenance need being planned and implemented in a proper way and with detailed plan works to make sure meet parks' sustainable goal and objectives.

efforts to carry out sustainable forestry have a long history in hungary, since 1879 (peter csoka 1994). After went through several discussions and preparations, the hungarian forestry law being enacted in 1961. Amongst the main items included in the hungarian forestry law is forests are open to the public for recreational purposes and forest owner/user must give a sum (determined by the logging involved) to a special forest maintenance fund. Clearly, this law is heading to sustainability approaches with the aimed to protect and conserve the existing forest areas and at the same time to give recreational services to their citizens. In line with this, the study aims to understand how recreational forests being support towards sustainability in hungary. Objective of the study is to explore, see and understand landscape maintenance practices in keeping pace with user needs and demands in hungarian recreational forests.

Methodology

This study was divided into two approaches as below:

1. Literature review - documents being collected and analyzed relating with landscape maintenance to get a better understanding of landscape maintenance aspects. Documents being collected from a range of academic publications and professional local and website documents as well as from hungarian forestry agency such as pilis park forestry company.

2. Field observation - conducting a field observation on selected recreational forest landscape development and management in hungary. Field observations were carrying out to collect data's about existing physical condition of the study sites. The work has carefully done and free from influence of anybody or body. This in line with the suggestion that field work must being done in detail, free from bias and careful to make sure the originality and reliability of the results (mohd kher 2012; lee 1976). Therefore, this study being carry out according to researchers' intuitive, experience and observation without enforcement and demand from anybody. Information and data's from field observation been considered as the best due to everything happened on the sites is firsthand information and providing real specific event information (merriam 1998). Photos' was taken during field observation as a proven in visual assessment about current landscape maintenance works of the site.

Landscape maintenance and sustainability

Landscape maintenance in recreational forest is important to give health environment, enhancing landscape biodiversity, protecting soil and vegetation, maintaining water quality and keep human made landscape elements in good condition. It' requires a high standard of maintenance services, actions for enhancing user's enjoyment and quality of experience, safeguarding the special qualities of the area and to raise awareness about the environment

sensitivity. Bay in mind that good landscape maintenance approaches can enhance good appearance and longevity of the existing site facilities (wan mohammad, 1995). On the other hand, maintenance aspect can enhance parks quality and provides a quick and highly visible indicator of whether an area is an attractive place for people to live and for economic activities to thrive (trzyna 2005).

Sustainability as applied to the recreational forest landscape maintenance means incorporating the efficiency and complexity of nature into the landscape, design, restoring damaged ecologies, maintaining biodiversity, promoting human health, and providing secure livelihoods as well as managing expectations of the forest aesthetic. In order to do this, good quality development and management including landscape maintenance aspect is necessary. Osman (2002) argued that good environmental quality being gained through quality development and management including good quality maintenance aspect. Therefore, landscape maintenance works must be sustainably not only ecologically, but socially and economically.

sustainable landscape is an approach of sustainable practices in managing recreational forest landscapes including design, construction, implementation and management in a way that will benefit current generations and future generations. In line with this, recreational forests need to have sustainable landscape maintenance management in order the forest being able to continually use by current generation as well as future generations. Thus, it ultimately depends on the cooperation and support from all parties involves which are the management, public/user and decision makers. To support the integrity of the recreational forest within the community, Potts (2011) had listed eight steps in management strategies which are:

- A) be inclusive and involve everyone in the dialogue about resource management.
- B) use all available media to get the message across.
- C) relate national or global issue to the visitors.
- D) get people to interact and discuss their vision for the area.
- E) provide summaries of the facts.
- F) make sure every visitors get clear access to any information available.
- G) involve volunteers.
- H) use information centers and exhibits.

Potts suggestions enhancing that cooperation are necessary in recreational forest landscape maintenance not only from the management, but also from others stake holders. Stake holders such as the public's need being involved in the maintenance program due to them are the user of the park. Many researchers argued that they must be involved in development process including in the decision making and access as well as maintenance tasks (selman 2008; moore-colyer & scoot 2005) to fulfill their requirements and to get full support from them. While these practices are necessary, however, they are not enough (selman 2008).

Landscape maintenance of recreational forest was also related to landscape aesthetic value. Gobster et al. (2007) claimed that aesthetic value has influence people in react towards recreational forest landscape base on their experiences that has closer to landscape (including maintenance aspect). This is because people try to value or perceive recreational forest landscape through aesthetical value that have, what being seen and how landscape being managed by the management. A part of that, landscape aesthetic also has a close relationship with ecology and maintenance works that can give affects to natural sites (gobster et al. 2007).

Due to recreational forest landscape are a combine of two types landscape element, their maintenance can be divided into two category, natural landscape maintenance and human made landscape maintenance. Park management should take a proactive measure to prepare a detailed maintenance program for those type landscapes separately. This is because both types of landscapes need different maintenance activities. Mohd kher (2012) suggested that landscape maintenance could be divides into three types: daily, prevention and repairing to make sure that maintenance work being done in an orderly, efficient and effective. It does be according to daily, weekly, monthly and yearly works planned.

Daily maintenance refers to efforts to protect and restore and keep up all landscape elements in a good and satisfying condition. It's done every day for user's convenience and to improve the visual quality in forest recreation. Some of the activities commonly performed are sweep the debris along the pedestrian/trail, remove the debris and cleaning activities (floors, benches, tables, mirrors, etc.). Preventive maintenance is an activity to prevent further damages from "spreading", conducted weekly, monthly or yearly. Implementation approaches is through identification and avoid potential problems on each element of the landscape of damages to repair. When there are little damages, then the replacement work being immediately carrying out. Meanwhile, repairing maintenance is an activity that being performed after damages occurred on any landscape elements that have been

find. Landscape elements that need being repaired must being marked with a red and white plastic strap so that users do not use it. Repairing works being carried out to make sure that these elements could continue to work and can being used safely.

Landscape maintenance activities in recreational forest cannot be taken for granted. All elements that the park has need being inventoried for easier maintenance schedule. The management team must give full commitment in ensuring the work is successful. Commitments in terms of staffing, time, budget and equipment are necessary. Good landscape maintenance can produce a healthy and safe environment in the park. It also can make the park in readiness for users to use without any obstacle that helps in achieving the sustainable development goal. Maintenance of human made landscape elements and natural landscape elements of the recreation area is mandatory for visitor enjoyment, ultimately, for the recreation area's continued use and existence (fogg & shiner, 1989). On the other hand, poor maintenance had hindered ideal social, economical, environmental and educational benefits of the park (rabare et al. 2009).

Results and discussions

To see extend of the landscape maintenance activities performed in a forest recreation in hungary, normafa recreational forest under the local government of hegyvidék and two areas under pilis park forestry company namely, buda hills recreational forest and visegrad recreational forest being visited and observed. The government of hungary provides the resources required for the local government of hegyvidék to manage the normafa recreational forest. Pilis park forestry company responsible for the park's forests maintenance including infrastructure under their control (www.parkerdo.hu 2014). Maintenance aspects being observed during field observation is on forest vegetation's, soil, facilities, trails, meadow/open space and park cleanliness.

Normafa recreational forest

Previously, pilis park forestry company has managed the normafa recreational forest. However, starting october 2013, the park being manages by the local government of hegyvidék due to hungarian parliament passed a law on rehabilitate normafa to the local government (www.normafa.info 2014). Normafa recreational forest situated at the svábhegy (schwab hill), close to jános-hegy (janos hill) is the highest point of the budapest city (photo 1). This park offers a very beautiful panoramic scenery and fresh air. It's provides a variety of recreational activities to the visitor in all seasons. In winter, skiers and snowboarders flood the hillside if there is enough snowfall. Sledging and cross-country skiing is also popular. Normafa and its environs are a favorite destination for nature-loving families during the summer session. Generally, the natural beauty of the area offers magnificent recreational time to anyone.



Photo 1 normafa recreational forest, budapest hungary got its name from a tree ('fa' in hungarian means 'tree') that was called norma.

normafa landscapes are the combination of natural landscapes and human made landscape elements. Their natural landscape comprises of forest vegetation's, soil, rock and wildlife. Common tree species that being found are turkey oak ([quercus cerris](#)), black locust ([robinia pseudoacacia](#)), pine ([pinus sylvestris](#)), black pine ([pinus nigra](#)), grey poplar ([populus x canescens](#)), black walnut ([juglans nigra](#)), red oak ([quercus rubra](#)) and silver lime ([tilia tomentosa](#)). Amongst wildflowers that being found are [anemone nemorosa](#) and [inula helenium](#). Forest tree in normafa being managed according to silviculture practices. Some of the trees being observed affected by diseases. However, fall or died trees being cut into small pieces for user safety as fire wood (photo 2). Wherever is possible

the areas had been regenerated naturally by seeding. Generally, forest vegetations in this park are under good maintenance. However, vandalism being found where several trees (bark) were knock and written with words by irresponsible visitors.



Photo 2 forest trees in normafa being managed according to silviculture practices, however, vandalism being found where several trees (bark) were knock and written with words by irresponsible visitors

soil in normafa park facing erosion and compactness problems at certain parts (e.g. Along walking trails, under the chair lift cable line and at children playground area). Urgent preventive works need being carrying out to protect further bad erosion being occurring (photo 3). Otherwise, park sustainability being affected because soil and nutrient conservation, water quality, hydrology systems and vegetation are always being referred to recreational forest landscape sustainability (haines-young et al. 2006). Furthermore, the exposed and eroded soil in the park will reduces the visual quality and visitor experience as well as causes injury to visitor.

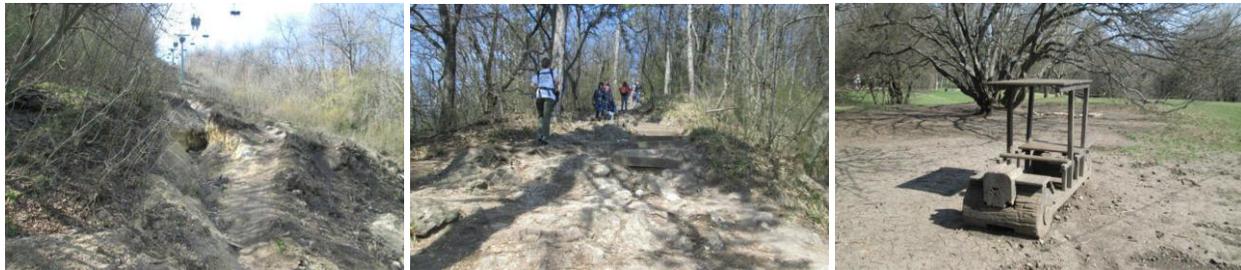


Photo 3 urgent preventive works need being carrying out to protect further bad erosion and soil compactness being occurs in normafa recreational forest.

Many human made landscape elements (facilities) being built in normafa park to fulfill user's need and demand. Amongst the elements are normafa ski house, chair lift cable, children railway and station, erzsebet observation tower, bench, picnic table, signage, notice/information board, fitness elements, children play equipment, toilet and parking area. Field observation noticed that for the major structure elements such as normafa ski house, chair lift cable, children railway station and erzsebet observation tower are in good maintenance. This is due to the fact that those structures are in a huge size and related with tourist attraction as well as user safety. However, for the basic recreation facilities an urgent corrective and preventive maintenance works being suggested being done (benches, signage, information board and picnic table). That facility requires works such as repainting, replacement of broken parts and cleaning from dusk/dirt (photo 4).



Photo 4 basic recreation facilities in normafa recreational forest such as benches, signage, information/notice board and picnic table/bench requires an urgent corrective and preventive maintenance works for user convenience.

trails in normafa park are human made landscape elements and need only minimal maintenance. However, if the maintenance works not being done in proper way, it causes to visual quality reduction and giving inconvenience to the user. From field observation, it was seeing that some part of normafa trail routes need preventive and corrective maintenance works from eroded and compactness (photo 5). Maintenance to keep trails in good condition may include, among other tasks, clearing encroaching vegetation and fallen trees, as well as repair and replacement of trail signs, water drainage features, trail bridges, and other trail structures. Delaying maintenance can increase the effort required to do routine maintenance and lead to increased maintenance costs in the future (gao 2013). Therefore, periodic maintenance being suggested here due to natural processes are constantly shaping and altering the forests where trails are no exception (harkins & megalos ____).



Photo 5 some part of normafa trail routes need preventive and corrective maintenance works to protect soil erosion.

during filed observation, author noticed that meadow/open area in normafa park is in good, healthy and clean condition. The grasses being mown and no littering are found (photo 6). This situation provides a good quality visual to the user. However, it is seeing that has cyclist track on this area, close to the trees edge row. Therefore, it is advisable here that the track should being close and move into other side to avoid soil erosion and grasses being died as well avoid conflict among user in the park.



Photo 6 meadow/open area in normafa park is in good, healthy and clean condition

generally, norma park is in good condition. Cleanliness is at their best where there is no invisible pile of garbage or littering can be found everywhere (photo 7). Cleanliness care is very important in recreational site in order to avoid environmental pollution problem that can causes to decrease number of visitors. Park cleanliness is very important because issues of littering and pollution can give an impact on recreational forests in maintaining the number of visitors day by day (nurfarhana 2010).



Photo 7 cleanliness in normaafa is at their best where there is no invisible pile of garbage or littering can be found everywhere

Buda hills recreational forest

Buda hills recreational forest being managed by budapest forestry of pilis park forestry company and its predecessors since 1969 (photo 8). Nowadays the size of recreational forests on the buda side is 2500 acres. The most frequented area of buda recreational forests is the forest block between szechenyi hill and harmashatar hill. According to pilis park forestry company management, this place being visited by 5,000,000 people every year. The buda hills consist mainly of limestone and dolomite, the water created cave formation, the most famous ones being the pálvölgyi cave and the szemlőhegyi cave. The hills being formed in the triassic period (halasz et al. 2008). The highest point of the hills and of budapest is jános hill, at 527 metres above sea level. The lowest point is the line of the danube which is 96 metres above sea level. The forests of buda hills are environmentally protected.



Photo 8 buda hills recreational forest has been managed by pilis park forestry company since 1969

due to buda hills being developed as recreational site, thus their landscapes are combination of natural and human made elements. This recreational site still keeps the existing forest vegetation's in natural setting. Amongst the common tree that being found are oak tree (covers 53 % of the area), beech, lime, maple, linden, ash and pine trees. The typical wild fruit trees also being found such as cherry, pear and dogwood. Some unique endemism and relict species such as dolomite flax (*linum dolomiticum*), the hungarian seseli (*seseli leucospermum*) and the stephen king'pink (*dianthus plumarius* ssp. *Regis-stephanii*) also being found. In maintaining forest vegetations and to make sure forest trees continuing exist in the park, the management applies silviculture technique (such as selective cutting) and natural methods (such as allow seeds growth naturally) (photo 9). Visitors are strictly prohibited to collect, destroy or interfere in any way with plants in the park.



Photo 9 the management applies silviculture technique (such as selective cutting) and natural methods (such as allow seeds growth naturally) in maintaining forest vegetation's of buda hills.

buda hills recreational forest also facing with the problem of soil erosion and compactness as normafa at certain parts (e.g. Along walking/cycles trails and at children playground area). Urgent preventive works need being carrying out to protect further bad erosion and compactness being occurring. Furthermore, regular maintenance, including surfacing repairs, erosion control and embankments are necessary. Bay in mind that improper maintenance trails can become dangerous or unusable to the user (photo 10). However, the cleanliness of the trails is in good condition.

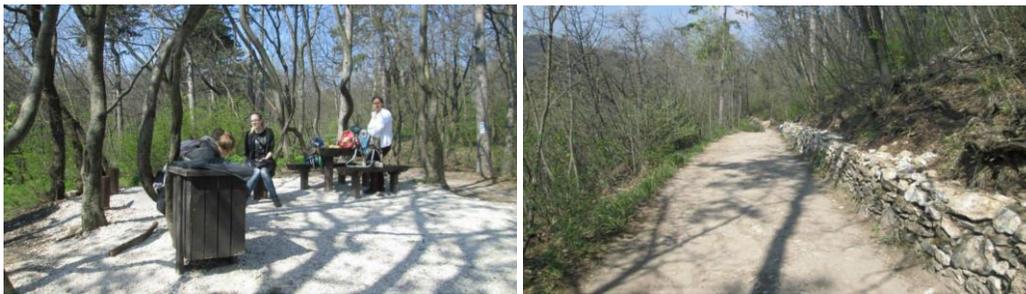


Photo 10 regular maintenance, including surfacing repairs, erosion control and embankments are necessary in buda hills recreational forest

basic recreational facilities such as benches, children play equipment, notice boards, rubbish bin and picnic table are generally in good condition (photo 11). But some of them need repairing works such as replacing the missing parts and repainting. For instance, authors notice that trail wooden bridges had broken on rails part and need corrective maintenance. In the mean time, vandalism also occurred in the park where some of the elements being strike through by irresponsible user, such as on notice boards.



Photo 11 basic recreational facilities such as children play equipment, notice boards, rubbish bin and picnic table are generally in good condition

trails in buda hills recreational forest also faced problems of soil compactness and erosion because of heavy recreational activity used, similar with normafa park. However, looking on trail cleanliness, it is seeing that the trail are in good condition where no littering and animal feces being found. But, trail wooden bridge being found requires corrective maintenance due some part had broken (photo 12). It is to remind here that the same route for walking

users and cyclist had created conflicts among user as well as causes dangerous to walkers in this park. It is better if the park management could separate the route for walker and cyclist for user convenience.



Photo 12 the same route for walking user's and cyclist had created conflicts among park user as well as broken hand rails wooden bridge causes dangerous to walkers

open space in buda hills being used for football field (futsal) and children playground area. Therefore, due to heavy duty of used have causes to their grasses being died and the soil being compacted (photo 13). Preventive maintenance works need to carry out urgently to replant the grass on that areas. Soil improvement also needs to carry out to make sure the soil compactness being treated. The place need being closed to the user for a while during maintenance worked. This task is very important for achieving the sustainability concepts of forest recreational area.



Photo 13 open spaces in buda hills being used for football field and children playground area causes to soil compactness and their grasses being died.

Visegrad recreational forest

Visegrad forestry unit under the pilis park forestry company managed the park. This recreational forest is among the tourist attraction place in visegrad region. This area is one or the last european remains royal forest that makes visegrád special. It consists of a medieval royal palace (with its garden), two castles, a franciscan friary and the surrounding forest. One of the castles being built during the era of bela iv (1235-1270) (photo 14). The monument represent unique values, and all being preserved in and restored to various conditions, however, the combination make them an outstanding monument of the kind of landscape structure that was prevailing for half a millennium and created the richest cultural landscapes. The monument being manage by the matyas kiraly muzeum while, the park and forest being manage by pilis park forestry.



Photo 14 during the era of bela iv (1235-1270) one of the castles being built and become as focal monument in visegrad recreational forest

during field observation, author noticed that some parts of the monument require corrective maintenance works (especially for wooden structure) (photo 15). Broken/decay stair planks must being replaced for user safety and repainting or re varnish should being carry out to improve the overall quality of the facility appearance. The most important aspect of wooden care and maintenance is to know the type of wood used because each wood has different characteristics and requires a specific cleaning agent. For instance, redwood need annual maintenance by using a special oil, while for white cedar, pine and oak it be must protect with a topcoat or a water resistant stain. Otherwise, the wood will quickly decompose.



Photo 15 some parts of the monument need corrective maintenance works (especially for wooden structure)

Visegrad recreational forest was covers by deciduous forest trees like beech, hornbeam and oak. Rare and protected species also was found in this area such as purple flower frills (*himantoglossum caprinum*), hungarian doricum (*doricum hungaricum*), lobed vesepafrany (*polyticum aculeatum*) and various orchids (11 species). Forest of these area having manages according to 10 years forest plan, which is the forest and nature conservation laws and professionals standard of conservation strictly followed. Silviculture practices such as afforestation being practiced to conserved and protected natural forest (photo 16). Thus their forest looks in good condition. However, vandalism also seen where some trees bark being slash by irresponsible visitors. Even though the cases of vandalism is small in this park, but if no action taken its can spread up in future. Therefore, to control vandalism activity enforcement needs being strengthening.



Photo 16 to make sure the natural forest being protected, silviculture practices such as afforestation being practiced in visegrad recreational forest. However, vandalism also was seeing where some trees bark being slashed by irresponsible visitors.

others than historic monument the park have, the management also has built many new human made landscape elements for user convenience. Among the elements are forest playgrounds, camping site, an observation tower, hundreds of bench, table, trash, rain place, fireplace, 100 km hiking and walking trails as well as four nature trails. The most attractive element is the forest house of culture. During field observation, author notice that some of the elements need corrective maintenance due to going to dull and decaying (photo 17). Some of them look like abundant. The management should pay attention that a human made landscape once created, needs constant care and maintenance. Further, some of the elements get worn out and destroyed over a time and need being replaced. This is very important for user safety, convenience and to make sure the elements being ready to use at any time without obstacle. Unmaintained man made elements also can reduce user experience and causes to park visual quality reduction.



Photo 17 some of the elements need corrective maintenance due to going to dull and decaying. Some of them look like abundant.

trails in visegrad recreational forest also faced problems of soil compactness and erosion because of heavy recreational activity used, similarly with normafa and buda hills recreational forests. Generally, looking on trail cleanliness, the trails seeing in good condition, but a can littering being found. Author also notice that wooden hand rails being found requires corrective maintenance due look dull and some part had broken (photo 18). It is to remind here that this situation had created dangerous to the user in this park. An urgent action needs being taken to avoid further destruction. Stepankova et. Al. (2012) claimed that high quality and timely maintenance will greatly extend the useful life of a trail. Therefore, routine maintenance for trails needs being taken which are remove debris and obstacles; keep up clearances; clear trail edges; replace and maintain trail signs and route markers; keep users on the trail; and check and report conditions and serious problems (dcr 2010).



Photo 18 wooden hand rails being found requires corrective maintenance due look dull and some part had broken

Soils in visegrad recreational forest also facing the same problem with normafa and buda hills park, which is compactness and erosion especially along the trail routes (photo 19). Thus, it requires maintenance actions from the management to protect further bad situation and soil losses in the park. The management should being noted that soil issues cover a broad range of topics such as soil erosion, soil sealing, soil remediation, soil neglect and soil marginalization (breiling 2012). The number of soils affected by soil erosion or desertification is much larger due to mechanization used and in a more negative case the land is not managed at all, providing many possibilities for destabilizing the landscape (breiling 2012). Writer believes that it also due to extensive use for recreation activity

such as cycling which uncontrolled number of visitor. Therefore, soil maintenance must being accounted in the park management system and need a proper maintenance schedule.



Photo 19 soil erosion being occurred along the trails in visegrad recreational forest that needs maintenance works

Observing on park cleanliness, the park being considered as in good condition and clean. But some actions need being taken on died and fallen trees/branches along the trails where they need being clear (photo 20). Otherwise it would destruct park appearance and could being danger to the user. The management should realize that a recreation site that is clean and well maintained is easier to keep in that condition, since visitors are more cooperative when they satisfied with clean facilities as well as deters vandalism (forest service 1995). Forest service (1995) also claimed that one of the target areas for vandalism is “property that tends being derelict, incomplete, or badly kept.” Therefore, ensuring park cleanliness is vital for the benefits of environment, economy and social.



Photo 20 some actions need being taken on died and fallen trees/branches along the trails need to clear

Study sites maintenance observation summary

Table 1 shows the summary of maintenance aspects that being observed on three selected study sites.

Table 1 study sites maintenance observation summary

Aspects observed	Study sites		
	Normafa	Buda hills	Visegrads
Vegetations	<ul style="list-style-type: none"> • Managed according to silviculture practices • Fall or died trees - cut into small pieces for user safety as fire wood • Regenerated naturally by seeding • Visitors are strictly prohibited to collect, destroy or interfere in any 	<ul style="list-style-type: none"> • Keeps the existing forest vegetation's in natural setting • Applies silviculture technique (selective cutting) and natural methods (allow seeds growth naturally) • Visitors are strictly prohibited to collect, 	<ul style="list-style-type: none"> • Having manages according to 10 years forest plan • Followed forest and nature conservation laws and professionals standard of conservation • Practiced silviculture practices such as

	way with plants in the park.	destroy or interfere in any way with plants in the park.	afforestation
Soil	<ul style="list-style-type: none"> • Facing erosion and compactness • Reduces the visual quality and visitor experience 	<ul style="list-style-type: none"> • Facing with the problem of soil erosion and compactness • Reduces the visual quality and visitor experience 	<ul style="list-style-type: none"> • Facing with the problem of soil erosion and compactness • Reduces the visual quality and visitor experience
Facility	<ul style="list-style-type: none"> • Major structures such as ski house, chair lift cable, are in good maintenance • Basic recreation facilities need urgent corrective and preventive maintenance • Vandalism occurred 	<ul style="list-style-type: none"> • Basic facilities are generally in good condition • Some of them need repairing works such as replacing the missing parts and repainting • Vandalism occurred 	<ul style="list-style-type: none"> • Some parts of the monument require corrective maintenance (especially for wooden structure) • Some of the elements going to dull and decaying • Some of the elements get worn out and destroyed over a time and need being replaced
Trails	<ul style="list-style-type: none"> • Some parts need preventive and corrective maintenance works from eroded and compactness • Periodic maintenance being suggested • Cleanliness is in good condition. 	<ul style="list-style-type: none"> • Faced problems of soil compactness and erosion • Wooden bridge trail being found requires corrective maintenance • Cleanliness is in good condition. 	<ul style="list-style-type: none"> • Faced problems of soil compactness and erosion • Wooden hand rails requires corrective maintenance due to dull and some part had broken
Meadow/open space	<ul style="list-style-type: none"> • In good, healthy and clean condition • The grasses being mown and no littering are found 	<ul style="list-style-type: none"> • Their grasses being died and the soil being compacted • Preventive maintenance works need to carry out 	<ul style="list-style-type: none"> • In good, healthy and clean condition • The grasses being mown and no littering are found
Cleanliness	<ul style="list-style-type: none"> • At their best where there is no invisible pile of garbage or littering can be found everywhere 	<ul style="list-style-type: none"> • At their best where there is no invisible pile of garbage or littering can be found everywhere 	<ul style="list-style-type: none"> • At their best where there is no invisible pile of garbage or littering can be found everywhere • Died and fallen trees/branches along the trails need being clear

from table 1, clearly being understand that all of study sites had given priority on maintaining their forest vegetations' through silviculture practices for controlling the establishment, growth, composition, health, and quality of forests to meet diverse needs and values. Silviculture represents a balance between overall natural resource protection and forest resource use of the parks. Park cleanliness also being given priority by the managements to offer a good visual quality and experience to the user.

table 1 also shows that each management parks need to take further actions and care on soils, basic facilities and meadow/open areas due to those elements under threat because of improper maintenance works. Again, maintenance program and schedule is necessary being established by the management to fulfill sustainability concept.

Recommendations

Due to recreational forest landscapes are mixes of the natural and human made elements, it has urged future development plan should look at the potential of management systems that can accommodate all the changes that occur, including maintenance needs, user’s and the potential roles and functions. It’s also should outline a clear and comprehensive maintenance management standard that ensuring the goal and objectives of the park development being followed through into the maintenance activities. Landscape maintenance for recreational forest is outline as figure 1. Two categories being set up for recreational forest landscape maintenance which is natural landscape and human made element landscape. Natural landscape maintenance should apply silviculture and conservation strategy, while human made landscape maintenance being grouped into three activities (daily, corrective, preventive). Therefore, all landscapes element being recorded and inventoried into the system for easy maintenance management.

it was also recommended here that the management use written instructions to its employees about the maintenance tasks of all landscape elements that need being done . In addition, the action plan is not maintenance chores should also be identified so that priorities being given with simple maintenance such as repairs and preparation for a specific event. To ensure proper system maintenance, the management should appoint responsible staff for each type of assignment as head of maintenance, crew or contractor. With this, the maintenance activities being monitor easily and efficiently. Most importantly, the management should conduct maintenance planning system, rigorous, exercise control workload so that no maintenance being neglected and find schedule daily, weekly and seasonal necessary. It includes matters related to time, staff, and equipment and material estimates being used.

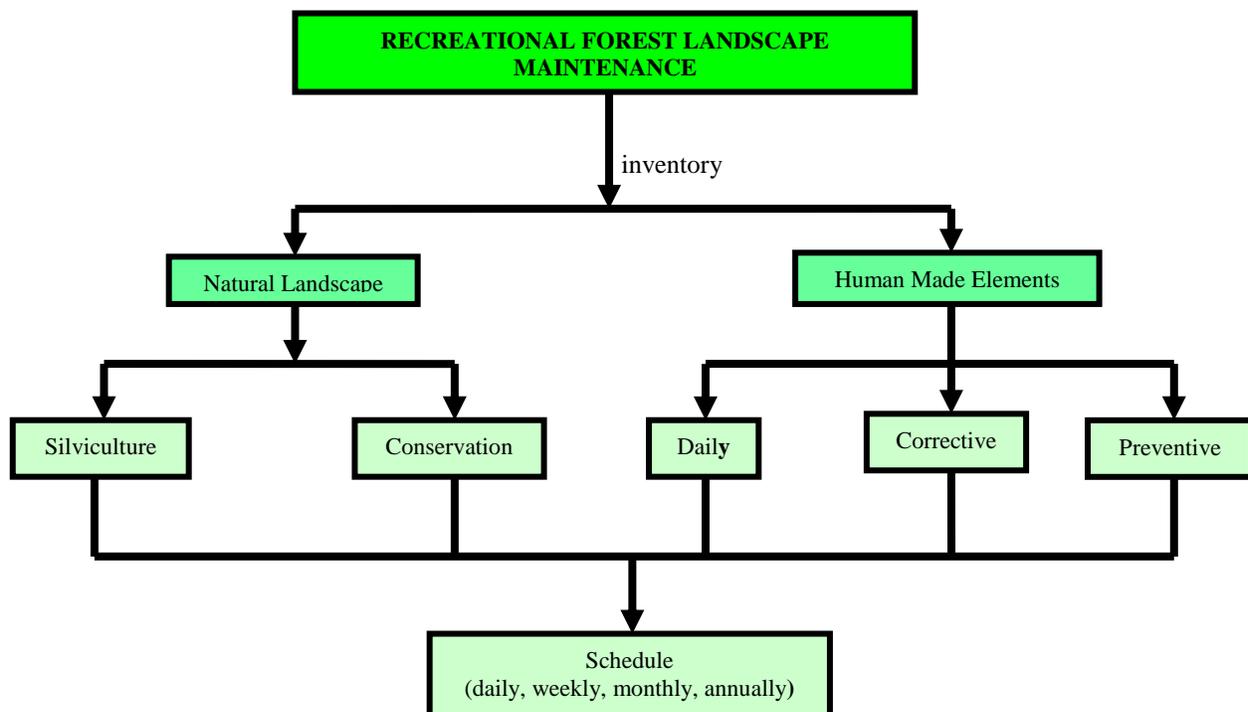


figure 1: recreational forest landscape maintenance

Conclusion

Maintenance activities in the recreational forest area are very important being aware of and are essential to encourage and safeguard the timeless beauty of a park. Approach to keep up the human made landscape elements after the damage occurrence should be avoided to discuss rising costs. Realize or not, with a proper maintenance program a park will flourish year after year and create a positive first impression, set up a peaceful mood and increase park value. Furthermore, a planned maintenance activity can make sure sustain a recreational forest development being achieved. Perception that landscape maintenance is not important before needs being change to very important aspect. The management should realize that maintenance activity is division of the park management part that needs being focus too to avoid development failure in future.

park management effort on maintenance works that are only focused on the trails and park cleaning of garbage collection has implications for keep of human made elements that are or are not given proper attention. Indeed, this maintenance activity was less supportive towards the park sustainability due to poor management maintenance system. It also can eventually cause the user satisfaction level of maintenance to stay at a level not satisfied. These issues may arise due to not enough budgets, lack of staff and no/unclear maintenance standard. So, it is time for management to allocate adequate budgets and provide maintenance standards for landscape maintenance activities (especially on human made landscape elements). User look that the weaknesses in maintenance aspect as management's incompetence in managing forest recreation. Therefore, it is better for the management to focus on landscape maintenance aspects of existing recreational forest and not building an excessive facility to increase visitor experience.

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