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Landscape evaluation of the "Sheikh Sou" suburban park created in an old Mediterranean rangeland

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Abstract. Rangelands in the Mediterranean region are diverse ecosystems holding great recreation potentials. Landscape evaluation is recognized as a powerful and interdisciplinary research method for evaluating diverse landscape systems such as natural parks and suburban recreation areas. The "Sheikh Sou" suburban park, which is located on the northern edge of the Thessaloniki metropolitan area in North Greece, was chosen as the study area. Sheikh Sou, originally a typical Mediterranean rangeland, was partially restored by planting pine trees in the mid 30's as an erosion prevention strategy. Following a long history of disturbances, today the park contains six vegetation types: old pine groves, shrublands, grasslands, mixed shrublands with pines that have emerged after a fire due to natural revegetation and several riparian zones. All these vegetation types form a rich mosaic of landscape units that this paper aimed to evaluate. For this purpose, twenty landscape evaluation criteria were applied and graded by experts and a visual management goal was set. The analysis showed that mixed shrublands and riparian areas were visually attractive landscapes receiving higher grades, followed by grasslands. As opposed to this, shrublands and old pine groves received lower grades and became less sensitive to management interventions. Our results suggest that pine groves and ungrazed shrublands had a negative effect on total landscape value.

Keywords. Pine grove – Unmanaged shrublands – Evaluation criteria – Visual management goal.

Evaluation du paysage du "Cheikh Sou", parc périurbain créé dans une ancienne zone de pâturage méditerranéen.

Résumé. *L'évaluation des paysages est reconnue comme une méthode de recherche puissante et interdisciplinaire, pour évaluer les divers systèmes paysagers tels que les parcs naturels et aires de loisirs suburbaines. Les pâturages dans la région méditerranéenne sont des écosystèmes variés détenteurs de grands potentiels de loisirs. Le parc suburbain "Cheikh Sou", situé au-dessus du centre de la ville de Thessalonique dans le nord de la Grèce, a été choisi comme zone d'étude. À l'origine, Cheikh Sou était un parcours typique de la Méditerranée, partiellement restauré par la plantation de pins au milieu des années trente pour la protection des sols. Après de nombreuses difficultés, le parc comprend aujourd'hui six types de végétation: les pins, anciennement plantés, des arbustes, des prairies, une zone arbustive mixte mélangée à des pins apparue par régénération naturelle suite à un incendie et plusieurs zones riveraines. Tous ces types de végétation forment une riche mosaïque d'unités paysagères que cet article vise à évaluer. À cet effet, 20 critères d'évaluation du paysage ont été appliqués et classés par des experts et un objectif de gestion visuelle a été créé. L'analyse a montré que les zones arbustives et riveraines mixtes étaient visuellement attrayantes recevant des notes supérieures suivies par les prairies. Au contraire, les zones arbustives et l'ancienne plantation de pins ont obtenu des notes inférieures et sont devenues moins sensibles aux interventions de gestion. Il a été conclu que la plantation de pins et les zones arbustives non pâturées ont eu un effet négatif sur la valeur totale du paysage.*

Mots-clés. *Plantation de pins – Zones arbustives non pâturées – Critères d'évaluation – Objectif de gestion visuelle.*

I – Introduction

Landscape evaluation is widely recognized as a powerful and interdisciplinary research method suitable for evaluating diverse and traditional landscape systems (Otero *et al.,* 2007), such as rangelands. Rangelands provide a multitude of goods and services not only to rural populations, but also to large urban areas located within or among them (Havstad *et al.,* 2007), including recreational areas such as suburban green parks. Mediterranean rangelands are man-made pastoral landscapes of great variety and value (Papanastasis and Chouvardas 2005) suitable also for recreational use. In North Greece, three vegetation types of Mediterranean rangelands can be found, namely grasslands, shrublands and open forests. The management activities on these pastoral landscapes may be grouped into three main actions: grazing, reforestation followed by prohibition of livestock grazing and abandonment (Papanastasis *et al.,* 2015). The establishment of a suburban green park in previously managed rangelands usually includes reforestation and prohibition of livestock grazing and has a significant impact on landscape value. The aim of this study was to evaluate the landscape of suburban Mediterranean rangelands as they are formed through management activities.

II – Materials and methods

"Sheikh Sou" suburban park, located on the northern edge of the Thessaloniki metropolitan area in northern Greece, was chosen as the study area. Historical records suggest that since the 16th century "Sheikh Sou" was a typical Mediterranean rangeland (a mixture of grasslands and shrublands), where unmanaged wood cuttings and overgrazing activities occurred (Kallidromitou, 2015). During the 20th century, the area was partially reforested with pine trees for soil protection, firstly from the Ottoman municipality of Thessaloniki (1908) and later on from the Greek municipality and the Forestry School of Aristotle University of Thessaloniki (1929). From the mid-30's until the mid-80's, 5.000.000 pine trees were systematically planted in the park, transforming the previously established Mediterranean rangeland into a monocultural pine grove (Kallidromitou, 2015). During that time the park had a long history of disturbances, most important of which was the great wild fire of 1997, which destroyed more than 50% of the pine plantation (Kallidromitou, 2015). The park today is protected as a wildlife refuge area, where livestock grazing and wood cutting are forbidden. It includes six vegetation types: old pine groves that were never burned, mixed shrublands with pines that emerged after the fire due to natural revegetation, shrublands, grasslands, and several riparian zones. All these vegetation types form a rich mosaic of landscape units.

In order to evaluate the six landscape units, 20 evaluation criteria were applied (Table1) (Ispikoudis *et al.,* 2001). These kinds of criteria are based on the physical, aesthetical and psychological attributes of the landscapes and need to be evaluated by a panel of experts (Otero *et al.,* 2007). In the present study, five experts visited all six landscape units and graded each one on a scale from 1 to 4 (Ispikoudis *et al.,* 2001).

The final score of each landscape was the mean of the cumulative grade of each expert. Based on the final grades (ranging from 20 to 80), a value scale and a visual management goal was set for each landscape, namely: Low value/ Maximum Modification (20-35/ MM), Moderate value/ Modification (35-50/ M), High value/ Partial Retention to Retention (51-65/ PR – R,) or Very High value/ Preservation (65-80/ P) (Bacon, 1979, Ispikoudis *et al.,* 2001).

III – Results and discussion

The research showed that the vegetation types of mixed shrublands with pines and riparian zones received higher grades, constituting highly valued landscapes, and retention was set as their visual management goal (Table 2). Grasslands also constituted highly valued landscapes, but were less attractive than the former ones, and their visual management goal was partial

retention. Similarly, shrublands scored a high landscape grade but with a marginal value of 51.2. On the other hand, old pine groves received lower grades, suggesting that planting pines in a former shrubland creates moderately valued landscapes, where modification can be set as the visual management goal.

Table 1. Landscape evaluation criteria and their grading system (adapted from Ispikoudis *et. al.*, 2001)

Criteria	Grading							
Scale	Limited	1	Small	2	Big	3	Huge	4
Enclosure	Tight	1	Enclosed	2	Open	3	Exposed	4
Variety	Exposed	1	Small	2	Big	3	Huge	4
Harmony	Chaotic	1	Discordant	2	Balanced	3	Harmonious	4
Movement	Dead	1	Calm	2	Busy	3	Frantic	4
Texture	Smooth	1	Managed	2	Rough	3	Wild	4
Coloring	Monochrome	1	Muted	2	Colorful	3	Garish	4
Rarity	Ordinary	1	Unusual	2	Rare	3	Unique	4
Security	Threatening	1	Unsetting	2	Safe	3	Comfortable	4
Stimulus	Boring	1	Bland	2	Interesting	3	Invigorating	4
Impression	Offensive	1	Unpleasant	2	Pleasant	3	Beautiful	4
Type of view	Far	1	Enclosed	2	Interrupted	3	Panoramique	4
Fragility	Big	1	Moderate	2	Small	3	Not at all	4
Naturalness, Typicalness, Size, Importance, Authenticity, Symbolic value, Potential value	Minimum	1	Small	2	Moderate	3	Big	4

Table 2. Landscape value grades for each landscape unit in the "Sheikh Sou" suburban park

	Old pine groves	Mixed shrublands with pines	Shrublands	Riparian zones	Grasslands
Total Landscape Value	49.20	63.00	51.20	59.60	54.40

Analyzing the grades for each landscape unit and taking into consideration the physical, aesthetical and psychological attributes of landscapes showed that aesthetic criteria (e.g. coloring, variety, harmony, texture) and also psychological ones (e.g. security, impression, enclosure, stimulus) received higher grades in the mixed shrublands and in the riparian zones and partially in the grasslands. This can be attributed to the fact that these vegetation types, especially the mixed shrublands and the riparian zones, sustain a great variety of vegetation species in number, color, shape and size in comparison to the old pine groves and the old ungrazed shrublands. This variety of species promotes the aesthetic value of the landscape and the feeling of relaxation and enjoyment. The fire that created the mixed shrublands transformed the monotonous dark monocultural pine groves to a diverse landscape with a variety of plant species such as *Cistus* sp., *Quercus coccifera* etc. The riparian zones, due to the presence of water, also created diverse systems, but these are much smaller in size and practically embedded in between the old pine groves. The ungrazed old shrublands received lower grades due to the fact that grazing prohibition reduced plant diversity and created a monotonous landscape of old Kermes oak (*Quercus coccifera*) shrubland. It is well documented that ungrazed shrublands tend to reduce their diversity, productivity, ecological values and their ecosystem services in general (Papadimitriou *et al.* 2004).

No significant differences were found while analyzing the physical criteria for the six landscape units. Physical criteria such as scale, naturalness and typicalness gave similar values to all units, with the exception of fragility, which, especially for the old pine groves, scored a very low grade of 1.2 (max 4). The latter datum was probably due to the fact that the old pine groves are very sensitive to disturbances such as wild fires, insect-induced diseases etc.

The visual management goal of retention for the mixed shrublands and the riparian zones of the Sheikh Sou park suggests that management activities suitable for a suburban park, such as recreation activities, should not be visually evident, in order to protect the significantly high landscape value of these two units. Partial retention, on the other hand, allows these kinds of activities to be visually noticeable to some extent. This is the case for the grasslands and the shrublands of the park, but only on condition that they repeat the form, line, color and texture of the surrounding landscape. Finally, the management goal of modification allows structures and recreation activities in the old pine groves to be more visually dominant as this landscape unit is considered less sensitive.

Our landscape evaluation results suggest that pine groves and old shrublands had a negative effect on the landscape value of the "Sheikh Sou" suburban park, thus reducing its recreational value.

IV – Conclusions

Landscape evaluation analysis of the six landscape units of the "Sheikh Sou" suburban park revealed that mixed shrublands with pines and riparian areas were visually attractive landscapes, very sensitive to management activities. Shrublands and old pine groves, received lower grades and became less sensitive to management interventions. It was concluded that pine groves and ungrazed shrublands had a negative impact on the total landscape and recreation value.

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