

FUNCTIONAL ASSESSMENT OF FORESTS AS RECREATIONAL RESOURCES

[Professor Edvardas Riepsas](#)

Lithuanian Agricultural University
Lithuania

Riparian forests mostly serve as recreational resources, although their water protection and anti-erosion functions are also important. In order to improve the efficiency of these functions, it is necessary to perform different management means. In the areas where all the functions are important, it is essential to have the means properly balanced. Use of the model presented allows to reach the objectives in the coastal areas, where recreation is the most important function of the forests.

From the standpoint of methodology, investigations on recreational forests belong to the field of functional anthropological applied analyses of forest landscapes, as local spaces necessary for realising the recreational demands of the population. The evaluation of biological, humanitarian and socio-economical demands of the population for forest recreation provides a foundation of complex investigations.¹

A fundamental logical network of methodical differentiating of studies on recreational resources, suggested by P. Kavaliauskas, may also be used for investigating recreational forests.² However, purposeful application of the findings is conditioned by the organisational/economic peculiarities of this branch of forest management. It determines the development only of some trends of the research, including those necessary for grounding a system of indices for the functional assessment of forests as recreational resources.

In the modern branch of forest management, two purposeful trends of results for the assessment of forests as recreational resources were singled out: (a) the allotment of forests with prevalence of their recreational function, and (b) the projection of organisational/economic measures. A different application objective of the findings determines the composition of indices in the system of assessment. With their aid, reliable information can be obtained. Two basic requirements for establishing indices to assess forest recreation potential are presented: (a) indices must be general regarding the object assessed - allotment of forest inventory, forest plot, compartmentalisation, forest mass - and the conditions of conducting the assessment - ratio of the amount to complexity of field and indoor operations; (b) it should be appropriate to include the indices in the system of general methods for complex forest assessment.

A high degree of generality of the method provides a wide application of assessment, with respect to the precision required and the cost of carrying out the assessment. Inclusion of assessment indices in the system of general complex assessment methods offers an opportunity for alternative decision-making to determine the main function of forests.

The system of assessment indices is assigned for projecting specialised organisational measures for forest management and public services. This system must favour optimal decision-making in improving the recreational properties of forests, and in ensuring their protection and rational use. Also, the system has to encompass a complex of criteria, taking into account the biological, humanitarian and socio-economic requirements of visitors.

The following four most important qualities for assessing recreational potential have been singled out: aesthetic relevance, environmental quality, topography and stability of forest ecosystems (Figure 1). Relevance of a forest to recreation, in a psychological aspect, is determined by the aesthetic criteria. Information and interpretation attributes are less investigated. According to Kavaliauskas,² usually one fails to unite all the three groups of criteria into the general system of quantitative parameters. Interpretation and information peculiarities of forests are to be investigated in the future.

Objective characteristics of natural landscapes are revealed by three factors: spatial structure, diversity and natural state. Unfortunately, in the practice of forest management, the significance of the above characteristics in many methods of aesthetic evaluation of forest landscapes are not substantially evaluated. In most methods, the indices characterise not their beauty but their forestry/ecological properties - quality, stocking, age, health, hydrological conditions of an area, forest type. Besides, only quantitative indices of beauty are applied. Purvinas³ finds this method to be erroneous. Consequently, it necessitates conforming objective quantitative indices of beauty to subjective emotional criteria. Figure 2 presents a system of assessment indices for the aesthetic properties of forests.

Forests relevant to recreation, in terms of improving health and physiological processes in a human organism, are characterised as sanitary/hygienic. In forest ecosystems, these environmental attributes are determined mainly by micro- and anthropo-climatic conditions, qualitative and quantitative parameters of air and water, as well as by natural food products and medicinal herbs. A complex of these properties stipulates forest relevance to recreation from the point of view of biotherapeutics and climate. Most sanitary/hygienic forest functions are investigated insufficiently. Until recently, a system of research based standards of the sanitary/hygienic recreational capacity of forests was lacking. This was due to the absence of a reliable methodology and devices for the objective evaluation of the reactions of the human organism to different biotic and sanitary/hygienic forest properties. Therefore, only approximate significance determination of some indices, such as air

quality, is feasible.

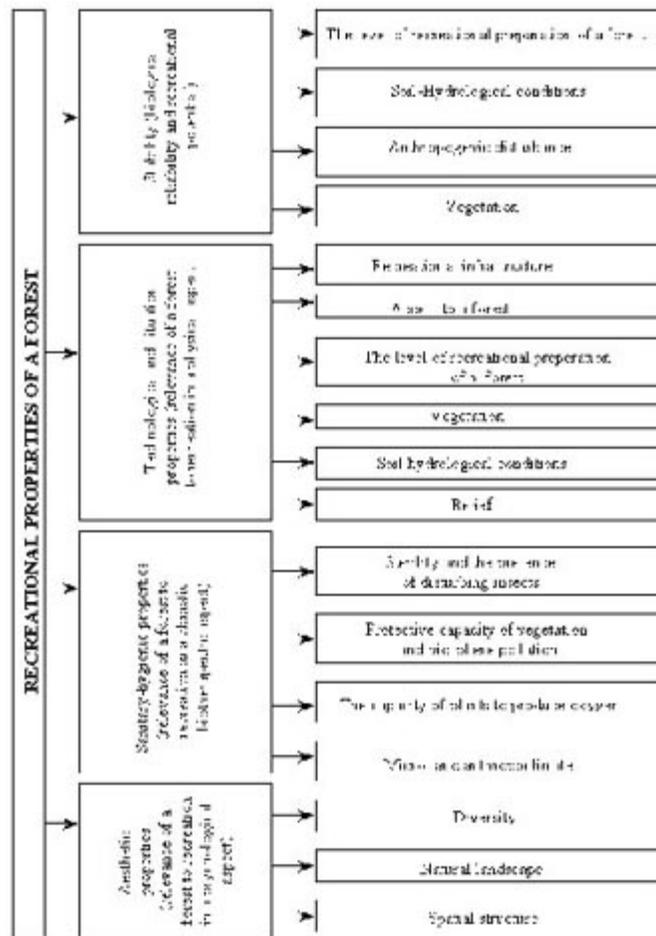


Figure 1. Methodological differentiation of the recreational characteristics of a forest

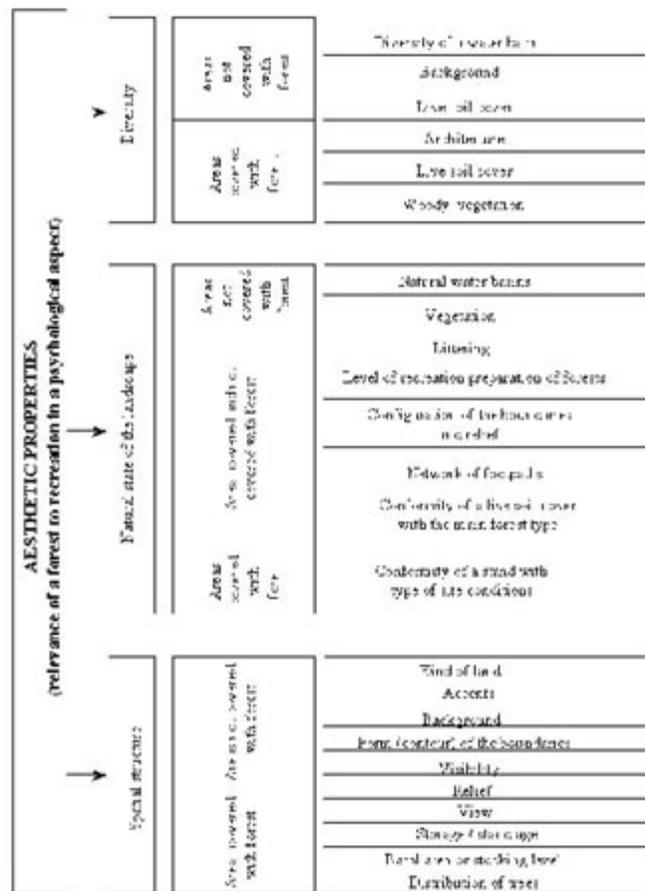


Figure 2. Scheme for the evaluation of the aesthetic properties of a forest

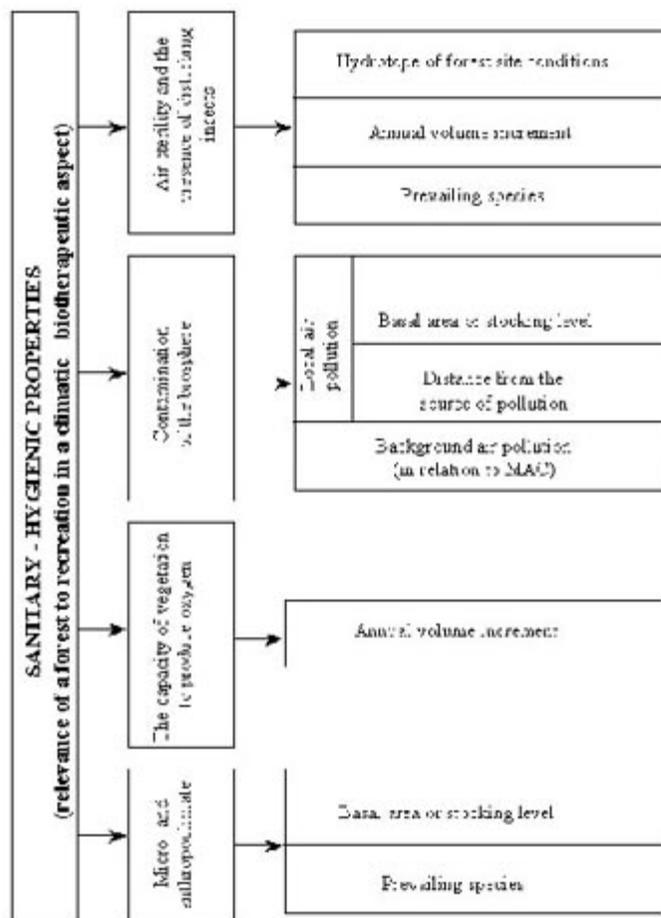


Figure 3. Scheme for the evaluation of the sanitary/hygienic properties of a forest

Relevance of a forest to recreation, in a climatic/sanitary aspect, is established according to solar radiation, wind speed, temperature and humidity, since the dynamics of these micro-climate elements, in time and space, condition the trend and intensity of biological and physical processes within forest ecosystems. Due to the influence of the forest on the environment, the micro-climate is mild and it stipulates recreational conditions. Relevance of a forest to recreation, according to climatic/sanitary properties, is characterised by the indices of effective or radioactive effective temperatures, as well as by those of resulting temperatures.^{4,5}

Relevance of forests to recreation, in a biotherapeutic aspect, is determined by the capacity of plants to produce oxygen and protect the environment, by the presence of plants used for food and in the medical practice - phytoncides - and by ionisation of the atmosphere. The air in the forest is pure and fresh, due to insignificant toxic mechanical and chemical anthropogenic admixtures, as well as due to greater quantities of cations and phytoncides. Many forest plants and their fruits have sanitary properties. A system for the evaluation of indices of forest sanitary/hygienic properties is shown in Figure 3. This system includes the four main factors and light indices mentioned above.

Relevance of forests according to physical properties is usually assessed with the aid of technological and situation indices. Technological indices reveal internal relevance of forest ecosystems for recreation, whereas situation indices - dislocation, localisation - reveal external fitness. Technological indices characterising practicability are important. Situation indices incorporate information on concrete access to a forest and on infrastructural provision possibilities for developing separate kinds and forms of recreation in this forest. Many works analysing technological and situation indices are available. However, up to now, an integrated system of ergonomic appraisal of recreational forests was lacking.

While carrying out applied studies of the inner capacity of a forest to meet different visitor requirements, it is expedient to use both sociological and ergonomic methods. A prerequisite for all investigations is the differentiation of recreational activity into kinds and forms of recreational occupation, since for one form of recreation a significantly pronounced macro-relief swampiness will be assessed affirmatively, whilst for other forms, adversely.

In investigating the external physical relevance of a forest, attention must be focused on distance to the forest and the quality of roads and means of transportation, based on the properties of the recreational activity and its duration, i.e. holidays, weekends.

Practicability of the area assessed is the most important technological factor, and access to a forest, as well as the infrastructure of a recreational forest, are the factors of situation/localisation (Figure 4).

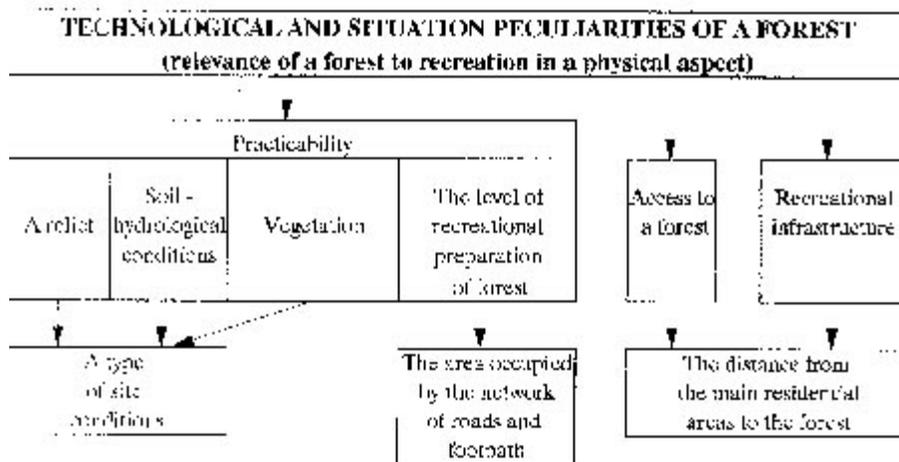


Figure 4. Scheme for the assessment of technological and situation properties of a forest

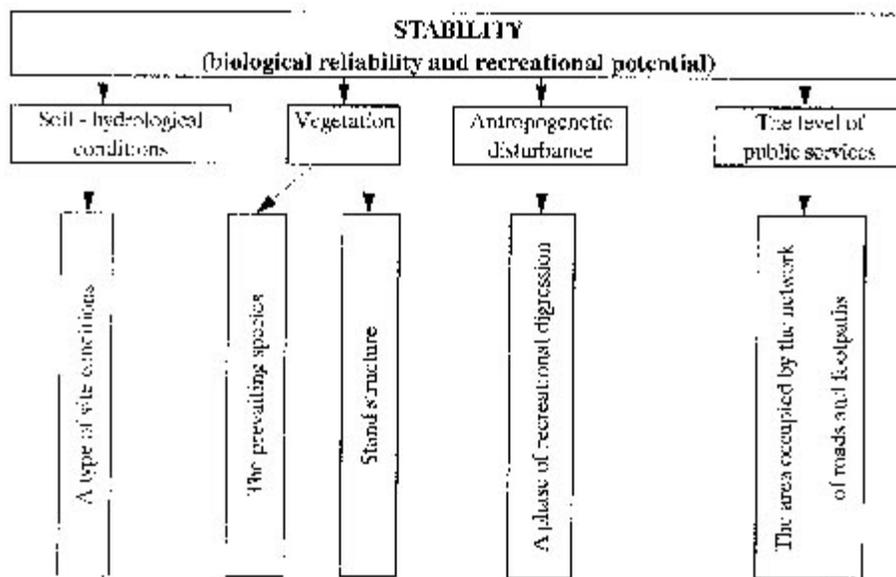


Figure 5. Scheme for the assessment of forest resistance to different recreational loads

The state and stability of forest ecosystems are usually characterised by integrated indices such as a phase of recreational digression, rank of stability, resistance to recreational impact or anthropogenic tolerance, and a rank of ecological recreational capacity. These indices reveal the relative stability of forest ecosystems to a greater or lesser extent. They are determined by a complex of natural and anthropogenic factors. Site type, species composition and tree cluster structure characterise the anthropogenic/ecological essence of natural factors, whereas the level of damage - a state of digression - and the level of recreational preparation of forests reveals the anthropogenic essence (Figure 5). The requirements must be considered in the standards of maximally allowable loads, expressed by the criterion of visitor hours per ha per year.

It is suggested that all four trends of assessment should be scored on a scale of 1 to 5. Integrated indices of assessment refer to: recreation quality, class of each allotment of the forest inventory area, compartmentalisation and forest mass. The methods for evaluation of the recreational forest characteristics, prepared according to the model presented in this paper, are successfully used for landscape planning and management in Lithuania.¹

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Professor **Edvardas Riepsas** is Departmental Head at the Lithuanian Academy of Agriculture, and Professor of Forest Genetics and Reforestation at the Lithuanian Forest Research Institute. He holds a Ph.D. from the Forest Technical Institute in Moscow and is Member of the Union of Lithuanian Foresters and the Lithuanian Forest Owners Association Consultants. Chairman of 3 scientific committees of postgraduate studies, he has worked as a forester at Krusiu Nerija Forest Enterprises and has been Departmental Head at the Lithuanian Forest Research Institute. He has authored numerous publications.