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Incorporating vegetation analysis into ecological characterization of landscapes: the Turkish case.

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Abstract
This paper mainly focuses on the integration of vegetation analysis for characterization and conservation assessment of landscapes. The role of vegetation science, in particular habitat classification, for landscape conservation and spatial planning are discussed. Phytosociological evaluation as a tool for indicating level of naturalness of landscape character areas, are considered to be essential. Within this scope CORINE Land Cover and CORINE Biotope classifications are subjected. Recent studies performed along the landscapes of the Eastern Mediterranean coast of Turkey, were reviewed. In conclusion, the function of vegetation analysis-oriented landscape characterization in landscape planning framework was highlighted.

Keywords: Vegetation analysis, landscape characterization, CORINE biotope manual, naturalness, hemeroby.

Riassunto
Questo documento si concentra principalmente sulla integrazione di analisi della vegetazione per la caratterizzazione, conservazione e la valutazione dei paesaggi. Il ruolo della scienza della vegetazione, in particolare la classificazione degli habitat, per la conservazione del paesaggio e pianificazione del territorio sono discussi. La valutazione fitosociologica come strumento per indicare il livello di naturalità di aree di paesaggio caratteristico, sono considerati essenziali. All'interno di questo ambito "CORINE Land Cover" e "CORINE Biotope classifications" sono soggetti. Recenti studi effettuati lungo il paesaggi della costa del Mediterraneo orientale della Turchia, sono stati rivisti. In conclusione, la funzione dell'analisi vegetazionale, orientata per la caratterizzazione della pianificazione paesaggistica quadro è stato evidenziata.

Parole chiave: analisi vegetazionale, caratterizzazione del paesaggio, manuale biotopo CORINE, naturalità, basso impatto antropico.

Introduction

The definition of landscape is "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Anon., 2000). Landscape character is defined as a distinct pattern of elements that occur consistently in a particular type of landscape. Particular combinations of objective indicators as geology, landform, soil conditions, and the associated vegetation, land use, and human settlement create the character, which makes different landscapes distinct from each other (Van Eetvelde *et al*., 2005).

It was stated that the word landscape lacked a universal and widely accepted classification system until recently. Many landscape characterization initiatives are based on regional studies which often use region-specific data and methods (Mücher & Wascher, 2007). The European Landscape Convention (ELC) has stimulated landscape characterization and mapping landscape types. The legal obligations of the convention state that; each country (*i*) has to identify its own landscapes throughout its territory, (*ii*) to analyze their characteristics and the forces and pressures transforming them, (*iii*) to take note of changes, and to assess the landscape thus identified, taking into account the particular values assigned to them by the interested parties and the population concerned (Van Eetvelde *et al*., 2005).

At present the core data layers with a high spatial resolution: climate, altitude, parent material and land use, are utilized to distinguish different landscape types. The European Landscape Map (LANMAP2) was based on those layers, and 350 landscape types were classified at level four (Mücher *et al*., 2006). Within this methodology CORINE land cover data (Tab. 1), soil associations, digital elevation model, and satellite images, are widely used as sources for the classification of landscape character areas.

To achieve a holistic landscape characterization, covering assessment of naturalness of landscape units, phytosociological data is an essential component. Naturalness is one of the most important criteria in nature conservation (Reif & Walentowski, 2008; Plachter, 1991; Peterken, 1977, 1993, 1996; Usher & Erz, 1994; Reif, 2000; Knight &Landers, 2002). Vegetation conditions can be assessed in terms of the relative content of native vs. introduced species from phytosociological maps (Tüxen, 1956; Ellenberg, 1996). Therefore, classification of phytosociological units into degrees of naturalness and mapping vegetation naturalness can be based on such an

Level 1	Level 2	Level 3	
1. Artificial surface	1.1. Urban fabric	1.1.1. Continuous urban fabric	1.1.2. Discontinuous urban fabric
	1.2. Industrial, commercial and transport units	1.2.1. Industrial or commercial units	1.2.3. Port areas
		1.2.2. Road and rail networks and associated land	1.2.4. Airports
	1.3. Mine, dump and construction sites	1.3.1. Mineral extraction sites	1.3.3. Construction sites
		1.3.2. Dump sites	
	1.4. Artificial, non-agricultural vegetated areas	1.4.1. Green urban areas	1.4.2. Sport and leisure facilities
2. Agricultural areas	2.1. Arable land	2.1.1. Non-irrigated arable land	2.1.3. Rice fields
		2.1.2. Permanently irrigated land	
	2.2. Permanent crops	2.2.1. Vineyards	2.2.3. Olive groves
		2.2.2. Fruit trees and berry plantations	
	2.3. Pastures	2.3.1. Pastures	
	2.4. Heterogeneous agricultural areas	2.4.1. Annual crops associated with permanent crops	2.4.3. Land principally occupied by agriculture with significant areas of natural vegetation
		2.4.2. Complex cultivation patterns	2.4.4. Agro-forestry areas
3. Forests and semi-natural areas	3.1. Forests	3.1.1. Broad- leaved forest	3.1.3. Mixed forest
		3.1.2. Coniferous forest	
	3.2. Shrub and/or herbaceous vegetation associations	3.2.1. Natural grassland	3.2.3. Sclerophyllous vegetation
		3.2.2. Moors and heathland	3.2.4.Transitional woodland scrub
	3.3. Open spaces with little or no vegetation	3.3.1. Beaches, dunes, sand plains	3.3.3. Sparsely vegetated areas
		3.3.2. Bare rock	3.3.4. Burnt areas
		3.3.5. Glaciers and perpetual snow	
4. Wetlands	4.1. Inland wetlands	4.1.1. Inland marshes	4.1.2. Peat bogs
	4.2. Coastal wetlands	4.2.1. Salt marshes	4.2.3. Intertidal flats
		4.2.2. Salinas	
5. Water bodies	5.1. Continental waters	5.1.1. Water courses	5.1.2. Water bodies
	5.2. Marine waters	5.2.1. Coastal lagoons	5.2.3. Sea and ocean
		5.2.2. Estuaries	

Tab. 1 - CORINE Land Cover Classes (Anon., 1993).

assessment.

Van der Maarel (1975) suggested a six-category system based on Sukopp's (1972) hemerobiotic degrees: natural, near-natural, semi-natural, agricultural, near-cultural, and cultural. The term Hemeroby expresses the magnitude of cultural influences which work against the natural succession towards a terminal phase in the development of an ecosystem. Natural vegetation is "ahemerob", an artificial environment is "metahemerob" (Kowarik, 1988, 1999).

Westhoff (1983) suggested a less detailed system based on four categories: natural, sub-natural, semi-natural, and cultural. Ferrari *et al*. (2008) classified phytosociological vegetation types and ordered them into the following five degrees of naturalness; urbanized, agricultural, semi-natural, sub-natural, and natural. Two overlapping scales of naturalness used for forest habitat mapping are shown in Table 2.

This approach is the so-called analysis of vegetation naturalness, based mainly on species composition and vegetation structure. The core of such an approach is the assessment of the condition of a site's native vegetation, which in turn requires a benchmark against which the existing vegetation can be assessed. Hopkins (1999) suggested that the primary benchmark might be the pre-1750 condition.

Oliver *et al*. (2002) highlight that the degrees of naturalness of vegetation are a valuable and practical tool for describing vegetation changes on a regional scale within particular land-use contexts; for example, pastoralism, agriculture, or horticulture. The related objective is to assess vegetation condition as a surrogate for the status of species biodiversity at the site scale.

Degree of naturalness Characterization (Schirmer, 1999)	Degree of naturalness Indicators (BMVEL, 2004)
1. Non-native Share of the tree species which are native on the site <20 %. Foreign tree species form the stand	**V. Cultural** Share of the tree species which are native on the site <25%
2. Native to a certain extent Share of the tree species which are native on the site 20-49 %. Foreign tree species determine the stand	**IV. Strongly cultural** Share of the tree species which are native on the site between >25 and 50%
3. Relatively near-natural Share of the tree species which are native on the site >50 %	**III. Relatively near natural** Share of the tree species which are native on the site between >50 and 75%
4. Near-natural Share of the tree species which are native on the site >80 %	**II. Near-natural** Share of the tree species which are native on the site >75% Share of exotic tree species <30%
5. The most important tree species of the potential natural vegetation of the site are present	**I. Very near-natural** Share of the tree species of the natural forest vegetation >90% Share of exotic tree species <10%
5a. Very near-natural The share of accidental tree species <10 %	
5b. Very near-natural The share of accidental tree species <20 %	

Tab. 2 - Scales of naturalness used for forest habitat mapping in Baden-Württemberg (Schirmer, 1999; BMVEL, 2004).

CORINE Biotope Classification and Case Studies on Vegetation Analysis

The Council of the EC identified the aim of the CORINE Project as to identify and describe biotopes of major importance for nature conservation in the Community. The results of the work of compiling the biotopes inventory during the experimental phase of CORINE from 1985 to 1990 are described in the CORINE biotopes manual.

Hierarchical levels of biological organization (such as ecosystem) are widely used by scientists but also by decision-makers and managers. Limits of ecosystem are usually difficult to define and are often too large to be of a practical value. A relatively new way of defining sub-units in an ecosystem is based on the concept of the biotope. They can be mapped easily and changes in time in their distribution can be recorded.
Definition of a biotope; a community is identified as a group of organisms occurring in a particular environment, presumably interacting with each other and with the environment, and identifiable by means of ecological survey from other groups. A community is normally considered as a biotic element of a biotope. Any attempt to characterize sites in terms of their importance for nature conservation, to inventory such sites, to constitute coherent networks of protected sites or to monitor the evolution of such networks requires that the habitats and ecosystems present are recorded in detail. To this end, a typology is needed which describes the recognizable communities formed by interactions between flora, fauna and the abiotic environment. Later, 1260 detailed habitat types, regrouped in 7 classes; (1) Coastal and halophytic communities, (2) Non-marine waters, (3) Scrubland and Grassland, (4) Forests, (5) Bogs and Marshes, (6) Inlands Rock, screes and sand (8) Agricultural land and highly artificial landscapes.

Management planning efforts for protected areas in Turkey continues in accordance with the international guidelines. The need for determining important, typical and rare habitats, biotopes and communities was highlighted and use of a common terminology for identifying these ecosystems was considered as fundamental for management by the related ministry. For this purpose, CORINE habitat classification was recommended by the official authorities. Use of descriptors for flora and fauna, rare and threatened habitats, and exploitation factors described in the nationally and internationally recognized documents (IUCN, Bern Convention, Habitat and Bird Directives) has been adopted as a methodology approach for determining biodiversity (Erdem, 2007).

At present conservation of biodiversity is one of the most important concerns for the Turkish Ministry of Environment and Forestry and, certain areas have been designated for protection. However many conservation dependent ecosystems are threatened by

several detrimental impacts such as; thermoelectric power plants, oil transportation facilities, residential development, tourism, and agriculture. As regard the Eastern Mediterranean coast of the country those are concentrated between Göksu Delta in the West, and Samandag Dunes in the East (Figure 1). In this paper four locations: Göksu, Seyhan, and Ceyhan Deltas, and Kazanlı Coast that considered as BD hotspots along the Eastern Mediterranean coast were reviewed and the role of vegetation analysis-oriented habitat classification in landscape characterization was highlighted.

A study was conducted to compare the principal coastal habitats occur in Göksu Delta SPA with the CORINE Biotope manual and draft classification of coastal (terrestrial and wetland) habitats for the Mediterranean region established by the RAC/SPA (Yılmaz *et al*., 2004). In Göksu Delta 21 distinct habitat types were classified according to RAC/SPA. Those comprise 4 large natural units; (I) Coastal and Halophytic Communities, (II) Non-Marine Waters, (IV) Forests, and (V) Bogs and Marshes. Among those units Coastal and Halophytic Communities contains 70 % of the entire habitat types.

A research project was implemented to examine and map the biotopes on the coastal zone between Seyhan and Ceyhan deltas (Uzun *et al*., 1995). Transects trough the research area were used to examine the vegetation.

The natural and the cultural types of biotopes were classified and mapped by interpretation of airborne images. Borders of the coastal biotopes delineated on the 1: 25000 scale topographic maps.

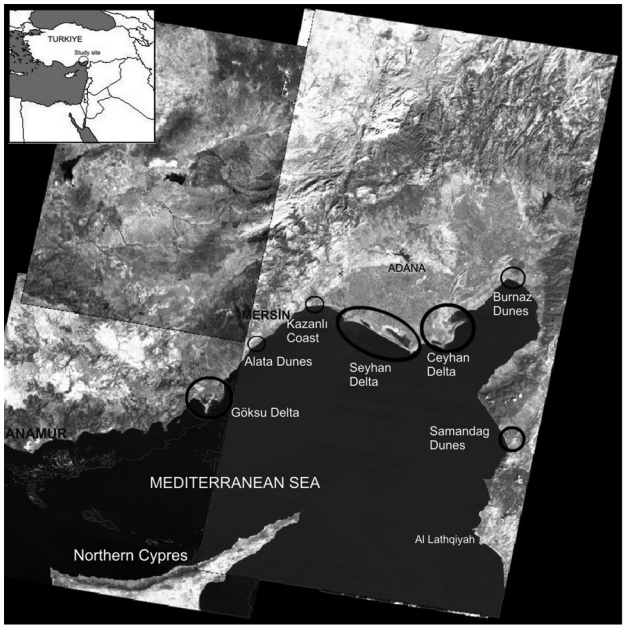

Fig. 1 - Geographic locations of the case study sites along the Eastern Mediterranean coast of Turkey.

Spatial change of land cover as a function of land use alternations (expanding agricultural practices) for above mentioned area was reported. Land cover change in Seyhan Delta (from dunes to cultivated land) was determined 719 ha/year between 1953 and 1993. Later annual land conversion exceeded 1800 ha between 1993 and 2002. Vegetation analysis data was employed as an indicator to landscape degradation and naturalness assessment. According to the results 65% of the taxa represent natural dune vegetation in the Seyhan and Ceyhan deltas. The rest consists of synanthropic species which occurs in man-made habitats. Impacts of the major land use types have been determined according to species richness and species cover of the vascular plant taxa (Yılmaz, 2002).

Land use activities result with a clear change on unique species composition of the dunes. Total coverage and number of alien species (SV) are higher than native dune species (NDV) in the plots where the human impact exists (Fig. 2).

Another research project conducted along the coast of Kazanlı in order to describe floral and avian diversity and their habitats (Yılmaz *et al*., 2006). Thirteen land cover types were detected along the study site and their boundaries were delineated on the mosaicked image to create the habitat map. Locations of forty-six plots, observed for vegetation analysis, were also overlapped onto the image to identify landscape units.

Coastal dunes show a zonation of habitats, and those may have relatively more limited extension than other terrain types. A foredune zone has high heterogenity in terms of phytosociological groups. This geomorphological unit can be identified as an individual landscape character area; however it is classified into several landscape units regarding plant communities along the distance gradient from coastline to landward (Fig. 3).

CORINE land cover classification is employed for landscape characterization in general. Landscape character assessment allows the delineation of the spatial pattern of landscape features in a coarser scale. However, landscape character areas may have relatively wider spatial distribution; hence information on land cover level may not be suitable for boundary detection of landscape patches as sub-units of character areas.

As it is reported landscape character areas are geographically-specific areas, and each has its own individual character and identity. However they may share the same generic characteristics with other areas

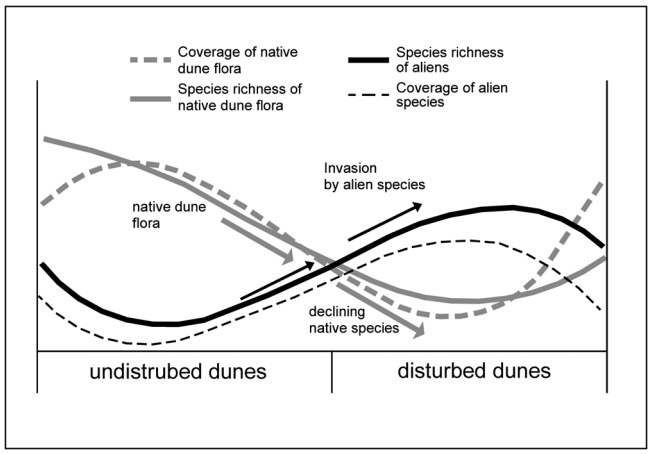

Fig. 2 - Vegetation dynamics of the native dune flora along the land use gradient: Modified from Yılmaz (2002).

of the same type (Şahin, 2007). One of the overlapping generic characteristics is vegetation cover. Carboni *et al*. (2009) used CORINE land cover classification for assessing conservation status of the dunes along Tyrrhenian coast of Italy. To achieve finer-scale characterization the legend followed the CORINE land cover proposal (Anon., 1993) expanded to a fourth level of detail for natural and semi-natural dune areas. Plant taxa and physiological features were used for description of fourth level classes.

Therefore to determine similarities or differences between landscape character areas at a finer scale evaluation, vegetation community indicator can be used as a powerful tool (Tab. 3).

Within above mentioned studies, characterization of the landscape units was achieved by means of taxonomic and syn-taxonomic indicators. In some cases, draft classification of coastal habitats for the Mediterranean region established by the RAC/SPA was followed if the local habitat type was not described in the CORINE classification.

As a synthesis, a list of principal biotopes in accordance with CORINE Land Cover (level 3), and CORINE Biotope Manual is given in following table (Tab. 4).

Conclusion

Landscape characterization is an essential tool for conserving bio-diversity as well as planning and management of landscapes. To achieve this goal spatial planning should be based on ecological characterization of landscapes. Objective character indicators as geomorphological and phytosociological units are more effective rather than perceptional ones. As shown in this paper the CORINE biotope manual provide a finer scale classification for landscape units. Assessment of naturalness is an essential part of landscape characterization. Presence and abundance, cover ratio of alien/ruderal species vs. potential natural

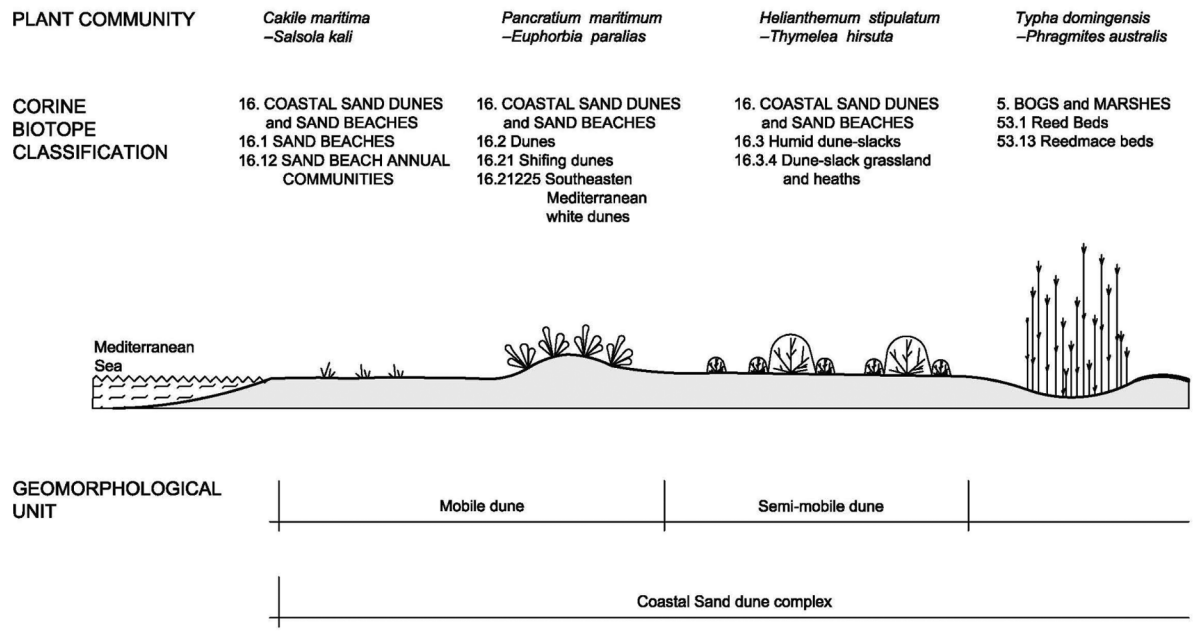

Fig. 3 - Landscape units, in accordance with the CORINE biotope classes, and indicator plant communities along the dune coast of Kazanlı.

Coarse ↑	• **Vegetation cover**	Present / Absent - source: Airborne data -	CORINE LAND COVER CLASSES
	• **Plant formation or Vegetation type**	Broad-leaved forest, heathland, macchia, wetland, dune formation Deciduous forest, Coniferous forest, Sclerophyllous vegetation	
↓ Detailed	• **Plant communities**	Floristic composition (including under-storey species) • Taxonomic categories: Family, genus, species, sub-species, variety Syn-taxonomic categories - association, alliance, order, class – *Carpino-Quercetum cerridis, Juniperetum excelsae, Pistacio-Rhamnetalia alaterni, Phragmitetea, Cakiletea maritimae* • Dominant, characteristic and associated species Vegetation sampling (needs in-situ access) Releves, circular plots, line-intercepts, transects Remote sampling by high-powered telescope, over-storey species composition in sites where terrain and canopy characteristics prohibit access but permit open visibility of the landscape as; scrublands, desert, sparsely vegetation (Meentemeyer and Moody, 2000)	CORINE BIOTOPE CLASSES

Tab. 3 - Comparision of availability of the CORINE Land Cover, and the CORINE Biotope Classifications for a finer scale evaluation.

vegetation indicators are proper tools for assessment of naturalness. Degree of naturalness may chance over the time. To detect possible changes on naturalness long-term monitoring scheme based on habitat and community levels, is needed.

Interpretation of vegetation characteristics is an effective tool for indicating habitat quality and classifying the gradual habitat cline between natural and cultural states. This can enable to determine the actual state of the landscapes in order to create management strategies, in particular, delineating the boundaries for protection zones (Yılmaz, 2002).

Therefore decision-making, aiming equilibrium between conservation priorities and reasonable use of ecological values needs implementation of the following tasks: (1) vegetation analysis, (2) mapping spatial distribution of phytosociological units and habitats, (3) characterizing landscape units accordingly, and (4) determining conservation priorities vs. land use demands.

The lack of implementation of the above mentioned tasks is a predominant factor resulting misuse of landscape resources. Investigation of a wide variety of habitats is a crucial issue that can provide ecosystem-oriented data inventory for physical planning activities. Conservation of biodiversity was structured in a national framework covering isolated individual sites which were designated for areal protection (e.g. National Park, Specially Protected Area, Nature Reserve, Wildlife Reserve, Natural Site, and Monuments of Nature).

Legal instruments for conserving biodiversity in physical planning have not been used efficiently. Environmental Impact Assessment procedure is not effective since a comprehensive data inventory on ecosystem level, is lacking. Environmental Order Plans (EOPs; 1/25 000 and 1/100 000 scale) are compulsory and land use decisions of Urban Development Plans must be compatible with EOP directives. However the above planning process has not been efficient to provide a realistic protection for the biodiversity since basic environmental parameters (e.g. level of biodiversity, naturalness assessment, threat categories for species and their habitats, and spatial distribution of conservation dependent taxa) haven't been used as plan inputs. Therefore an ecosystem-oriented database is urgently needed to safeguard habitat potential and biodiversity.

Recently there has been an attempt for elaborating a new legislation. The draft of "Biodiversity and nature

CORINE LAND COVER (Level 3)	**CORINE BIOTOPE CLASSES**
4.2.1. Salt marshes	1 Coastal and halophytic communities 15.1 SALT PIONEER SWARDS *Thero-Salicornietalia* Tüxen in Tüxen & Oberdorfer ex Géhu & Géhu-Franck 1984 15.11 GLASSWORTH SWARDS *Salicornia* L. spp. 15.6 SALTMARSH SCRUBS *Arthrocnemetea fruticosi* Br.-Bl. et Tx. 1943 15.616 Mediterranean sea-purselane-woody glassworth scrub *Halimione portulacoides* (L.) Aellen 15.617 Halocnemum scrub *Halocnemum strobilaceum* (Pall.) M. Bieb.
3.3.1. Beaches, dunes, sand plains	16 Coastal sand dunes and sand beaches 16.2 DUNES 16.2112 Mediterranean embriyonic dunes 16.21123 East Mediterranean embryonic dunes *Elymus farctus* (Viv.) Runemark ex Melderis, *Zygophyllum album* L., *Pancratium maritimum* L., *Cyperus capitatus* Vand. 16.21225 Southeastern Mediterranean white dunes *Pancratium maritimum*, *Cakile maritime* Scop., *Cyperus capitatus*, *Salsola kali* L. , *Ipomea stolonifera* (Cyrill.) J. F. Gmel., *Echium angustifolium* Lam. , *Xanthium strumarium* L. 16.3 HUMID DUNE-SLACKS 16.35 DUNE-SLACK REEDBEDS, SEDGEBEDS AND CANEBEDS *Saccharum ravennea* (L.) L., *Imperata cylindrica*(L.) Beauv. I.2.2.2.2.4 Southeastern Mediterranean rear dune communities *Vitex agnus-castus* L., *Vitis sylvestris* Gmelin, *Pistacia terebinthus* L.,*Cionura erectra* (L.) Griseb., *Pancratium maritimum*. (only in the RAC/SPA Classification) I.2.2.2.2.4.1 Southeastern Mediterranean *Ononis* dune communities *Ononis viscosa* L., *Inula viscosa* (L.) Aiton, *Echium angustifolium*. (only in the RAC/SPA Classification) 16.28 DUNE SCLEROPHYLLOUS SCRUBS *Myrtus communis* L., *Rhamnus hirtellus* Boiss., *Styrax officinalis* L., *Pistacia terebinthus*, *Cionura erecta*, *Vitis sylvestris* C.C. Gmel., *Rubia tenuifolia* d'Urv. 16.284 Dune phryganas and bathas *Sarcopoterium spinosum* Spach , *Cistus salviifolius* L., *Osyris alba* L., *Paronychia argentaea* Lam., *Helianthemum stipulatum* (Forssk.) C. Christens., *Phagnalon graecum* Boiss., *Satureja thymbra* L., *Artemisia scoparia* Waldst et Kit.
3.3.2. Bare rock	18.2 VEGETATED SEA CLIFFS AND ROCKY SHORES 18.22 MEDITERRANEAN CLIFF COMMUNITIES *Chritmo-Limonietalia* *Crithmum maritimum* L.
3.2.3. Sclerophyllous vegetation	3 Scrub and grassland 32.2 THERMO-MEDDITERANEAN SHRUB FORMATIONS 32.21 THERMO-MEDDITERANEAN BRUSHES, TICKETS AND HEATH GARRIGUES 32.211 Olea-lentisc brush *Olea europea* ssp. *sylvestris* L., *Pistacia lentiscus* L.
3.1.2. Coniferous forest	4 Forests 42 Coniferous woodland 42.84 ALEPPO PINE FORESTS *(Pinus halepensis* Mill.*)*
3.1.1. Broad- leaved forest	44 Alluvial and very wet forests and brush (Temperate riverine and swamp forests and Brush) 44.6 MEDITERRANEAN POPLAR-ELM-ASH FORESTS *Populion albae* Br.-Bl. ex Tchou 1948 (Mediterraneo-Turanian riverine forests) *Salix triandra* 'Black Maul'., *Populus* sp., *Alnus glutinosa* (L.) Gaertn., *Plantanus orientalis* L., *Phragmites communis* Trin.
5.2.2. Estuaries	5. Bogs and marshes 53. Water-Fringe Vegetation 53.17. HALOPHILE CLUBRUSH BEDS *Scirpion maritimi* Dahl & Hadač 1941 *Scirpus maritimus* L., *Schoenoplectus litoralis* (Schrad.) Palla 53.1 REED BEDS 53.11 COMMON REED BEDS *Phragmites communis*, *Juncus maritimus* Lam., *Tamarix tetragyna* C. Ehrenb.
2.1.2. Permanently irrigated land	8. Agricultural land and highly artificial landscapes. 82. Crops 82.3. EXTENSIVE CULTIVATION
2.2.2. Fruit trees and berry plantations	83 Orchards, groves and tree plantations 83.16. CITRUS ORCHARDS
2.4.4. Agro-forestry areas	83.3. PLANTATIONS 83.31. CONIFER PLANTATIONS *Pinus pinea* L.
No match is available	83.32 PLANTATIONS OF BROAD-LEAVED TREES 83.322. *Eucalyptus* L. plantations 83.325 Other broad-leaved tree plantations *Acacia saligna* (Labill.) H.L.Wendl. 87 Follow land, waste places
2.1.1. Non-irrigated arable land	87.1 FALLOW FIELDS *Prosopidetea farctae halo-segetalia* Zohary 1973.
1.3.3. Construction sites	87.2 RUDERAL COMMUNITIES *Chenopodietea* Braun-Blanq. (1951) 1952

Tab. 4 - A list of principal biotopes in accordance with CORINE Land Cover (level 3), and CORINE Biotope Manual.

conservation law" is still under discussion. The draft proposed by the Turkish Ministry of Environment and Forestry;

- aims at identification of biodiversity (BD) and ecological values occur in terrestrial, wetland and marine ecosystems in Turkey,
- conservation by means of protected areas, restriction of certain activities which have negative impacts on BD and the nature, protection of flora and wildlife species together with their habitats as well as ecosystems, habitats and biotopes are not covered in the designated protected areas,
- creating a national database which will be the basic tool of rapid and objective decision making procedure by means of monitoring, inventory and evaluation activities,
- investigating ecosystems without any conservation status and enacting limitations are also aimed in order to detect and safeguard potentially important areas for nature conservation. Regarding this understanding, the draft maintains an innovative approach which will extend conservation activities in countrywide scale.
- The objectives of the draft, as stated in Article # 1, include preparing management plans that requires a comprehensive landscape characterization.

This initiative is considered an important opportunity to incorporate BD conservation into physical planning scheme through landscape plans. Vegetation analysis-oriented biotope mapping is suggested as an essential tool for ecological characterization of landscapes (Fig. 4).

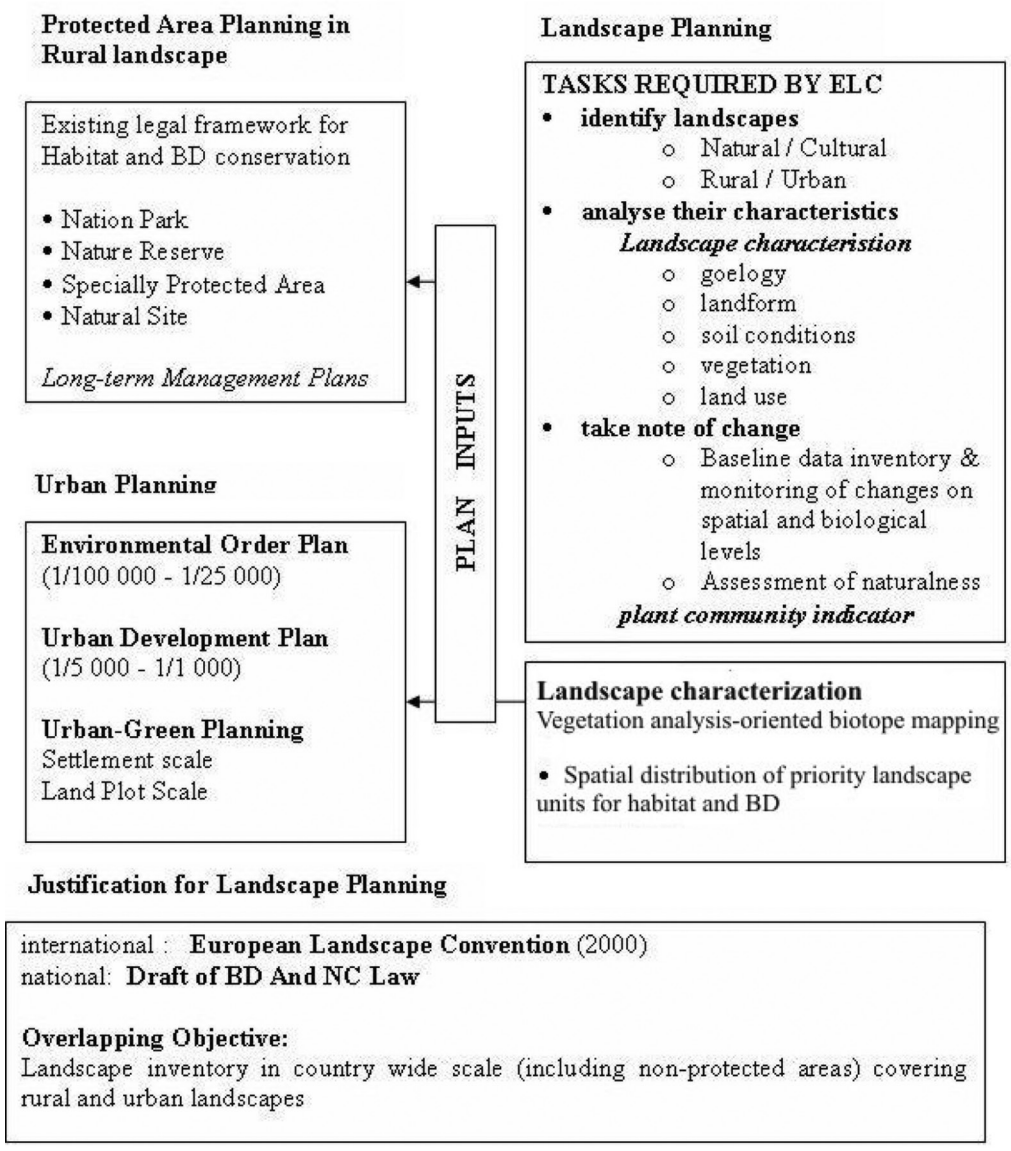

Fig. 4 - The function of vegetation analysis-oriented landscape characterization in landscape planning framework.

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