COASTAL SCENIC ASSESMENT USING FUZZY LOGIC APPROACH

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

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IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
CIVIL ENGINEERING

NOVEMBER, 2004

Approval of the Graduate School of Natural and Applied Sciences

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ABSTRACT

COASTAL SCENIC ASSESMENT USING FUZZY LOGIC APPROACH

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November 2004, 164 pages

This thesis analyzes the coastal landscape evaluation that is strongly rooted in the man-environment tradition. Scenery is a natural resource and managers need to attempt the evaluation of scenic resources in an objective and quantitative way that can be utilized mainly in landscape preservation and protection. The thesis will try to find an objective way in evaluation of the coastal scenery by using fuzzy logic mathematics and public perception studies. Using mathematical model developed within the frame work of the present study the selected 22 sites in Turkey were evaluated and then classified.

Keywords: Coastal, Scenic, Assessment, Fuzzy Logic, Public Perception

ÖZ

KIYI ALANLARININ GÖRSEL ÖZELLİKLERİNİN
DEĞERLENDİRİLMESİNDE BULANIK MANTIK YÖNTEMİ YAKLAŞIMI

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Bu çalışma, insan-çevre kültürünün temel taşlarından biri olan kıyı alanlarının manzara açısından değerlendirilmesini incelemiştir. Manzara doğal bir kaynaktır, yöneticiler ve yetkililer kıyı alanlarının korunup saklanması için, bu doğal kaynakların objektiv ve sayısal bir şekilde incelenmesine ihtiyac duymaktadır. Bu çalışma bulanık mantık matematiği ve halkın algılamasının incelenmesi yollarıyla kıyı alanları değerlendirmelerini objektiv ve sayısal yapmaya çalışmaktadır. Bu çalışma sürecinde geliştirilen matamatik model ile seçilmiş 33 kıyı alanı değerlendirilmiş ve sınıflandırılmıştır.

Anahtar Kelimeler: Kıyı, Görsellik, Bulanık Mantık, Değerlendirme, Halkın Algılaması

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CHAPTER 1

INTRODUCTION

"Look deep into nature than you will understand everything better."

Albert Einstein

Landscape evaluation is strongly rooted in the man-environment tradition. Scenery is a resource and managers need to attempt the evaluation of scenic resources in an objective and quantitative way. Evaluation of the coast on a scientific basis can be utilized mainly in landscape preservation and protection. In view of these objectives this study will be the first pilot study of its type for Mediterranean trans-national boundaries.

A voluminous literature exists with respect to scenic assessment but shrinks rapidly when the coastal scene is examined. Such evaluation is important e.g. for providing means for which scenery/amenities can be compared against other resource considerations; it can improve resource inventories, carrying capacity decisions and Environmental Impact Assessments. Coastal landscape evaluation can be utilized for landscape preservation (identifying the value to society of particular areas/views); protection (identifying high quality landscapes and controlling development); improvements (identification of components that can detract from views). Literature with regard to national and cultural differences in landscape appreciation and preference is sparse on this subject. extending over a wide spectrum, especially when coastal landscapes are considered. Elefteriadis *et al* (1990), found agreement between European nationality groups with regard to the most/least preferred landscapes – but also many significant differences, which was attributed to cultural differences and home environment familiarity. Fines (1968); Kaplan *et al* (1972) found natural landscapes to be perceived as more distinguished and spectacular and more scenic amongst culturally homogenous participants. Zube

and Pitt (1981) showed that not all cultures shared the same perception of anthropogenic landscapes, suggesting that man might be taught, or implicitly led to believe that scenic beauty is an attribute of unmodified landscapes. They suggested that environmental experience and landscape familiarity were very important factors in shaping perceptions, the opposite to that found in studies by, for example, Wellman and Buyhoff (1979).Various models/rating schemes have been developed in this field, the bulk of them rooted in the last quarter of the 20th Century. Important concepts were expressed in papers such as those of Fines (1968), Linton (1968), Leopold (1969), Coventry-Solihull-Warwickshire (1971), Staffordshire County Council (1973), Briggs and France (1980), Buyoff and Arndt (1981), Weddle (1989), However, the basic theme of Appleton's (1975) seminal paper still holds true today, i.e. there are many practitioners and techniques for landscape assessment but a theoretical vacuum still exists.

The main objectives of this study were;

- To assess coastal scenic quality by selected component based on scientific methodologies.
- To provide baseline information so that a sound scientific basis can be available for any envisaged subsequent management plans.

Within the framework of the thesis a public perception study has been carried out for the development of the coastal scenic evaluation model selected 22 sites were visited in Turkey for the application of the model which was developed using fuzzy logic mathematics.

The first Chapter of the thesis is the introduction to coastal scenery evaluation. The motivation of the thesis was introduced in this chapter.

In Chapter II the development of coastal scenic evaluation system checklist was described in detail, and methodology developed for quantitative assessment of coastal landscape was examined, and the perception survey was utilized for the process of development of methodology and calibrated for the system for objectivity.

In Chapter III the evaluation steps for the development of the mathematical model using fuzzy logic approach is given. The selected sites for developing and calibrating the model are evaluated and classified in this Chapter.

Finally in Chapter IV the conclusion, discussion and recommendations of the thesis were presented

CHAPTER 2

COASTAL SCENIC EVALUATION METHODOLOGY AND APPLICATION AT SELECTED SITES IN TURKEY

"So far as the laws of mathematics refer to reality, they are not certain. And so far as they are certain, they do not refer to reality."

Albert Einstein, Geometry and Experience 1921

2.1 Introduction to Parameters.

It has already been acknowledged that the scenic checklist type of ratings used in coastal scenic assessment is open to criticism with regards to its subjectivity, particularly in rating the aesthetic qualities of a scene where the viewer preferences and priorities dominate. A lot of discussion ranged over the idea of producing a novel checklist based upon ideas first proposed by Leopold (1969) in his classic assessment of scenery in the American mid-west. Preliminary checklist parameters (physical biological and human) were developed based on Leopold .is given in Table 1.

After several applications of the checklist to the selected sites, the selected Coastal Evaluation Parameters were modified. New system was developed with respect to the applicability of the checklist system for a scenic evaluation therefore in the Final Coastal Scenic Evaluation System (CSES) checklist only physical and human parameters were considered. After three revisions the Coastal Scenic Evaluation System (CSES) checklist was finalized (Appendix A) and also presented in Table 2. Scenic assessment parameters were obtained by consultation with coastal

experts and beach users. In the checklist each assessment parameter is given with the attributes represented by numbers from low to high rating as 1,2,3,4, and 5 where 1 stands for absent unless otherwise defined. Definitions of the parameters are presented in Appendix B.

Table 1. Parameters to be considered in any scenic assessment checklist (based on Leopold, 1969)

PHYSICAL		**Scoring system 1-5**
Cliff	Profile	
	Accidentation	
Beach	Width	
	Shape	
Composition (e.g. mud, gravels, sand)		
Shore platform	width	
Rocky shore		
Valley		
Land form (e.g. undulating)		
Tides		
Waves		
Landscape variation (e.g. deltas, estuaries.)		
BIOLOGICAL		
Water Colour		
Turbidity		
Tree cover		
Cultivation		
Moorland		
Bio-diversity		
Heath		
Hedgerows		
HUMAN		
Conservation status		
Vistas		
Recreation		
Litter	noise	
	air	
	odour	
	metal	
	paper	
	plastic	
	sewage	
Land use		
Accessibility		
Utilities		
Historic features		
Attractive buildings		
Boats		
BONUS POINTS: Special views e.g. islands, stacks, waterfalls		

Table 2. Coastal scenic evaluation system

COASTAL SCENIC EVALUATION SYSTEM (I

Site Name:

No:	Physical Parameters		RATING 1	2	3	4	5
1	CLIFF	Height	Absent	>5 -<30m	30 - <60m	61 - 90m	>90m
2		Slope	Absent	45°	60°	75°	Circa Vertical
3		Special Features*	Absent	1	2	3	Many >3
4	BEACH FACE	Type	Absent	Mud	Cobble / Boulder	Pebble / Gravel (±Sand)	Sand
5		Width	Absent	<5 - >100m	5 - <25m	25 - <50m	50-100m
6		Colour	Absent	Dark	Dark Tan	Light Tan Bleached	White/Gold
7	ROCKY SHORE	Slope	Absent	$<5^0$	5^0-10^0	10^0-20^0	20^0-45^0
8		Extent	Absent	<5m	5-10m	10-20m	>20m
9		Roughness	Absent	Distinctly Jagged	Deeply Pitted and/or Irregular	Shallow Pitted	Smooth
10	DUNES		Absent	Remnants	Fore-dune	Secondary Ridge	Several
11	VALLEY		Absent	Dry Valley / Small	(<1m) Stream	(1-4m) Stream	River/ Large scale limestone gorge
12	SKYLINE LANDFORM		Not Visible	Flat	Undulating	Highly Undulating	Mountainous
13	TIDES		Macro (>4m)		Meso (2-4m)		Micro (<2m)
14	COASTAL LANDSCAPE FEATURES **		None	1	2	3	>3
15	VISTAS		Open on one side	Open on two sides		Open on three sides	Open on four sides
16	WATER COLOUR & CLARITY		Muddy Brown / Grey	Green Milky Blue / Opaque	Green / Grey Blue	Clear Blue / Dark blue	Very Clear Turquoise
17	NATURAL VEGETATION COVER		Bare (10% vegetation only)	Scrub / Garigue (marram/gorse, bramble, etc)	Wetlands / Meadow	Coppices, Maquis (±Mature Trees)	Variety of Mature Trees / Mature Natural Cover
18	VEGETATION DEBRIS		Continuous >1m high	Continuous <1m high	Patchy Distribution	Strand Line	None
	Human Parameters		1	2	3	4	5
19	NOISE DISTURBANCE		Intolerable	Tolerable		Little	None
20	LITTER		Continuous Accumulations	Separate Accumulations	One Big Accumulation	Few Scattering Items	Virtually Absent
21	SEWAGE DISCHARGE EVIDENCE		Sewage Evidence		Some Evidence (1-3 items)		No Evidence of Sewage
22	NON-BUILT ENVIRONMENT		None		Hedgerow / Terracing / Monoculture		Field Mixed Cultivation ± Trees / Natural
23	BUILT ENVIRONMENT***		Heavy Industry	Heavy Tourism and/or Urban	LightTourism and/or Urban and/or Sensitive Industry	Sensitive Tourism and/or Urban	Historic and/or None
24	ACCESS TYPE		No Buffer Zone / Heavy Traffic	No Buffer Zone / Light Traffic		Parking Lot Visible From Coastal Area	Parking Lot Not Visible From Coastal Area
25	SKYLINE		Very Unattractive	Unattractive	Sensitively Designed High / Low	Very Sensitively Designed	Natural / Historic Features
26	UTILITIES ****		>3	3	2	1	None

* Cliff Special Features: Indentation, banding, folding, screes, irregular profile

** Coastal Landscape Features: Peninsulas, rock ridges, irregular headlands, arches, windows, caves, waterfalls, deltas, lagoons, islands, stacks, estuaries, reefs, fauna., embayment, tombulla etc.

*** Built Environment: Caravans will come under Tourizm in greading #2-4y

**** Utilities: Power lines, pipelines, street lamps, distinctive groins, seawalls, revetments

The quantified grading and/or order forms obtained from qualitative, subjective observations and/or pronouncements made in linguistic terms as in the case of coastal scenic assessment and landscape evaluation, do not replace or overcome the vagueness of data. Therefore, in this study, to quantify uncertainties and subjective pronouncements inherited in the assessment parameters; Fuzzy Logic Assessment (FLA) approach is used as an appropriate methodology.

By applying FLA, it is expected to arrive at robust decisive factors by the notion of possibility (magnitude) of participation of each assessment parameter introduced as weighted averages.

In coastal scenic assessment studies the quantified grading depends on a number of factors such as; the national and cultural background, age, gender, education and training. Also within the scheme put forward the dominance of physical, and, human factors with subsections become very important in obtaining the weighting of assessment parameters.

2.2 Assessment Parameters.

The main factors affecting the coastal scenic assessment results are Physical and Human parameters.

The factor set F is then defined as

F={PHYSICAL, HUMAN}={P , H}

where the subsets P and H are formed from the assessment parameters as defined below.

P = **{Cliff** (Height, Slope, Special Features), **Beach** (Type, Width, Colour), **Rocky Shore** (Slope, Extend, Roughness), Dunes, Valley, Skyline Landform, Tides,

Coastal Landscape Features, Vistas Water Colour and Clarity, Natural Vegetation Cover, Vegetation Debris**}**

H = {Noise Disturbance, Litter, Sewage Discharge Evidence, Non-Built Environment, Built Environment, Access Type, Skyline, Utilities}

For this specific study, the sets P, and H consist of 18, and 8 assessment parameters, respectively. The set P is further subdivided into the following subgroups

$\mathbf{P} = \{P_1 , P_2 , P_3 , P_{other}\}$

where,

$\mathbf{P_1}$ = {height, slope, special features},

$\mathbf{P_2}$ = {type, width, colour},

$\mathbf{P_3}$ = {slope, extent, roughness}

$\mathbf{P_{other}}$ = {dunes, valley, skyline landform, tides, coastal landscape features, vistas water colour and clarity, natural vegetation cover, vegetation debris }.

2.3 Weighting of Assessment Parameters.

2.3.1. Introduction

To each of the members of the factor set (assignment parameters) a non-negative weight number is assigned considering the degree of influence on the final result.

In this study the weight matrix W_F for the set F is assumed as

$$W_F = \left(\frac{1}{2} \quad \frac{1}{2}\right)$$

where ½ and ½ refer to equal weights for both P and H.

The weight matrix for subset P(Physical) is assumed as of equal weights to each of its parameters.

$$W_P = \left(\frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{36}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\ \frac{1}{12}\right)$$

where the first nine weights correspond to P_1, P_2 and P_3, respectively. The last six are for the parameters from dunes to vegetation debris.

Similarly the weight matrix of subset H(Human) is also assumed with equal weights.

$$W_H = \left(\frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\ \frac{1}{8}\right)$$

To re-evaluate the validity of "equal weights" of assessment parameters assumption and to bring out the viewer's preferences and priority to different assessment parameters it is decided to carry out a **perception survey** by questionnaires.

2.3.2. Perception Survey

To form a questionnaire a pilot study was carried out in METU, June 2001. The questionnaire formulated for the pilot study was designed with the main assessment parameters used in the checklist. The results of the pilot surveys are presented on the questionnaire in Table 3 .As it is seen from the table the top five parameters rated are;

1. Absence of Sewage and Litter with 92 %rating.
2. Coastal Landscape Features with 76 % rating.
3. Water Colour and Clarity with 68 % rating.
4. Absence of Buildings and Utilities 68 % rating
5. Natural Vegetation Cover. 40 % rating

Based on the results of pilot surveys and "Coastal Scenic Evaluation System", the questionnaire "Coastal Scenic Assessment Inquiry Form" is finalized Table 4. In this questionnaire assessment parameters are rated by their importance level ranging

between 1 and 5. Also to the questionnaires a last column “Top Five” is added to bring out the observers preferences for the most important 5 assessment parameters. Site study results for Çıralı Beach and Antalya Konyaaltı Beach, 2001, Turkey.

Table 3. Results of the pilot inquiry studies achieved in METU June 2001

Parameters Used In The Inquiry		Percentage voted for	Rank due to percentage
Cliff	Height	0%	15
	Slope	0%	16
Beach Face Type	Sand	28%	7
	Pebble / Gravel	0%	17
	Rocky	0%	18
Valley and River Mouth		8%	12
Coastal Landscape Features (Caves, Waterfalls, Islands, Rocks…)		**76%**	**2**
Historical Features (Castles, Towers, Historical Remains...)		12%	10
Water Colour and Clarity		**68%**	**3**
Seaweed Banquettes		12%	11
Biotype Diversity (Fauna)		20%	9
Natural Vegetation Cover (Flora)		**40%**	**5**
Absence of Noise		40%	6
State of The Sea		4%	14
Water Depth		8%	13
Absence of Sewage and Litter		**92%**	**1**
Absence of Buildings and Utilities (Power lines…), Natural View of the Skyline		**68%**	**4**
Ease of Access		24%	8

Table 4. Final Questionnaire and Overall questionnaire result

Çıralı + Antalya Konyaaltı Beach Total (Foreign + Local People)										
Number Of People Contributed To The Inquiry is 270										
Parameters				**Importance**					**Top Five**
				1	2	3	4	5	
1	Cliff	Height		47	29	76	64	54	6
2		Slope		50	34	81	53	52	6
3		Special Features (Indentation,Bending,Folding)		34	19	49	58	110	13
4	Beach Face	Type	Sand	32	17	24	51	146	81
5			Pebble / Gravel	75	46	68	45	36	18
6			Cobble Boulder	124	40	44	31	31	5
7		Width		30	22	48	58	112	22
8		Colour		42	30	54	57	87	8
9	Rocky Shore Platform	Slope		58	47	77	52	36	2
10		Extent		45	54	79	53	39	3
11		Roughness		38	35	62	54	81	16
12	Sand Dunes			74	64	53	40	39	4
13	Valley and River Mouth			42	25	42	75	86	14
14	Landform	Flat		70	51	68	43	38	12
15		Undulating		51	40	86	66	27	3
16		Mountainous		37	23	43	53	114	28
17	Tides			85	52	61	33	39	5
18	Coastal Landscape Features (Caves,Waterfalls, Islands, Rocks…)			7	5	21	53	184	90
19	Vistas of Far Places			18	15	49	65	123	23
20	Historical Features (Castles, Towers, Historical Remains...)			8	16	23	63	160	85
21	Water Colour and Clarity			4	0	5	21	240	183
22	Seaweed Banquetts			35	24	44	41	126	35
23	Biotype Diversity (Fauna)			17	6	44	58	145	64
24	Natural Vegetation Cover (Flora)			10	7	23	71	159	76
25	Absence of Noise			7	6	13	39	205	138
26	Absence of Sewage and Litter			6	0	5	13	246	210
27	Land use(Monoculture, Many Crops...)			40	24	84	62	60	15
28	Absence of Buildings and Utilities (Powerlines…), Natural View of the Skyline			3	5	16	40	206	137
29	Ease of Access			26	33	44	53	114	48

This inquiry form will be used in the following academic projects

a)Coastal Scenic Assessment At Selected Areas: Turkey, UK, Malta' Project Supported By British Council

b)Middle East Technical University Research Funds Project No: 2001.03.03.01) 'Coastal Scenic Assessment By Using Fuzzy Logic'

The questionnaire work is done with approximately 300 people but not all the questionnaires were appropriate to use for the evaluation, so the final number of the questionnaires used were 270.

The number of people involved to the questionnaire work is given as:

- **Çıralı Beach July 2001;**

  60 Foreigner Tourists

  123 Local Tourists

  Total 183 Tourists

- **Konyaaltı Beach July 2001;**

  7 Foreigner Tourists

  80 Local Tourists

  Total 87 Tourists

The results of inquiries for total data (270 people), are given in Table 4. As it is seen from the these results the top 5 rated parameters are;

1. Absence of Sewage and Litter with 210 rating
2. Water Colour and Clarity with 183 rating.
3. Absence of Noise with 138 rating
4. Coastal Landscape Features with 90 rating
5. Historical Features with 85 rating

As a result of public perception studies distribution of the ticked importance of the parameters are given in Table 4. In addition the last column of the table is devoted to the “Top Five”.

2.4 Fuzzy Logic Methodology

Within the scheme, the dominance of physical, human factors with attendant subsections becomes very important in obtaining weight matrices for a Fuzzy Logic

Approach (FLA) . By applying FLA, it is possible to arrive at robust decisive factors by the notion of possibility (magnitude) of participation of each assessment parameter introduced as weighted averages. In return, the weight matrices affect the final assessment results via weighted averages of the parameters. Estimation of a scenic evaluation rating for individual parameters is beneficial in that it allows the identification of any particular sub section having low rating values which in turn allows for more effective management of the area in question. The FLA methodology has to be accepted as a novel scientific approach used in coastal scenic evaluation where assessment uncertainties are covered by membership grade functions.

2.4.1. Weightings of Assessment Parameters

The weight matrix $W_F = (1/2, 1/2)$, where weights belonging to the subsets P and H are taken to be equal in this study. Revision of the equal weight assumption on the subsets P and H was done via the Turkish perception survey.

A typical weight computation is given as an example for the cliff assessment parameter in the following steps;

Step 1.

Parameter	Level of importance (out of 270)	
	4	5
Cliff height	64	54
Cliff slope	53	52
Cliff special features	58	110

Step 2.

The Revised Rated Weight (RW) of the cliff parameter was obtained from Step 1, taking into consideration the level of importance (4) and (5) with weights 4 and 5 respectively.

RW cliff = (RW height + RW slope + RW special features).

$$= \frac{(64\times4) + (54\times5)}{270} + \frac{(53\times4) + (52\times5)}{270} + \frac{(58\times4) + (110\times5)}{270}$$

$$= (1.9481) + (1.7481) + (2.8963) = 6.5926$$

For the sub group, cliff factor elements, a normalization process was applied as:

$$\text{Cliff height factor} = \frac{1.9481}{6.5926} = 0.2955$$

$$\text{Cliff slope factor} = \frac{1.7481}{6.5926} = 0.2652$$

$$\text{Special feature factors} = \frac{2,8963}{6.5926} = 0.4393$$

The average rated weight for the cliff parameter is then 6.5926 / 3 = 2.1975

Step 3.

Summation of the rated weights (RW) of all elements of the physical and human parameters is calculated as given above. The human parameters were treated in exactly the same manner: Parameter weights were found by taking the ratio of the parameter RW, to the total RW of all physical parameters (34.1478). For the cliff parameter this is 2.1975 / 34.1478 = 0.064.

The cliff weighting was distributed among its elements as shown by below

Parameter	Cliff weight (1)	Element factor (2)	Sub Parameter Weight (1×2)
Cliff height		0.2955	0.0191
Cliff slope	0,0644	0.2652	0.0171
Cliff special features		0.4393	0.0263

Similarly, the weight of each parameter was uniquely defined. Computational details of the statistical work for each parameter are given in Appendix C. Finally weight matrices of physical and human parameters W_P and W_H were evaluated as stated in the following section, respectively.

2.4.2. Fuzzy Logic Matrices

In the present study, attributes are formed from a set of five ordered grades represented by the numbers 1, 2, 3, 4, and 5. For every graded assessment parameter " i ", a possible, square membership grading matrix M_i is established with the estimated membership grades. This matrix is based on the idea of an error that may be introduced on the chosen grades when one is obliged to make a unique decision among several other possible grades over an attribute. For the ease of evaluations, the input data for the i'th parameter is represented as row matrix d_i. Entry of d_i is 1 if it is on the column where the attribute is graded and all other entries are 0. The membership grade matrix G_i of the i'th parameter is defined as:

$$G_i = d_i \; M_i$$

M_i is the membership grade matrices for the parameters I = 1 to 26 (Appendix D).

Table 5. The list of computed weights

WEIGHTS OF ASSESSMENT PARAMETERS							
Physical (1/2) $(P)_{subset}$						**Human (1/3) $(H)_{subset}$**	
Parameters		Weight	Parameters		Weight	Parameters	Weight
Cliff (P_1)	Height(1) (1)	0,019	Dunes (4)		0,039	Noise Factor (1)	0,137
	Slope (2) (1)	0,017	Valley (5)		0,079	Litter (2)	0,149
	Special Features (3) (1)	0,028	Skyline Land Forr (6)		0,085	Sewage Discharge Evidence(3)	0,149
Beach Face(P_2)	Type (1) (2)	0,034	Tides (7)		0,036	Non Built Environment (4)	0,064
	Width (2) (2)	0,029	Coastal Landscape Features .(8)		0,121	Built Environment (5)	0,137
	Color (3) (2)	0,024	Vistas (9)		0,095	Access Type (6)	0,091
Rocky Shore(P_3)	Slope (1) (3)	0,014	Water Colour and Clarity (10)		0,140	Skyline (7)	0,137
	Extent (2) (3)	0,015	Natural Vegetation Cover (11)		0,117	Utilities (8)	0,137
	Roughness (3) (3)	0,022	Vegetation Debris Banquets (12)		0,086		

For example for the parameter *beach face width* which is the 4th parameter, if grade 4 is chosen, then: d_5 = (0 0 0 1 0), and the corresponding membership grading matrix M_5 is

$$M_5 = \begin{array}{c} \begin{matrix} 1 & 2 & 3 & 4 & 5 \end{matrix} \\ \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0.2 & 1 & 0.2 & 0 \\ 0 & 0 & 0.2 & 1 & 0.6 \\ 0 & 0 & 0 & 0.6 & 1 \end{bmatrix} \end{array}$$

- 1- Absent
- 2- Smaller than 5m greater than 100m
- 3- Smaller than 25m greater than 5m
- 4- Smaller than 50m greater than 25m
- 5- Smaller than 100m greater than 50m

In the above matrix M_5, the estimated membership grades are given as: If the parameter is absent, a value of 1 is given in the first column and zeros in the others. If the beach face width is present but it is smaller than 5m greater than 100m, then the 1 is inserted into the second column. As it is extremely unlikely that the error 'jumps' an assessment grade, the remainder of the row is given a zero possibility. Similarly, if it scores 3, the error could now be either side of the true grade, so 0.2 is given on either side. In the same way if it scores four or five the error is distributed according to logical point of view, higher the logical possibility higher the error distribution. So the matrix is built up for all parameters.

Grading matrices M_i for all 26 parameters are presented in Appendix D.

Then the membership grade of "beach face width" for d_5 is;

$$G_5 = (0 \quad 0 \quad 0.2 \quad 1 \quad 0.6)$$

The entries for G_5 above, express the possibilities of grades 3 and 5 relative to graded attribute 4 for the parameter "beach face width".

Since weights may be different for the parameters in the sets P and H, the assessment matrix A_P and A_H are formed separately for each of the factors P and H, respectively. A_P is a 18x5 matrix formed from G_i (i = 1 to 18) rows , Similarly, A_H has as rows G_i (i = 19 to 26) .

The assessment matrix V_m for each factor is the weighted assessment matrix

$$V_m = W_m . A_m$$

where "m" is the subscript standing for sets P and H as V_P and V_H, respectively.

The final assessment matrix R, considering all factors, is obtained from:

$$R = W_F . A$$

where W_F is the weighting set of the system, and K is the matrix formed from two 1 x 5 matrices are formed from V_P and V_H ; respectively as its rows.

The i'th element of the 1 x 5 final assessment matrix R is the membership grade (possible grade) of the i'th element of the assessment set.

Assessment Matrices were obtained for all selected sites visited in Turkey as a part of coastal scenic assessment work and given in Table 6 as an example for Çıralı Karaburun and in Appendix E for all sites.

As it is seen from Table 6 in Assessment Matrices, graded attributes for Physical Parameters (1-18), Human Parameters (19-26) decided at the site and weights of those parameters are given in the third and fourth columns, respectively. Input matrices d_i are given from column five to nine. The columns from eleven to fifteen form the grade matrices G_i's which is the multiplication of d_i with corresponding grading matrices M_i. Weighted Assessment matrices R_m obtained by multiplying weights by subsequent grade matrix G_i. The column summation of Weighted Assessment Matrices is the Weighted Average Matrices V_P and V_H. The Membership Degree Matrix is then formed by multiplying weights of subset matrix W_F with matrix K. K is formed from V_P and V_H. as its rows.

Table 6. The Assessment matrices for Çıralı Karaburun

Çıralı Karaburun, Turkey																						
Assessment Matrices																						
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**													
									A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	3	0,019	0	0	1	0	0		0,00	**0,30**	**1,00**	**0,30**	0,00		0,000	**0,006**	**0,019**	**0,006**	0,000
2	Cliff Slope (1-2)	5	0,017	0	0	0	0	1		0,00	0,00	0,00	**0,50**	**1,00**		0,000	0,000	0,000	**0,009**	**0,017**
3	Special Features (1-3)	3	0,028	0	0	1	0	0		0,00	0,00	**1,00**	**0,30**	0,00		0,000	0,000	**0,028**	**0,008**	0,000
4	Beach Type (2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width (2-2)	4	0,029	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color (2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope (3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent (3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness (3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes (4)	2	0,039	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,039**	0,000	0,000	0,000
11	Valley (5)	4	0,079	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,10**		0,000	0,000	0,000	**0,079**	**0,008**
12	Landform (6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides (7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas (9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color (10)	5	0,139	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,028**	**0,140**
17	Vegetation Cover (11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed (12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,051**	**0,044**	**0,189**	**0,394**	**0,534**
Human																				
19	Disturbance Factor (1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter (2)	4	0,149	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
21	Sewage (3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment (4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment (5)	4	0,137	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
24	Access Type (6)	4	0,091	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,018**	0,000	**0,091**	**0,018**
25	Skyline (7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
26	Utilities (8)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																0,000	**0,018**	**0,113**	**0,431**	**0,671**
Weighted Averages Matrix																				
Elements of Weighted Averages Matrix				**Weights Of Subsets W_F**												**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P				1/2											**Matrix K**	**0,051**	**0,044**	**0,189**	**0,394**	**0,534**
Weighted Averages Matrix of Subset Human V_H				1/2												**0,000**	**0,018**	**0,113**	**0,431**	**0,671**
Final Assessment Matrix (W_F x K)																				
Final Assessment Matrix (R) - Membership Degree																**0,026**	**0,031**	**0,151**	**0,412**	**0,603**

CHAPTER 3

EVALUATION AND DISSCUSSION OF RESULTS AND CLASSIFICATION STUDIES

“If one way be better than another, that you may be sure is Nature’s way."

Aristotle

3.1 Introduction

For the evaluation and calibration of the model 22 selected sites were visited in Turkey. These sites are;

Antalya Kemer Region: Çıralı Mid-Section, Çıralı Karaburun, Phaselis Small Bay, Phaselis Large Bay, Tekirova North, Tekirova South.

Antalya City Region : Konyaaltı West Section, Konyaaltı East Section, Konyaaltı Middle Section, Lara Barınak, Dedeman Hotel, Lara Beach, Old Harbor, Waterfalls,

Mersin Region : Tisan Temple, Göksu Hurma, Alata West, Alata Mid., Tisan Back Bay, Karaburun Akyar, Alata East, Kızkalesi.

3.2 Data Presentation

In this thesis, data presentation and scenic rating assessment were carried out by fuzzy mathematical methods. “Coastal Scenic Assessment” data was presented by:

1) Assessment Histogram
2) Assessment Matrices

For all sites the “Assessment Histograms” and “Assessment Matrices” were prepared by the data taken from the “Coastal Scenic Evaluation System” tables.

Assessment Histogram is given by plotting the scores taken from the “Coastal Scenic Evaluation System” on the x-axis for each parameter presented on the y-axis. The y-axis is further grouped into physical and human subsections taken from the “Coastal Scenic Evaluation System” tables. Assessment histograms given in Figure 1 for Çıralı Turkey as an example, and in Appendix F for all sites.

The Results of Coastal Scenic Evaluation calculations are presented by:

- Weighted averages of physical and human factors
- Membership degrees of physical and human factors

These calculations are carried out for all sites investigated using assessment matrices of each site.. The results of fuzzy logic calculations are presented as;

- The histogram of weighted average of attributes grouped into physical (V_P) and human (V_H) attributes.
- The graphs of membership degrees versus attributes (Final Assessment Matrix R).

3.3 Evaluation of Results.

Evaluation of results was carried out on two bases;

1) Site (For individual site assessment)
2) Sites (For comparative site studies)

The histogram of weighted averages of attributes of Çıralı Karaburun and Mersin Kızkalesi are given in Figure 2 and 3, respectively as examples. The weighted averages of attributes histograms of the other assessed sites are given in Appendix G. The graphs of membership degrees of attributes of Çıralı Karaburun and Kızkalesi Mersin are given in Figure 4 and 5 respectively.

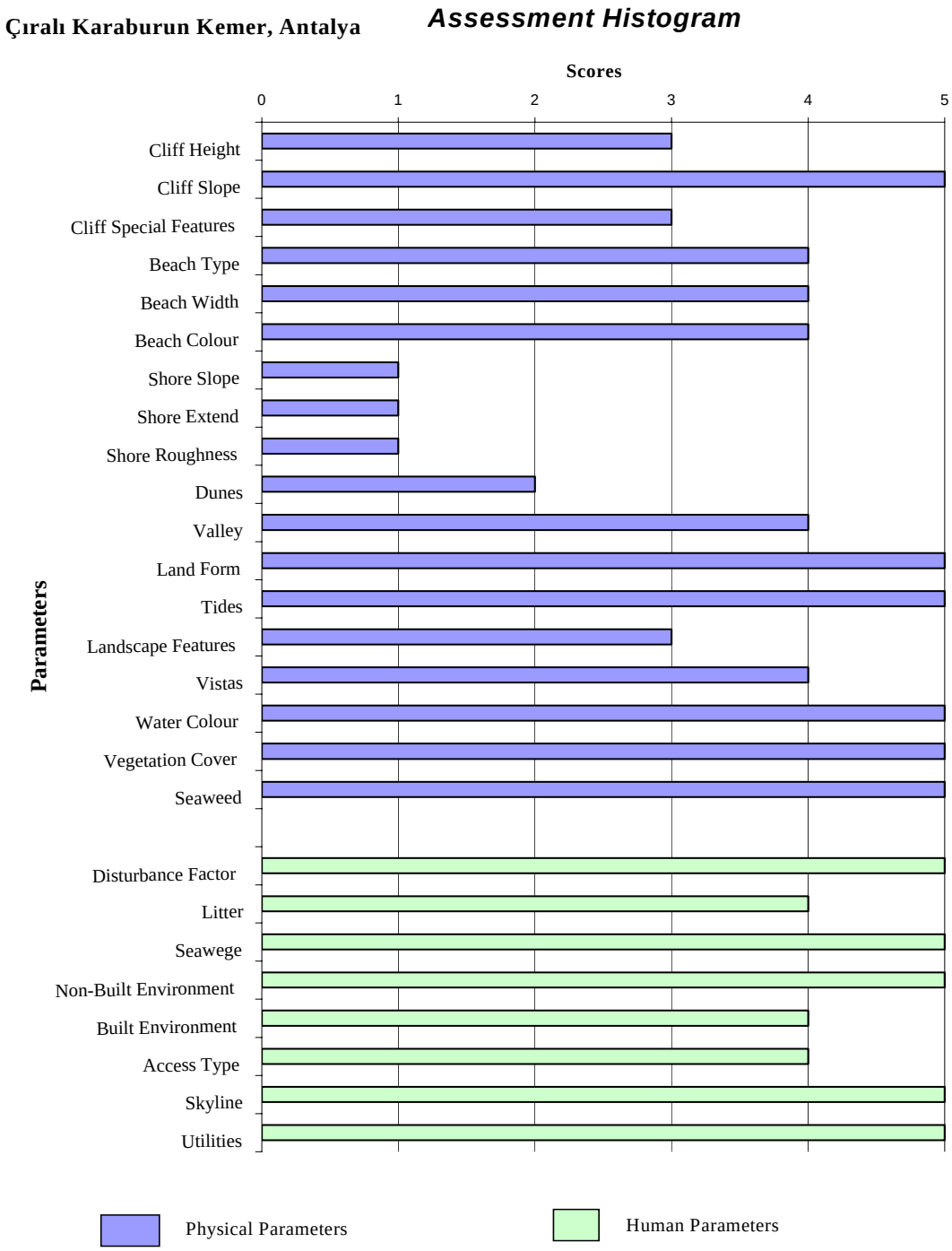

Figure 1. Assessment histogram for Çıralı Karaburun

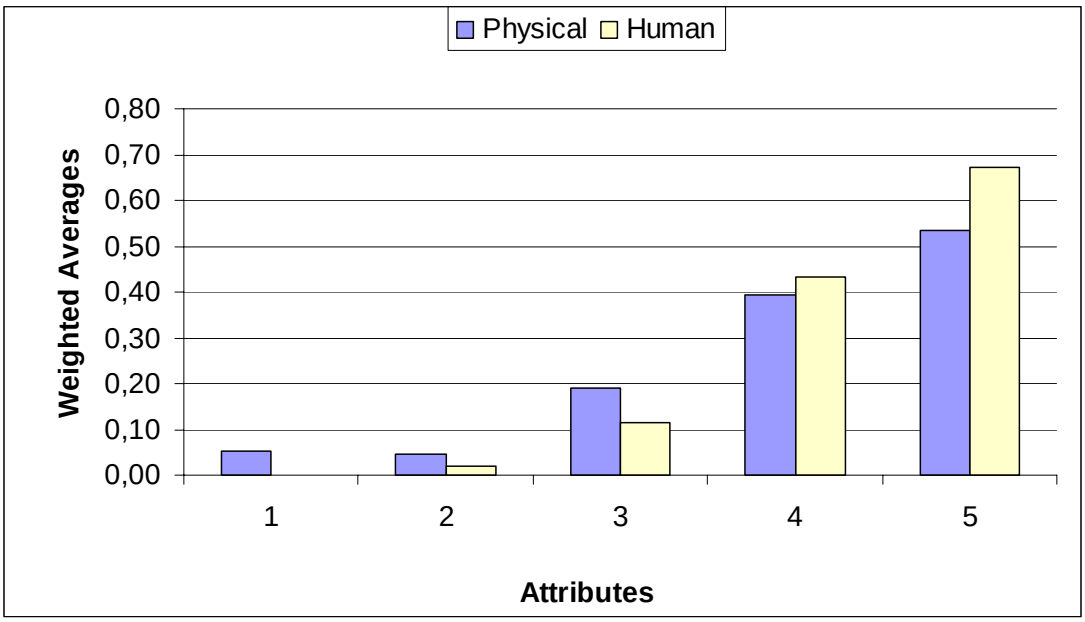

Figure 2. The histogram of weighted averages vs. attributes for Çıralı Karaburun.

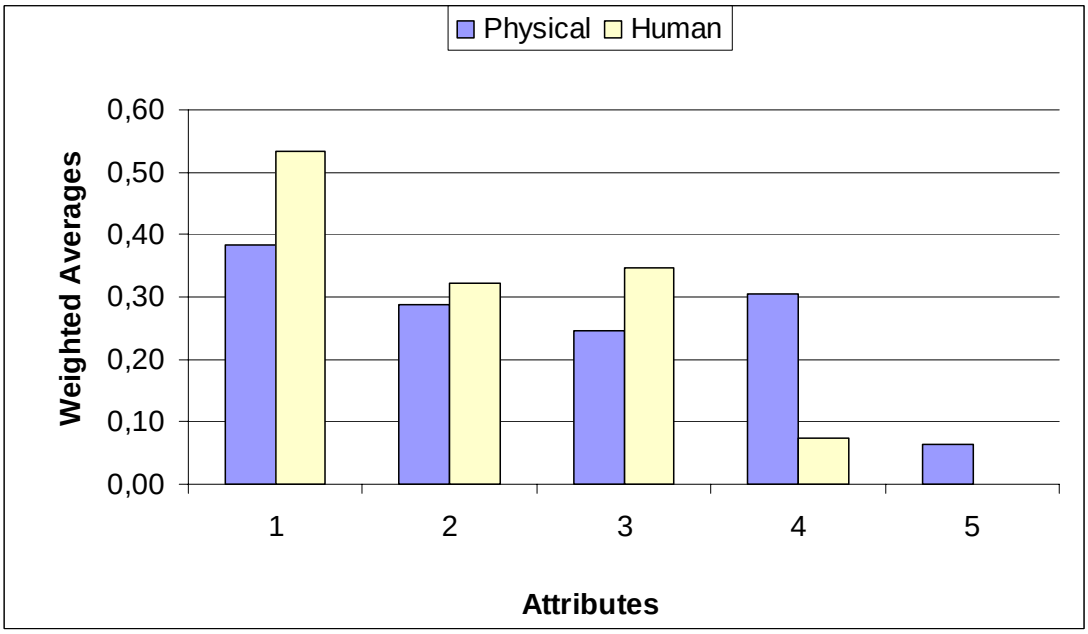

Figure 3. The histogram of weighted averages vs. attributes for Kızkalesi Mersin.

In this weighted averages versus attribute histogram it is possible to see the adverse and good effects separately for physical and human parameters. With respect to the weighted averages versus attribute histogram, high attribute values, e.g. high

attribute values such as 4 and 5, (e.g. Çıralı Karaburun Figure 2) reflect the positive influencing impact of the physical or human parameter. Similarly the reverse holds true for high weighted averages at lower value such as 1 and 2 (e.g. Kızkalesi Mersin Figure 3) reflects the adverse impact of the physical or human parameter.

To assess more than one site for comparative purpose "Membership Degrees of Attributes" are used. The membership degrees vs Attributes graph for Çıralı Karaburun is used as an example to compute decision parameter D.

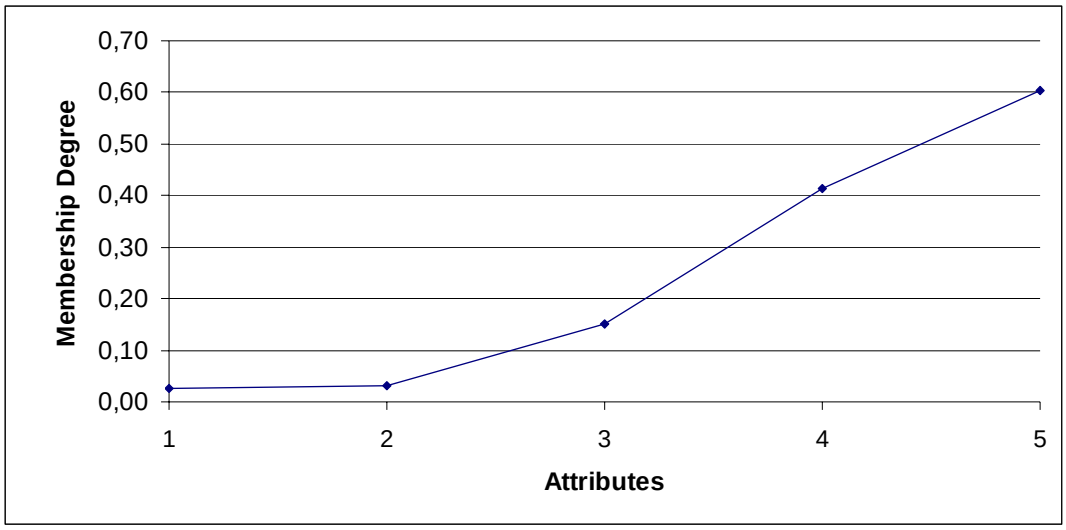

Figure 4. The membership degrees versus attributes graph of Çıralı Karaburun.

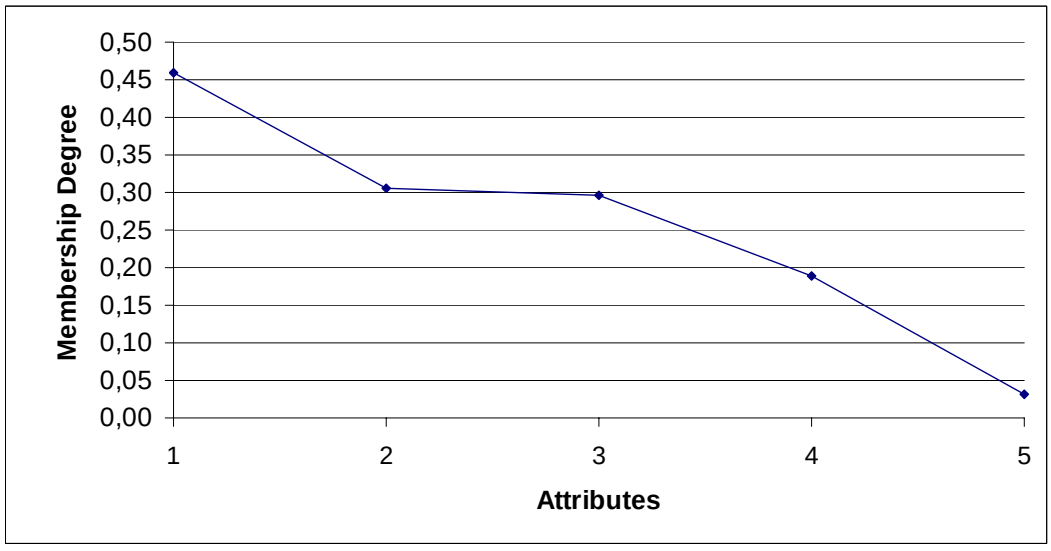

Figure 5. The membership degrees versus attributes graph of Kızkalesi, Mersin

With respect to membership degree versus attributes graphs, a right hand skew (RHS) e.g. Çıralı Karaburun (Figure 3), indicates a high scenic rating compared to left hand skew (LHS) curve e.g. Kızkalesi Mersin, (Figure 4).

In the context of coastal management policies, a reflection of high human parameters at low attribute values can be interpreted, e.g. as intensive urban development, litter, etc. Most sites will have physical parameters, which would tend to constrain an increased scenic value from these parameters so perhaps an emphasis should be given by coastal managers to viewing ways of increasing human parameter scores.

3.4 Decision Parameters.

For comparison purposes among sites, a set of decision parameters (D1 – D4) are defined in relation to their relative distribution over successive attributes. That is the decision parameters may be estimated as the ratio of the area of the area between the corresponding attributes to that of the total area A_T under the Membership Degree versus attribute curve.

The suggested decision parameters (D) for comparison are;

$$\mathbf{D1=}\ \frac{A_{35}}{A_T} \tag{1}$$

$$\mathbf{D1=}\ \frac{A_{35}}{A_{13}} \tag{2}$$

$$\mathbf{D3=}\ \frac{A_{35} - A_{13}}{A_T} \tag{3}$$

D4= $\frac{(-2\times A_{12})+(-1\times A_{23})+(1\times A_{34})+(2\times A_{45})}{A_T}$. (4)

where in equations (1) to (4) the area under the curve between the attributes 1 and 2 is named $A_{12,}$ the area under the curve between the attributes 2 and 3 is named $A_{23,}$ the area under the curve between the attributes 3 and 4 is named A_{34}, the area under the curve between the attributes 4 and 5 is named A_{45}

Whereas the area under the curve between the attributes 1 and 3, that is "A_{12} + A_{23}" is named $A_{13;}$ the area under the curve between the attributes 3 and 5, that is "A_{34} + A_{45}" is named $A_{35.}$

The total area under the curve is denoted by A_T

It can be seen that;

For D1 $A_{13} + A_{35} = A_T \quad \Rightarrow \quad 1\geq \frac{A_{35}}{A_T} \geq 0$ $A_{35}=0$ D1=0 $A_{12}=0$ D1=1

For D2 $\frac{A_{35}}{A_T}+\frac{A_{13}}{A_T}=1 \quad \Rightarrow \quad \frac{A_{35}}{A_{13}}=\frac{1-\frac{A_{13}}{A_T}}{\frac{A_{13}}{A_T}}=\frac{1}{\frac{A_{13}}{A_T}}-1$ $\Rightarrow$ It is clear that

$\infty > \frac{A_{35}}{A_{13}} \geq 0$

For D3 $\frac{A_{35}}{A_T}+\frac{A_{13}}{A_T}=1 \quad \Rightarrow \quad 1\geq \frac{A_{35}-A_{13}}{A_T} \geq -1$

For D4 $A_{12}+A_{23}+A_{34}+A_{45} = A_T \Rightarrow 2 \geq \frac{(-2\times A_{12})+(-1\times A_{23})+(1\times A_{34})+(2\times A_{45})}{A_T} \geq -2$

Higher the values of decision parameters imply more attractive scenic values.

The proposed decision parameters are applied for Çıralı Karaburun as below:

Area under the curve, between attributes 1 and 2 is calculated as follows;

Area (1 - 2) = (0.026+0.031) / 2 = 0.028

Area (2 - 3) = (0.031+0.151) / 2 = 0.091

Area (3 - 4) = (0.151+0.412) / 2 = 0.281

Area (4 - 5) = (0.412+0.603) / 2 = 0.508

Total = 0.908

Ratios;

Area (1 - 2) to Total Area = 0.028 / 0.908 = 0.032

Area (2 - 3) to Total Area = 0.091 / 0.908 = 0.100

Area (3 - 4) to Total Area = 0.281 / 0.908 = 0.309

Area (4 - 5) to Total Area = 0.508 / 0.908 = 0.559

Area under the curve which belongs to the attributes higher than 3.

Area (3 5) = Area (3 4) + Area (4 5) = 0.281 + 0.508 = 0.789

Ratio of Aria (3 5) to total area = 0.789 / 0.908 = 0.869

Area under the curve which belongs to the attributes smaller than 3.

Area (1 3) = Area (1 2) + Area (2 3) = 0.028 + 0.091 = 0.119

Ratio of Area (3 5) to total area = 0.119 / 0.908 = 0.131

Then the Ratio of the Area (3 5) to Area (1 3) is calculated as;

0.789 / 0.131 = 6.023

The results for these calculations are given in Table 7, for Çıralı Karaburun

Table 7: The values calculated using Membership Degrees versus Attributes graphs for Çıralı Karaburun

Areas Below the Curve For All Attributes								A_T	Attribute>3 (3-5)		Attribute<3 (1-3)		A_{35} / A_{13}
1-2		2-3		3-4		4-5							
A_{12}	A_{12} / A_T	A_{23}	A_{23} / A_T	A_{34}	A_{34} / A_T	A_{45}	A_{45} / A_T		A_{35}	A_{35} / A_T	A_{13}	A_{13} / A_T	
0,028	0,031	0,091	**0,100**	0,282	**0,310**	0,508	**0,558**	**0,909**	0,789	0,868	0,120	0,132	6,601

These calculations are carried out for all evaluated sites using decision parameters, D1 to D4. Order of sites with respect to D1 to D4 decision parameters are given as example in Tables 8 to 10, respectively. The graphical forms of coastal scenic sequence curves with respect to D1 to D4 are given in Figures 6 to 9 for all 22 sites.

Table 8 Order of sites with respect to decision parameters D1 and D2.

D1 CRITERIA			D2 CRITERIA		
	Sites	A_{35} / A_T		**Sites**	A_{35} / A_{13}
1	Çıralı Karaburun, Kemer	0,87	1	Çıralı Karaburun, Kemer	6,60
2	Çıralı Mid-section, Kemer	0,86	2	Çıralı Mid-section, Kemer	6,32
3	Phasalis Small Bay, Kemer	0,79	3	Phasalis Small Bay, Kemer	3,80
4	Tisan Back Bay Mersin	0,75	4	Tisan Back Bay Mersin	3,06
5	Phaselis Large Bay, Kemer	0,74	5	Phaselis Large Bay, Kemer	2,91
6	Tisan Tample, Mersin	0,70	6	Tisan Tample, Mersin	2,39
7	Karaburun Akyar, Mersin	0,69	7	Karaburun Akyar, Mersin	2,27
8	Göksu Hurma, Mersin	0,66	8	Göksu Hurma, Mersin	1,98
9	Alata West, Mersin	0,60	9	Alata West, Mersin	1,50
10	Alata Mid, Mersin	0,59	10	Alata Mid, Mersin	1,41
11	Old Harbour, Antalya	0,57	11	Old Harbour, Antalya	1,33
12	Tekirova South, Kemer	0,55	12	Tekirova South, Kemer	1,23
13	Tekirova North, Kemer	0,54	13	Tekirova North, Kemer	1,18
14	Konyaaltı West, Antalya	0,54	14	Konyaaltı West, Antalya	1,17
15	Konyaaltı East, Antalya	0,53	15	Konyaaltı East, Antalya	1,12
16	Konyaaltı Middle, Antalya	0,52	16	Konyaaltı Middle, Antalya	1,08
17	Alata East, Mersin	0,51	17	Alata East, Mersin	1,05
18	Waterfalls, Antalya	0,50	18	Waterfalls, Antalya	0,99
19	Lara Barınak, Antalya	0,47	19	Lara Barınak, Antalya	0,88
20	Dedeman Hotel, Antalya	0,43	20	Dedeman Hotel, Antalya	0,77
21	Lara Beach, Antalya	0,41	21	Lara Beach, Antalya	0,69
22	Kız Kalesi, Mersin	0,34	22	Kız Kalesi, Mersin	0,52

Table 9 Order of sites with respect to decision parameter D3

D3 CRITERIA

	Sites	$(A_{35} - A_{14}) / A_T$
1	Çıralı Karaburun, Kemer	0,74
2	Çıralı Mid-section, Kemer	0,73
3	Phasalis Small Bay, Kemer	0,58
4	Tisan Back Bay Mersin	0,51
5	Phaselis Large Bay, Kemer	0,49
6	Tisan Tample, Mersin	0,41
7	Karaburun Akyar, Mersin	0,39
8	Göksu Hurma, Mersin	0,33
9	Alata West, Mersin	0,20
10	Alata Mid, Mersin	0,17
11	Old Harbour, Antalya	0,14
12	Tekirova South, Kemer	0,10
13	Tekirova North, Kemer	0,08
14	Konyaaltı West, Antalya	0,08
15	Konyaaltı East, Antalya	0,06
16	Konyaaltı Middle, Antalya	0,04
17	Alata East, Mersin	0,03
18	Waterfalls, Antalya	0,00
19	Lara Barınak, Antalya	-0,06
20	Dedeman Hotel, Antalya	-0,13
21	Lara Beach, Antalya	-0,18
22	Kız Kalesi, Mersin	-0,32

Table 10 Order of sites with respect to decision parameter D4.

D4 CRITERIA

	Sites	$[(-2xA_{12})+(-1xA_{23})+(1xA_{34})+(2xA_{45})] / A_T$
1	Çıralı Mid-section, Kemer	1,31
2	Çıralı Karaburun, Kemer	1,26
3	Phasalis Small Bay, Kemer	1,08
4	Phaselis Large Bay, Kemer	0,91
5	Tisan Back Bay Mersin	0,83
6	Tisan Tample, Mersin	0,68
7	Karaburun Akyar, Mersin	0,67
8	Göksu Hurma, Mersin	0,61
9	Alata West, Mersin	0,31
10	Alata Mid, Mersin	0,29
11	Old Harbour, Antalya	0,19
12	Tekirova North, Kemer	0,19
13	Tekirova South, Kemer	0,18
14	Konyaaltı West, Antalya	0,10
15	Konyaaltı East, Antalya	0,09
16	Alata East, Mersin	0,07
17	Konyaaltı Middle, Antalya	0,04
18	Waterfalls, Antalya	-0,01
19	Lara Barınak, Antalya	-0,16
20	Dedeman Hotel, Antalya	-0,21
21	Lara Beach, Antalya	-0,28
22	Kız Kalesi, Mersin	-0,58

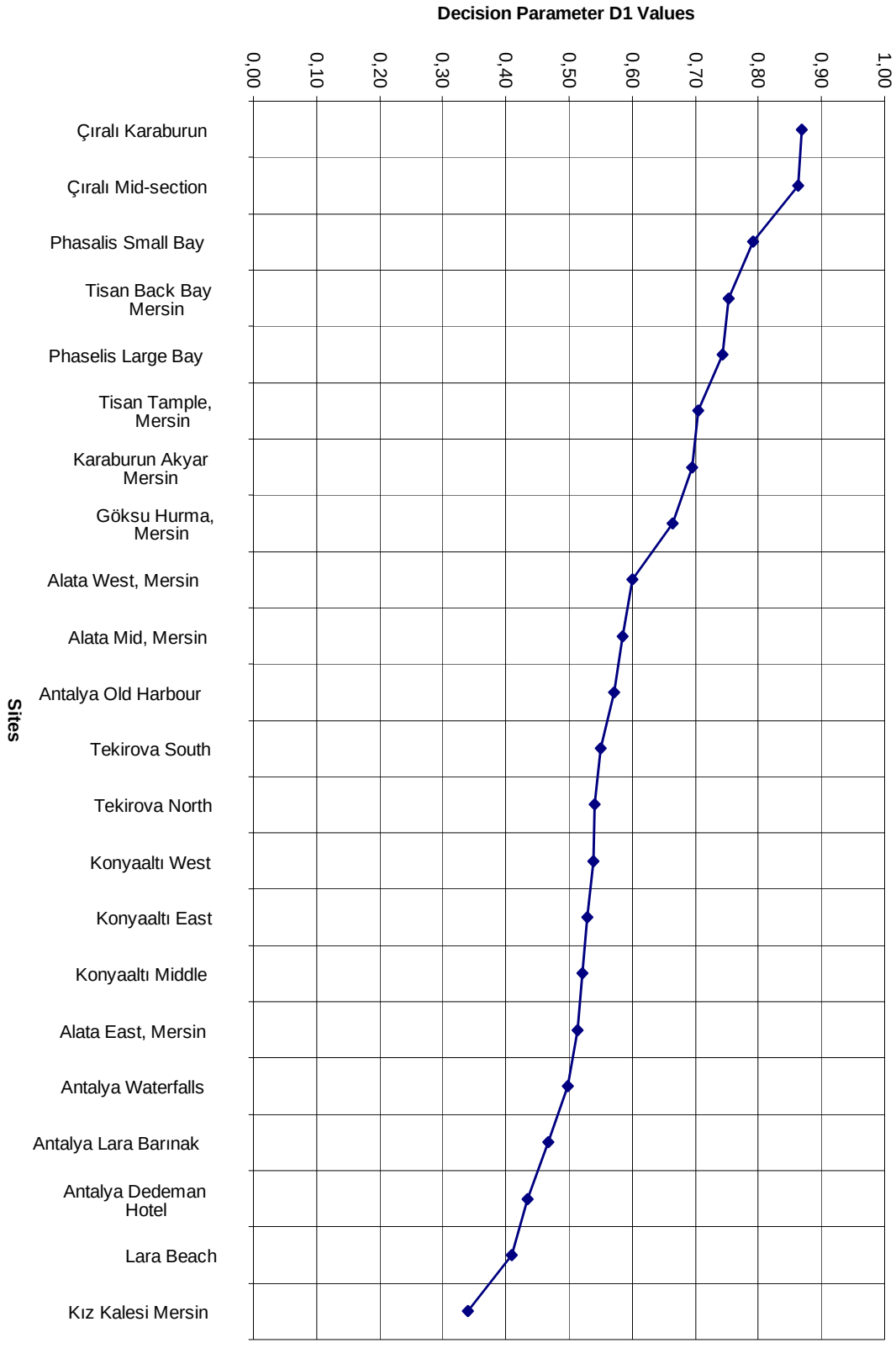

Figure 6 Coastal scenic sequence curve with respect to decision parameter D1.

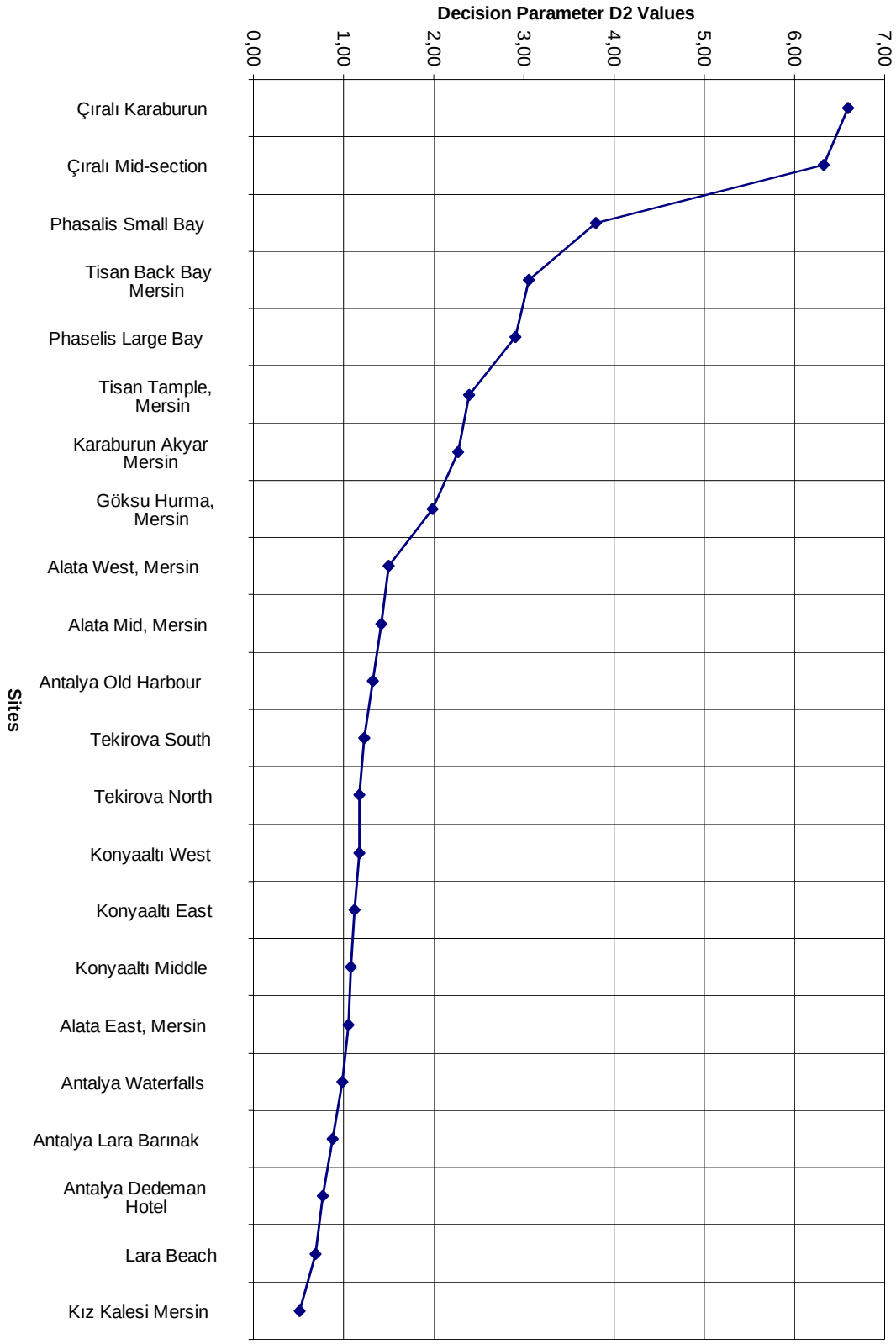

Figure 7 Coastal scenic sequence curve with respect to decision parameter D2.

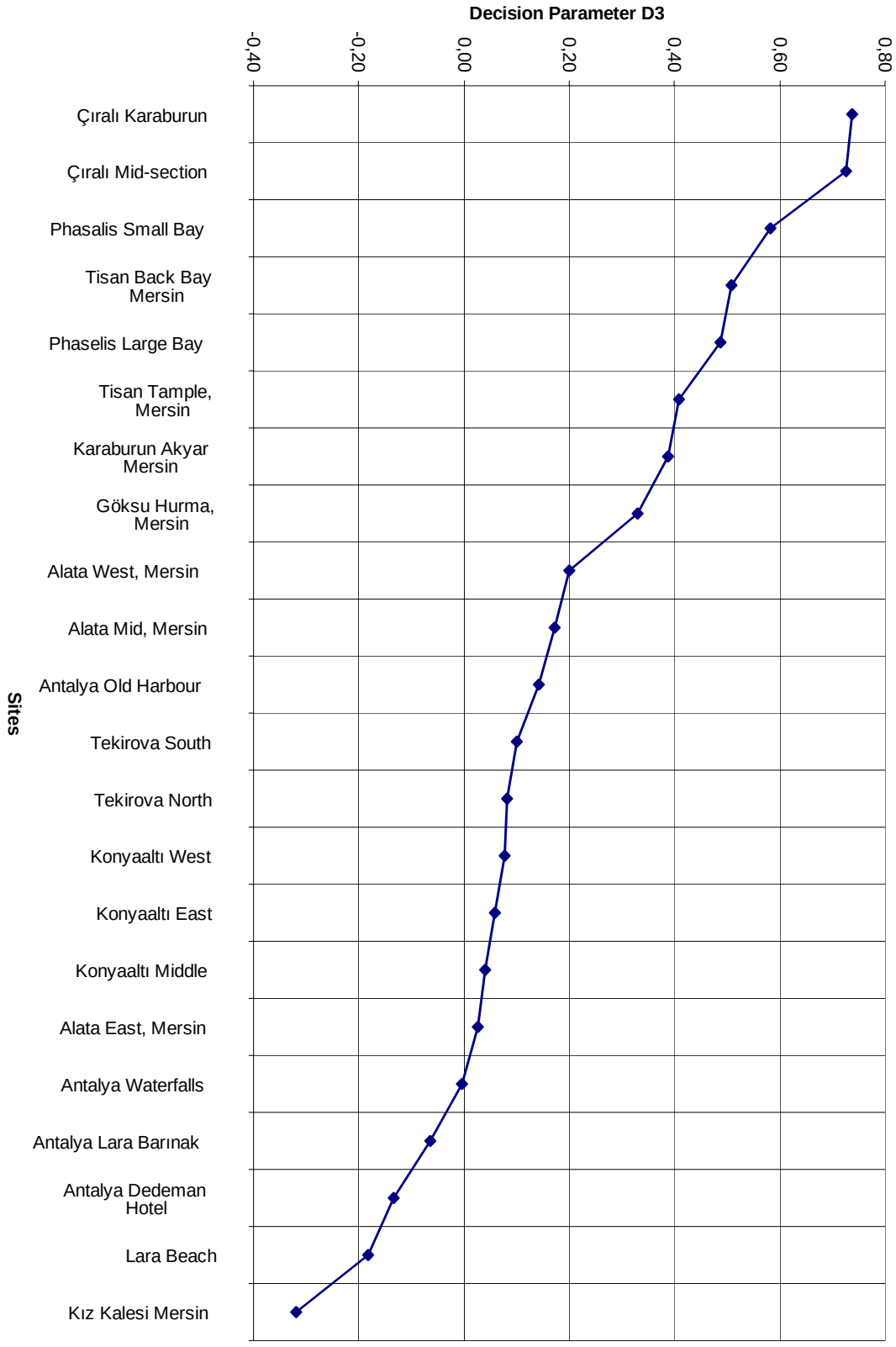

Figure 8 Coastal scenic sequence curve with respect to decision parameter D3

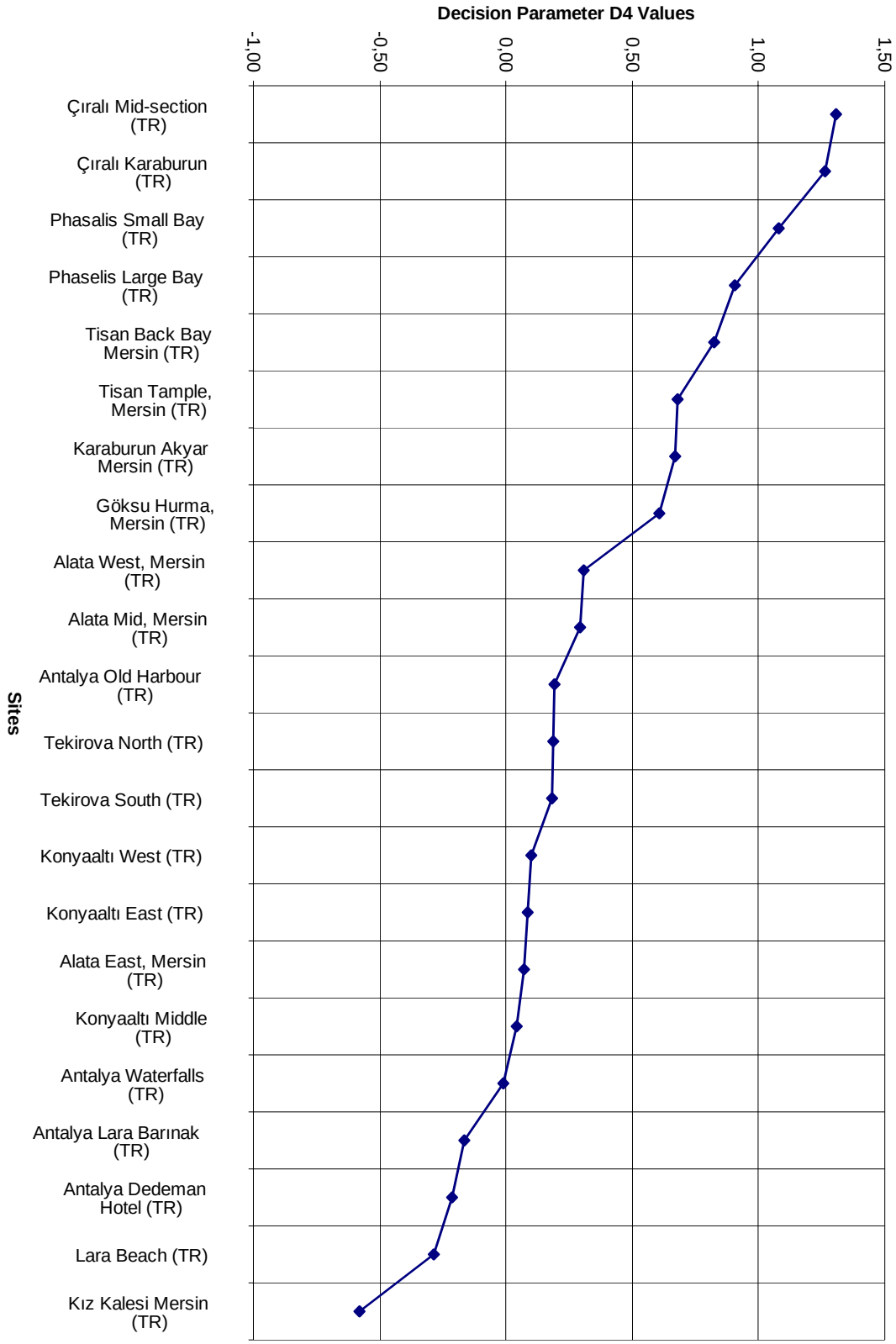

Figure 9 Coastal scenic sequence curve with respect to decision parameter D4

Although sequence graphs and order tables are resulting nearly the same outputs among those proposed decision parameters D4 was chosen as a decision tool. It reflects the attributed values taking into consideration the weighted areas.

3.5 A Five Class Coastal Scenery Evaluation System

As a first attempt a five class evaluation system for coastal scenery is proposed. The classification is based on by dividing the coastal scenic sequence curve with respect to decision parameter D4 into approximately five equal frequencies which almost correspond to break points of the curve as shown in Figure 10 According to this classification

CLASS 1;

Top Natural; Extremely attractive with very high landscape value. The first four sites are in this class. D4 value greater than 0.90 e.g. Çıralı Karaburun.

CLASS 2;

Natural; Attractive with high landscape value, having D4 value between 0.60 and 0.90 e.g. Tisan, Mersin.

CLASS 3;

Natural Average with medium landscape value having D4 value greater then 0.20 and less than 0.60 e.g. Alata mid-section Mersin.

CLASS 4;

Mainly Urban, Poor with medium landscape value and light development. The sites in this class have D4 value is between 0 and 0.15, e.g. Konyaaltı Middle, Antalya.

CLASS 5;

Urban, Poor with low landscape value, and intensive development. The sites in this group have negative D4 value such as Kızkalesi, Mersin.

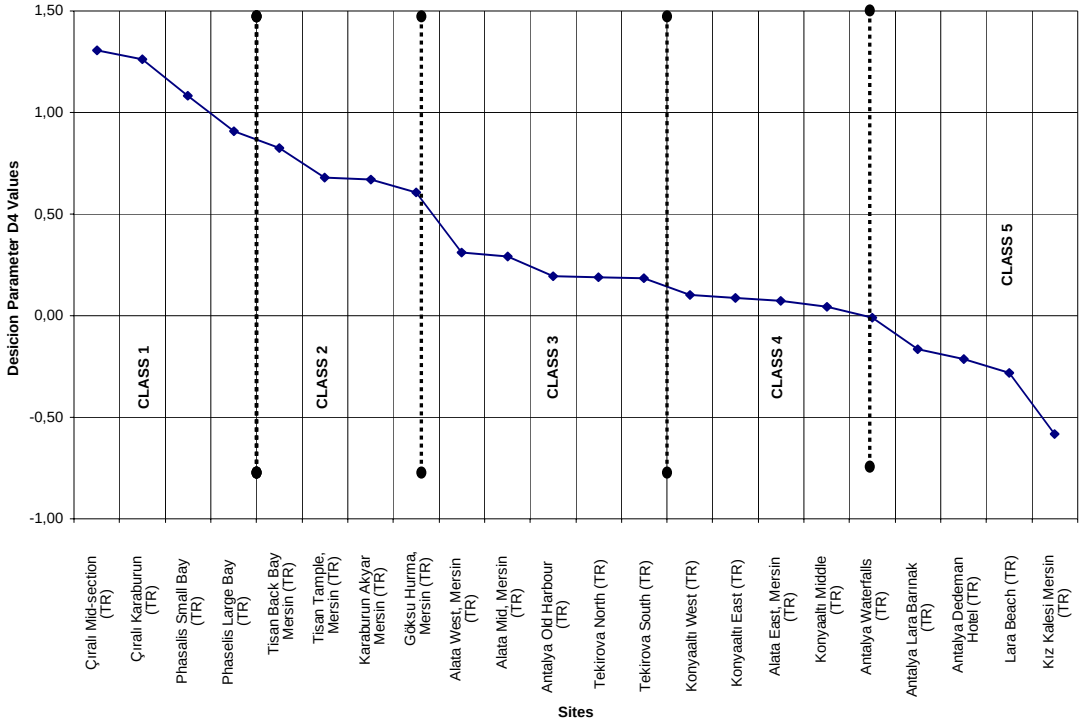

Figure 10 Coastal scenic sequence curve with respect to decision parameter D4 and classification.

Examples of class 1 sites would include Çıralı Mid-Section, Çıralı Karaburun, Phaselis Small Bay,, Phaselis Large Bay. These sites rate highly due to outstanding features represented by both natural as well as anthropogenic parameters. Based on perception studies carried out, the top five rated parameters were an absence of sewage and litter, water colour and clarity, absence of noise, quality of built environment and landscape features (caves, waterfalls etc.). Other high graded

parameters included beach type and natural vegetation cover. All scored highly for this category.

Examples of class 2 sites would include Tisan Back Bay, Tisan Temple, Karaburun Akyar Mersin,. These sites rated lower than Class 1 due to lower scoring of the above mentioned parameters for Class 1 sites. For example, the Tisan Temple site rating included spectacular historical features dating from Roman period together with excellent vegetation cover. However, negative aspects of this site included litter and tourism related development not in harmony with the environment.

Class 3 sites include Alata West, Mersin, Old Harbor, Tekirova North and Tekirova South Kemer. This category includes interesting but complex harbor sites such as the Antalya Old Yatch Harbor. Despite intensive development, this site is enhanced by aesthetically pleasing features such as marinas, traditional housing, and historical fortifications.

Class 4 category includes Konyaaltı beach (Antalya) and Alata East (Mersin) where negative aspects were dominated by creeping urbanization with the associated problems of utilities litter, poor skyline quality, noise disturbance and degeneration of natural features present. Yet in some sites Konyaaltı East, the presence of adequate buffer zones was noted to migrate such negative features. A well designed buffer zone pushed this site from Class 5 to Class 4.

Class 5 sites included Waterfalls, Lara Barınak, Dedeman Hotel, Lara Beach, (Antalya); Kızkalesi (Mersin). Typically these sites tended to be intensively developed, having features such as unattractive urbanization at Kızkalesi Mersin. Other negative features at such sites included high litter amount, noise, an absence of buffer zone, and degraded natural environments, e.g. loss of beach arising from

anthropogenic developments, poor skyline quality, noise disturbance, the degeneration of natural and cultural features.

As it is seen from the scenic classification, those sites with high scenic quality plus well planned civil usage such as Çıralı are classified as Class 1. Those sites regardless of their high scenic quality but with poor human usage such as Kızkalesi, Mersin are classified as Class 4. The outcome hopefully will be a warning and guide for coastal managers, planners and governmental agencies and most important to municipalities by providing a scientific comparison between areas, regions and countries.

CHAPTER 4

CONCLUSIONS and RECOMMENDATIONS

"Joy in looking and comprehending is nature's most beautiful gift."

Albert Einstein

An innovative coastal scenic evaluation (CSE) model was developed. The main features of the model can be summarised as follows:

- A Coastal Scenic Evaluation System composed of 18 physical and 8 human total of 26 assessment parameters, was based on a five-scale attribute rating system.
- A parameter ranking importance via a weighting index was derived from a perception study.
- A mathematical model based on a fuzzy logic approach was developed.
- 22 Turkish sites were evaluated using Coastal Scenic Evaluation model.
- For each evaluated site Assessment Matrices were prepared based on site investigations.
- Using site data Scenic Evaluation Histograms off all sites were obtained.
- Using site data, and assessment matrices histograms of weighted averages of attributes were obtained for all evaluated sites.
- Using the assessment matrices graphs of membership degree versus attributes were obtained for all sites. On the graphs the RHS (right hand skew) curve shows high physical characteristics combining with appropriate human usage

on the other hand LHS (left hand skew) curve shows low physical qualifications and inappropriate human usage.

- A site classification based on coastal scenic sequence curve with respect to decision parameter D4 is considered to be an appropriate tool to start the discussions on the site assessments. First attempt at site classification was made based on the final sequence curve produced (Figure 10) which gives number of sites in each class distributed as 4 or 5. Resulting proposed five class evaluation systems for coastal scenery. This comprised:

  CLASS 1: Extremely attractive natural site with a very high landscape value, having a D4value above 0.90, e.g. Cıralı, Turkey.

  CLASS 2: Attractive natural site with high landscape value, having a D4 value between 0.60 and 0.90, e.g. Tisan Temple Mersin

  CLASS 3: Many natural with little outstanding landscape features and a D4 value between 0.15 and 0.60, e.g. Old Harbour Antalya.

  CLASS 4: Mainly unattractive urban, with a low landscape value, and a D4 value between 0 and 0.4, e.g., Konyaalti East Antalya.

  CLASS 5: Very unattractive urban, intensive development with a low landscape value and a D4 value below zero, e.g. Kızkalesi Mersin, Turkey.

From this classification it can be seen that Cıralı that has very high scores with physical properties and human use, on the other hand Kızkalesi Mersin become

an example for good physical properties which are adversely effected by poor human usage.

With regard to coastal zone management, the technique introduced is suitable for evaluating future potential changes especially with regard to influence of coastal structures on the coastal scenery. This classification will hopefully be utilized by coastal managers, planners, academics, governmental agencies, as to improve the especially human usage of the coastal areas. This work will be a tool for the preservation/conservation and sustainable development of the coastal areas.

This study can be applied for more sites and may be calibrated by the new results.

More sites should be evaluated and the normality analysis for the decision parameter curve should be carried out.

Highly recommended work is using GIS techniques this study can be automated and large number of sites can be examined in a very short time. Software can be developed for this purpose. So this study can be applied worldwide and can be used by all International Environmental Preservation Projects. Another recommended future study can be developing management tools reflecting strengths and weaknesses of evaluated sites based on data presentation in the form of assessment histograms and weighted averages versus attributes by creating scenarios for different alternative cases. The latter reflects the effect of physical and human parameters on a scenic assessment, which can be used as a tool by coastal planners.

Based on all these works, where a scientific, comparative and universal scale is used as a tool, it is hoped that, those areas with high coastal scenic values, will have a chance to be accepted as **“World Heritage Coasts”**.

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APPENDIX A

COASTAL SCENIC EVALUATION TABLES

Table A1: Coastal Scenic Evaluation Table (Leopold 1969)

PHYSICAL		**Scoring system 1-5**
Cliff	Profile	
	Accidentation	
Beach	Width	
	Shape	
Composition (e.g. mud, gravels, sand)		
Shore platform	width	
Rocky shore		
Valley		
Land form (e.g. undulating)		
Tides		
Waves		
Landscape variation (e.g. deltas, estuaries.)		
BIOLOGICAL		
Water Colour		
Turbidity		
Tree cover		
Cultivation		
Moorland		
Bio-diversity		
Heath		
Hedgerows		
HUMAN		
Conservation status		
Vistas		
Recreation		
Litter	noise	
	air	
	odour	
	metal	
	paper	
	plastic	
	sewage	
Land use		
Accessibility		
Utilities		
Historic features		
Attractive buildings		
Boats		
BONUS POINTS: Special views e.g. islands, stacks, waterfalls		

Table A2-1: Coastal Scenic Evaluation Table Rev 1

Site Name:

Coastal Scenic Evaluation System:

Physical Parameters		RATING				
		1	2	3	4	5
LIFF	Height	Absent	> 5m - < 30m	>30 - < 60m	> 60 - < 90m	>90m
	Slope	Absent	45°	60°	75°	Circa Vertical
	Special Features*	Absent	1	2	3	Many >3
BEACH FACE	Type	Absent	Mud	Cobble / Boulder	Pebble / Gravel	Sand
	Width	Absent	<5 - >100m	> 5 - < 25m	> 25 - < 50m	> 50-100m
	Colour	Absent	Dark	Dark Tan	Light Tan Bleached	White/Gold
	Slope	Absent	<5°	> 5°- <10°	>10°-< 20°	>20°- 45°
	Extent	Absent	<5m	> 5 - < 10m	> 10 - <20m	>20m
	Roughness	Absent	Razor-Sharp	Deeply Pitted	Shallow Pitted	Smooth
DUNES		Absent	Remnants	Fore-dune	Secondary Ridge	Several
VALLEY		Absent	Dry Valley	(<1m) Stream	(1 - 4m) Stream	River
LANDFORM		Not Visible	Flat	Undulating	Highly Undulating	Mountainous
TIDES		Macro (>4m)		Meso (2-4m)		Micro (<2m)
COASTAL LANDSCAPE FEATURES **		None	1	2	3	>3
VISTAS		Open on one side	Open on two sides		Open on three sides	Open on four sides

Site Name:

Biological Parameters	RATING 1	2	3	4	5
WATER COLOUR & CLARITY	Muddy Brown / Grey	Milky Blue / Opaque	Grey/Dark Blue	Clear Blue / Green	Very Clear Turquoise
VEGETATION COVER (Natural)	Bare	Garigue / Scrub	Grass / Meadow	Heathland / Maquis	Mature Trees
SEAWEED BANQUETTS	Continuous >1m high	Continuous <1m high	Patchy Distribution	Strand Line	None
BIO-TYPE HETEROGENEITY	1	2	3	4	>4
Human Parameters					
DISTURBANCE FACTOR	Intolerable	Tolerable		Little	None
LITTER	Continuous Scattering	Accumulations	Accumulation	Few items	Virtually Absent
SEWAGE	Sewage Evidence		Some Evidence		No Evidence of Sewage
NON-BUILT ENVIRONMENT	None	Hedgerow / Mono-Crop / Terracing	Forestry	Mixed Cultivation (+ / - trees)	Natural
BUILT ENVIRONMENT	Heavy Industry	Insensitive Urban / Tourism	Light Urban/ Industry/ Tourism	Attractive Urban / Tourism	Historic / None
ACCESS TYPE	No Buffer Zone / Heavy Traffic	No Buffer Zone / Light Traffic	Poorly Managed	Well Managed	Walking only
SKYLINE	Very Unattractive	Unattractive	Sensitively Designed High / Low	Very Sensitively	Natural/Historic Features
UTILITIES ***	>3	3	2	1	None

Table A2-2: Coastal Scenic Evaluation Table Rev 1

Table A3: Coastal Scenic Evaluation Table Rev 2

COASTAL SCENIC EVALUATION SYSTEM(Γ

Site Name:

No:	Physical Parameters		RATING 1	2	3	4	5
1	CLIFF	Height	Absent	>5 -<30m	30 - <60m	61 - 90m	>90m
2		Slope	Absent	45o	60o	75o	Circa Vertical
3		Special Features*	Absent	1	2	3	Many >3
4	BEACH FACE	Type	Absent	Mud	Cobble / Boulder	Pebble / Gravel	Sand
5		Width	Absent	<5 - >100m	5 - <25m	25 - <50m	50-100m
6		Colour	Absent	Dark	Dark Tan	Light Tan Bleached	White/Gold
7	ROCKY SHORE	Slope	Absent	<50	50-100	100-200	200-450
8		Extent	Absent	<5m	5-10m	10-20m	>20m
9		Roughness	Absent	Razor-Sharp	Deeply Pitted	Shallow Pitted / Distinctly jagged	Smooth
10	DUNES		Absent	Remnants	Fore-dune	Secondary Ridge	Several
11	VALLEY		Absent	Dry Valley / Small	(<1m) Stream	(1-4m) Stream	River/ Large scale limestone gorge
12	LANDFORM		Not Visible	Flat	Undulating	Highly Undulating	Mountainous
13	TIDES		Macro (>4m)		Meso (2-4m)		Micro (<2m)
14	COASTAL LANDSCAPE FEATURES **		None	1	2	3	>3
15	VISTAS		Open on one side	Open on two sides		Open on three sides	Open on four sides
16	WATER COLOUR & CLARITY		Muddy Brown / Grey	Milky Blue / Opaque	Grey Blue	Clear Blue / Dark blue	Very Clear Turquoise
17	NATURAL VEGETATION COVER		Bare (10% vegetation only)	Scrub / Garigue (marram/gorse, bramble, etc)	Wetlands / Meadow	Copices, Maquis	Mature Trees
18	SEAWEED BANQUETTS		Continuous >1m high	Continuous <1m high	Patchy Distribution	Strand Line	None
	Human Parameters		1	2	3	4	5
19	DISTURBANCE FACTOR		Intolerable	Tolerable		Little	None
20	LITTER		Continuous Scattering	Accumulations	Accumulation	Few items	Virtually Absent
21	SEWAGE		Sewage Evidence		Some Evidence (1-3 items)		No Evidence of Sewage
22	NON-BUILT ENVIRONMENT		None		Hedgerow / Terracing / Monoculture		Field Mixed Cultivation +/- trees
23	BUILT ENVIRONMENT		Heavy Industry	Insensitive Urban / Tourism	Light Industry / Tourism/ Urban	Attractive Urban / Tourism	Historic / None
24	ACCESS TYPE		No Buffer Zone / Heavy Traffic	No Buffer Zone / Light Traffic	Poorly Managed	Well Managed	Walking Access Only
25	SKYLINE		Very Unattractive	Unattractive	Sensitively Designed High / Low	Very Sensitively Designed	Natural / Historic Features
26	UTILITIES ***		>3	3	2	1	None

Table A4: Coastal Scenic Evaluation Table Rev 3

COASTAL SCENIC EVALUATION SYSTEM (

Site Name:

No:	Physical Parameters		RATING 1	2	3	4	5
1	CLIFF	Height	Absent	>5 -<30m	30 - <60m	61 - 90m	>90m
2		Slope	Absent	45^{o}	60^{o}	75^{o}	Circa Vertical
3		Special Features*	Absent	1	2	3	Many >3
4	BEACH FACE	Type	Absent	Mud	Cobble / Boulder	Pebble / Gravel (±Sand)	Sand
5		Width	Absent	<5 - >100m	5 - <25m	25 - <50m	50-100m
6		Colour	Absent	Dark	Dark Tan	Light Tan Bleached	White/Gold
7	ROCKY SHORE	Slope	Absent	$<5^{0}$	5^{0}-10^{0}	10^{0}-20^{0}	20^{0}-45^{0}
8		Extent	Absent	<5m	5-10m	10-20m	>20m
9		Roughness	Absent	Distinctly Jagged	Deeply Pitted and/or Irregular	Shallow Pitted	Smooth
10	DUNES		Absent	Remnants	Fore-dune	Secondary Ridge	Several
11	VALLEY		Absent	Dry Valley / Small	(<1m) Stream	(1-4m) Stream	River/ Large scale limestone gorge
12	SKYLINE LANDFORM		Not Visible	Flat	Undulating	Highly Undulating	Mountainous
13	TIDES		Macro (>4m)		Meso (2-4m)		Micro (<2m)
14	COASTAL LANDSCAPE FEATURES **		None	1	2	3	>3
15	VISTAS		Open on one side	Open on two sides		Open on three sides	Open on four sides
16	WATER COLOUR & CLARITY		Muddy Brown / Grey	Green Milky Blue / Opaque	Green / Grey Blue	Clear Blue / Dark blue	Very Clear Turquoise
17	NATURAL VEGETATION COVER		Bare (10% vegetation only)	Scrub / Garigue (marram/gorse, bramble, etc)	Wetlands / Meadow	Coppices, Maquis (±Mature Trees)	Variety of Mature Trees / Mature Natural Cover
18	VEGETATION DEBRIS		Continuous >1m high	Continuous <1m high	Patchy Distribution	Strand Line	None
	Human Parameters		1	2	3	4	5
19	NOISE DISTURBANCE		Intolerable	Tolerable		Little	None
20	LITTER		Continuous Accumulations	Separate Accumulations	One Big Accumulation	Few Scattering Items	Virtually Absent
21	SEWAGE DISCHARGE EVIDENCE		Sewage Evidence		Some Evidence (1-3 items)		No Evidence of Sewage
22	NON-BUILT ENVIRONMENT		None		Hedgerow / Terracing / Monoculture		Field Mixed Cultivation ± Trees / Natural
23	BUILT ENVIRONMENT***		Heavy Industry	Heavy Tourism and/or Urban	LightTourism and/or Urban and/or Sensitive Industry	Sensitive Tourism and/or Urban	Historic and/or None
24	ACCESS TYPE		No Buffer Zone / Heavy Traffic	No Buffer Zone / Light Traffic		Parking Lot Visible From Coastal Area	Parking Lot Not Visible From Coastal Area
25	SKYLINE		Very Unattractive	Unattractive	Sensitively Designed High / Low	Very Sensitively Designed	Natural / Historic Features
26	UTILITIES ****		>3	3	2	1	None

* Cliff Special Features: Indentation, banding, folding, screes, irregular profile

** Coastal Landscape Features: Peninsulas, rock ridges, irregular headlands, arches, windows, caves, waterfalls, deltas, lagoons, islands, stacks, estuaries, reefs, fauna., embayment, tombulla etc.

*** Built Environment: Caravans will come under Tourizm in greading #2-4y

**** Utilities: Power lines, pipelines, street lamps, distinctive groins, seawalls, revetments

COASTAL SCENIC EVALUATION SYSTEM(

Site Name:

Physical Parameters

Cliff: A high area of rock with greater than 45^0 slope.

1) Cliff **Height:** Height of the cliff starting from the sea surface level to the top of the cliff.

1- Absent
2- Greater than 5m, smaller than 30m
3- Greater than 30m, smaller than 60m
4- Greater than 60m, smaller than 90m
5- Greater than 90m

2) Cliff **Slope:** The slope between the sea surface and the cliff in degrees.

1- Absent
2- Around 45^0
3- Around 60^0
4- Around 75^0
5- Circa Vertical

3) Cliff **Special Features:** The total number of the indentation, banding, folding, screes, irregular profile formations of the cliff .

1- Absent
2- 1
3- 2
4- 3
5- More than 3

Beach Face: The area between the water's edge and the back of the beach. The latter could be a wall, dune, building etc.

4) Beach Face **Type:** The physical type of the beach .

1- Absent
2- Mud
3- Cobble / Boulder
4- Pebble / Gravel ± Sand
5- Sand

5) Beach Face **Width:**.

1- Absent
2- Smaller than 5m – enormously big wide
3- Greater than 5m smaller than 25m
4- Greater than 25m smaller than 50m
5- Greater than 50m smaller than 100m

6) Beach Face **Colour:** .

1- Absent
2- Dark
3- Dark Tan
4- Light Tan / Bleached
5- White / Gold

Rocky Shore: Area of rock smaller than 45^0 slope

7) Rocky Shore **Slope:** The acute angle between the rocky shore and the horizontal..

1- Absent
2- Smaller than 5^0
3- Smaller than 10^0 greater than 5^0
4- Smaller than 20^0 greater than 10^0
5- Smaller than 45^0 greater than 20^0

8) Rocky Shore **Extent:** The width of the rocky shore.

1- Absent
2- Smaller than 5m
3- Greater than 5m smaller than 10m
4- Greater than 10m smaller than 20m
5- Greater than 20m smaller than 45m

9) Rocky Shore **Roughness:** The total number of the indentation, banding, folding, screes, irregular profile formations of the cliff .

1- Absent
2- Distinctly Jagged
3- Deeply Pitted and/or Irregular (Uneven)
4- Shallow Pitted
5- Smooth

1) Dunes**: Foredune;** The main dune adjacent to the beach. Frequently termed 'yellow' dunes. **Secondary dune ridges;** Located behind the foredune and representing old foredunes that have been colonized by plants. There may be many ridges and they are loosely called "grey dunes". .

1- Absent
2- Remnants
3- Foredune
4- Secondary Ridge
5- Several

2) Valley**:** The formation of valley with any kind of river formation

1- Absent
2- Dry Valley
3- (<1m) Stream
4- (1-4m) Stream
5- River / Limestone Gorge

3) Skyline Landform**:** The formation of the landform in the skyline

1- Not visible
2- Flat
3- Undulating
4- Highly Undulating
5- Mountainous

4) Tides**:** The range of tides is the criteria

1- Macro (>4m)
2- Blank Option
3- Meso (2m-4m)
4- Blank Option
5- Micro (<2m)

5) Coastal Landscape features**:** The number of Peninsulas, rock ridges, irregular headlands, arches, windows, caves, waterfalls, deltas, lagoons, islands, stacks, estuaries, reefs, fauna., embayment, tombola etc.

1- None
2- 1
3- 2
4- 3
5- More than 3

6) Vistas**:** The availability of the wide range of scenery

1- Open on one side
2- Open on two side
3- Blank Option
4- Open on three sides
5- Open on four sides

7) Water Colour and Clarity**:** Examine the scenic quality of the sea water.

1- Muddy Brown / Grey
2- Milky Blue / Green; Opaque
3- Green Grey Blue
4- Clear Blue / Dark Blue
5- Very Clear Turquoise

8) Natural Vegetation Cover**:** Examine the vegetation of the region.

1- Bare (<10% Vegetation only)
2- Scrub / Garigue (marram / gorse, bramble, etc)
3- Wetlands / Meadow
4- Coppices, Maquis (±Mature Trees)
5- Variety of mature trees / Natural Cover

9) Vegetation -Debris**:** Examine the scenic effects of the seaweed banquettes and other sea vegetation

1- Continuous (>50cm high)
2- Full Strand Line
3- Single Accumulation
4- Few Scattered Items
5- None

Human Parameters

1) Noise Disturbance **:** The disturbance from the sources of noise direct or indirect from human usage

1 Intolerable
2 Tolerable
3 Blank Option
4 Little
5 None

2) Litter**:** The litter found in the scenery region

1- Continuous Accumulations
2- Full Strand Line
3- Single Accumulation
4- Few Scattered Items
5- Virtually Absent

3) Sewage Discharge Evidence**:** The evidences showing a discharge of sewage such as bad smell or discharge pipe.

1- Sewage Evidence
2- Blank Option
3- Some Evidence (1-3 Items)
4- Blank Option
5- No Evidence of sewage

4) Non Built Environment**:** The use of the fields without building any structure

1- None (No empty fields, all the places are covered with some structures)
2- Blank Option
3- Hedgerow / Terracing / Monoculture
4- Blank Option
5- Field Mixed Cultivation ± Trees / Natural

5) Built Environment: The structures in the scenic area is examine in this part, Caravans are come under Tourism; Grading 2 :Large intensive caravan site, Grading 3: Light, but still intensive caravan sites, Grading 4: Sensitively designed caravan sites.

1- Heavy Industry
2- Heavy Tourism and/or Urban
3- Light Tourism and/or Urban and/or Sensitive Industry
4- Sensitive Tourism and/or Urban
5- Historic and/or None

6) Access Type**:** The access and scenic affect of the traffic, roads and cars are examined.

1- No buffer zone / Heavy Traffic
2- No buffer zone / Light Traffic
3- Blank Option
4- Parking Lot Visible From Coastal Area
5- Parking Lot not visible from coastal area

7) Skyline**:** The human effect on the formation of the skyline.

1- Very Unattractive
2- Unattractive
3- Sensitively Designed High / Low
4- Very Sensitively Designed
5- Natural / Historic Features

8) Utilities**:** The Power lines, pipelines, street lamps, groins, seawalls, revetments and all other infrastructure elements.

1- Number of Utilities greater than 3
2- 3 Utilities
3- 2 Utilities
4- 1 Utility
5- None

APPENDIX B

DEFINITIONS OF COASTAL SCENIC PARAMETERS

Cliff:

A high (>5m) area usually composed of rock with a > 45˚ slope.

- Banding : the cliff can be composed of various layers of rock e.g. alternate shale and limestone.
- Colour : Various colours can differentiate the bands.
- Faulting : Where earth movements have displaced the rock bands so that a line can be seen (fault line) which has shifted the layers on either side.
- Folding : Where the rocks have been under pressure and have folded to accommodate the pressure. Folding can be gentle of severe.
- Gullying : Rain can form gullies/rills along which cliff materials can be washed away.
- Indentation : The shape of the cliff edge. It could be straight or curved, the more curved, the more highly indented the cliff face.
- Scree : Accumulation of rock material at the foot of, or mantling cliff slopes.
- Tufa : A deposit of calcareous material on a limestone cliff face due to water seepage.
- Unconformity : represents the junction between two sets of rocks formed under different geological ages.

Beach Face:

The area between the water's edge and the back of beach. The latter could be a wall, dune, building etc.

Rocky Shore Platform :

An area of rock with a smaller than 45 degree slope. Formed by shore processes, especially wave action.

Dunes:

Foredune: The main dune adjacent to the beach. Frequently termed yellow dunes.

Secondary dune ridges: Located behind the foredune and representing old foredunes that have been colonised by plants. There may be many ridges and they are loosely called grey dunes.

Valley and River Mouth:

A valley is a V shaped landscape feature formed by flowing water. If no water is present, it is termed as a dry valley.

Landform:

Landform represents the distant land form type or in the side view of the coast.

Tides:

Tide is the alternating rise and fall in sea level with respect to the land, produced by the gravitational attraction of the sun. And more impoortantly, the moon.

Coastal landscape features:

Peninsula/headland is an area of land taht juts out into water which covers three sides.

A **bay** is the reverse of the above an area of water bordering land on three sides.

A **cave** is a hollow in a cliff face that can be caused by wave action, rock slippage, weathering, faulting etc. Where the cave breaks through a cliff headland it is called an arch.

A **lagoon** is a stretch of comparatively shallow salt/fresh water seperated from the sea by a shallow or exposed sandbank, coral reef, shingle beach or similar structure.

A **sandbank** is a mound of and located offshore which is exposed to the air. If completely submerged it is a sand bar.

A **stack** is steep, often vertical, sided column of rock in the sea formed as aresult of collapse of an arch (see cave above).

A **tombolo** is a deposition landform (usually sand or shingle) which connects an island to the shore.

A **delta** is a land usually a triangular in shape, formed by deposition of riverine sediment where a river enters the sea.

An **estuary** is an area of water bounded on one side by marine water and the other side by riverine input. It is the junction zone between salt/fresh water.

A **reef** is a degraded stack located at oir beneath sea level.

A **window** occur if cave(s) carve through a headland above the water line resulting a hole through the cliff.

Vistas:

It is related to far off views. For example a site could be enclosed on 4 sides, so no far off views can be seen. Alternatively it could be open on 1 or more sides. A far vista is where the foreground hill has another secondary background feature visible; e.g. a higher hill/mountain.

Water colour & clarity:

The colour of the ocean is determined by the interactions of incident light with substances or particles present in the water. The most significant constituents are free floating Figuresynthetic organisms (phytoplankton) and inorganic particulates. Clarity is related to whether sea bedcan be seen or not. Nutrient free waters tend to have the best clarity.

Natural vegetation cover:

It represents the flora of the coastal area vicinity, close enough to affect the beach and beach users visually and etc.

Vegetation debris:

Seaweed refers to the large marine algae that grow almost exclusively in the shallow waters at the edge of the world's oceans. Excessive seaweed accumulation in the coast represents unattractive views to beach users most of the time.

Disturbance Factor:

Relates to the noise factor on thr beach, e.g. playing of radios, jet skies, heavy traffic, etc.

Litter:

This is anthropogenic generated discards and includes building rubble. Examples are beer cans, sweet wrappers, plastic bags, sewage etc. Accumluations represent piles of these materials, Measurement surveys are usually carried out over a 100 m stretch of beach site

Non-built environment:

Rural areas, few buildings

Skyline:

The silhoutte of buildings on the skyline. They are in harmony with the environment if building lines are of the same height as the tree cover etc. Discord exists if they stand out from the surroundings.

Sewage:

Human/ animal waste products.

Utilities:

These include items such as power lines, telegraph lines/ poles, roads, etc

Access Type:

Buffer zone. An area that divides two seperate entities. For example, a grass/tree lined street that seperates a beach from a coastal road.

Built Environment:

The urban environment. It could include heavy industries (steel works, plants, etc); light industries.

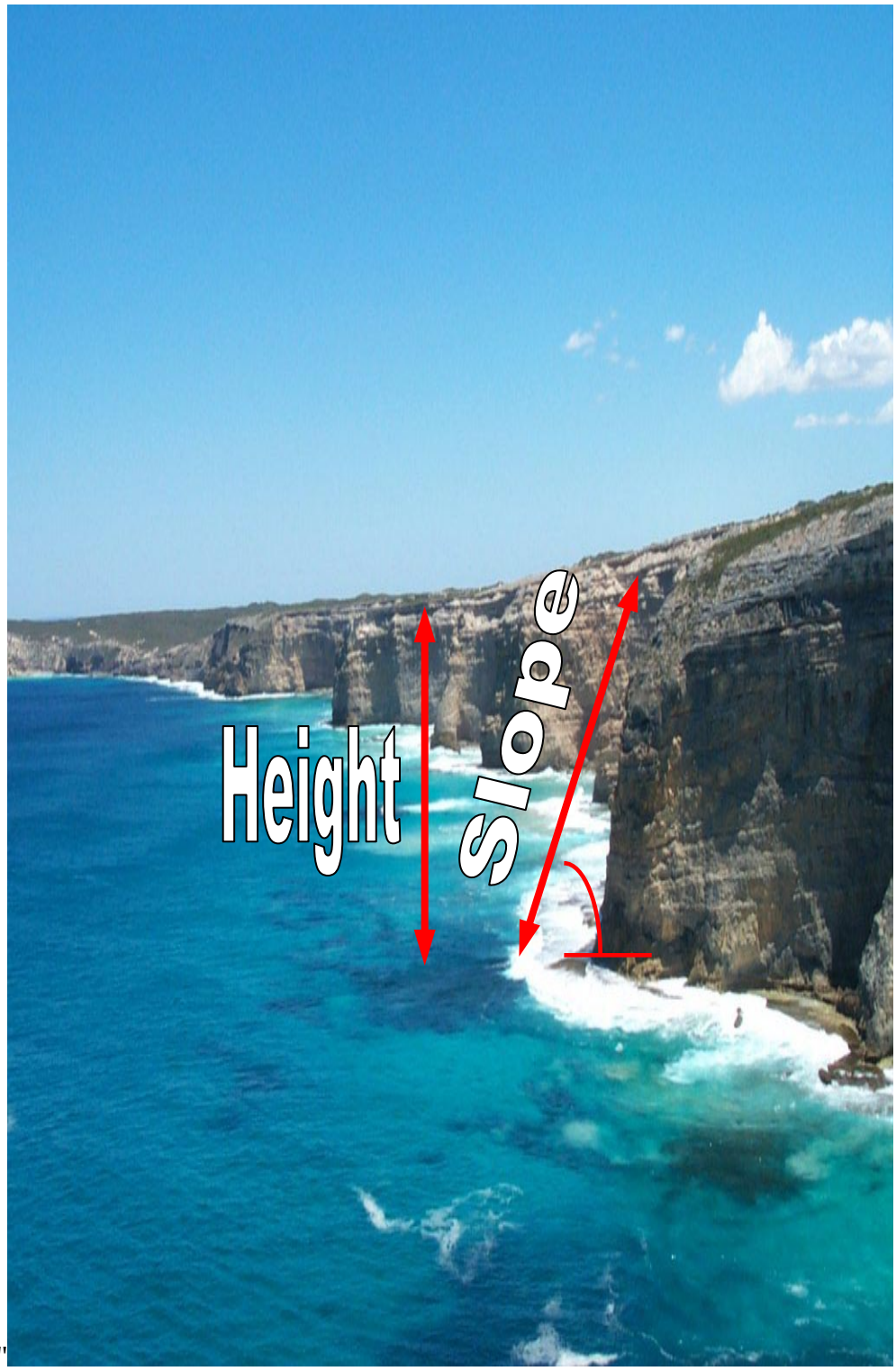

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Figure B1: Example of Cliff Parameters

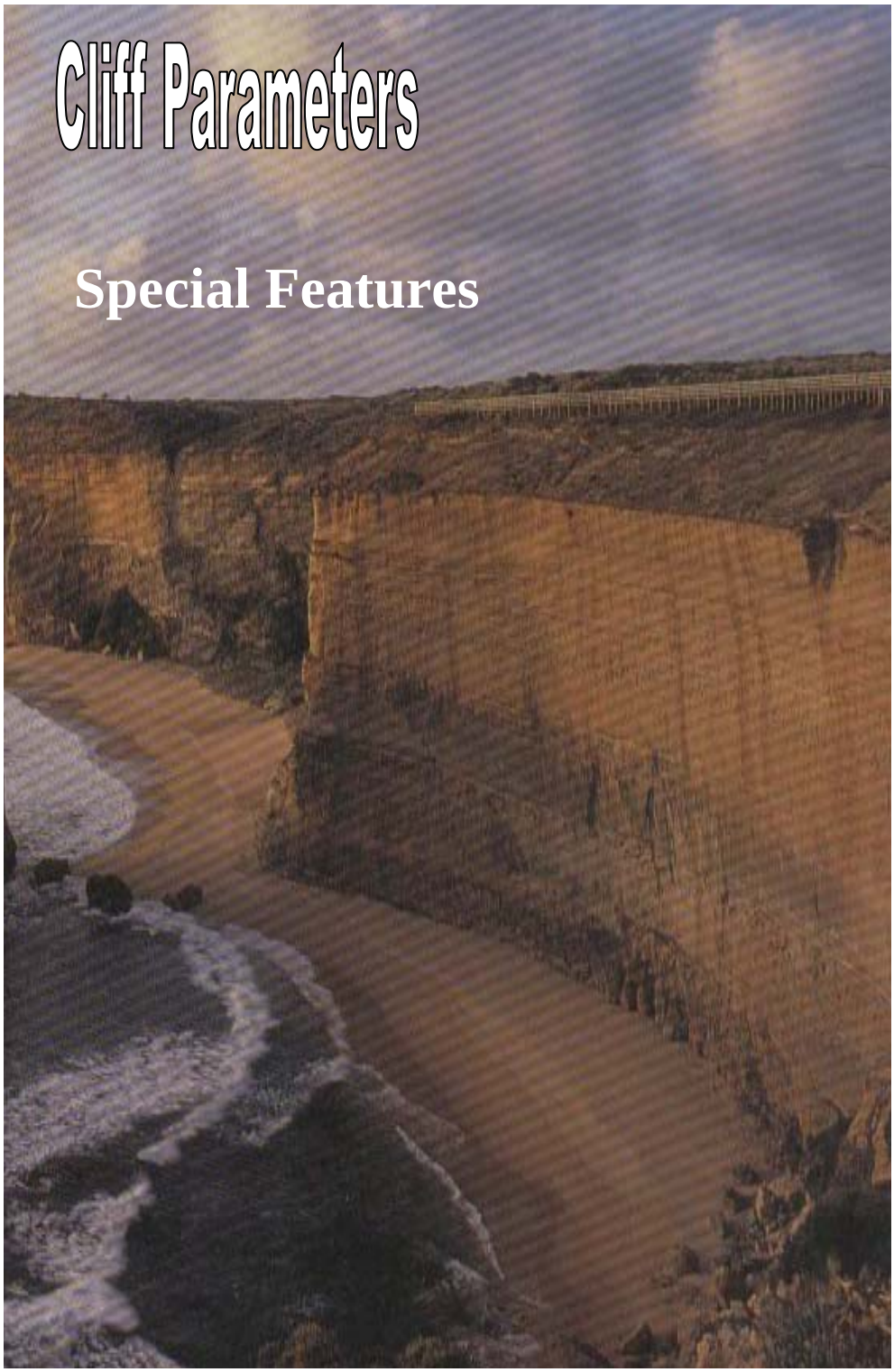


Figure B2: Example of Cliff Parameters

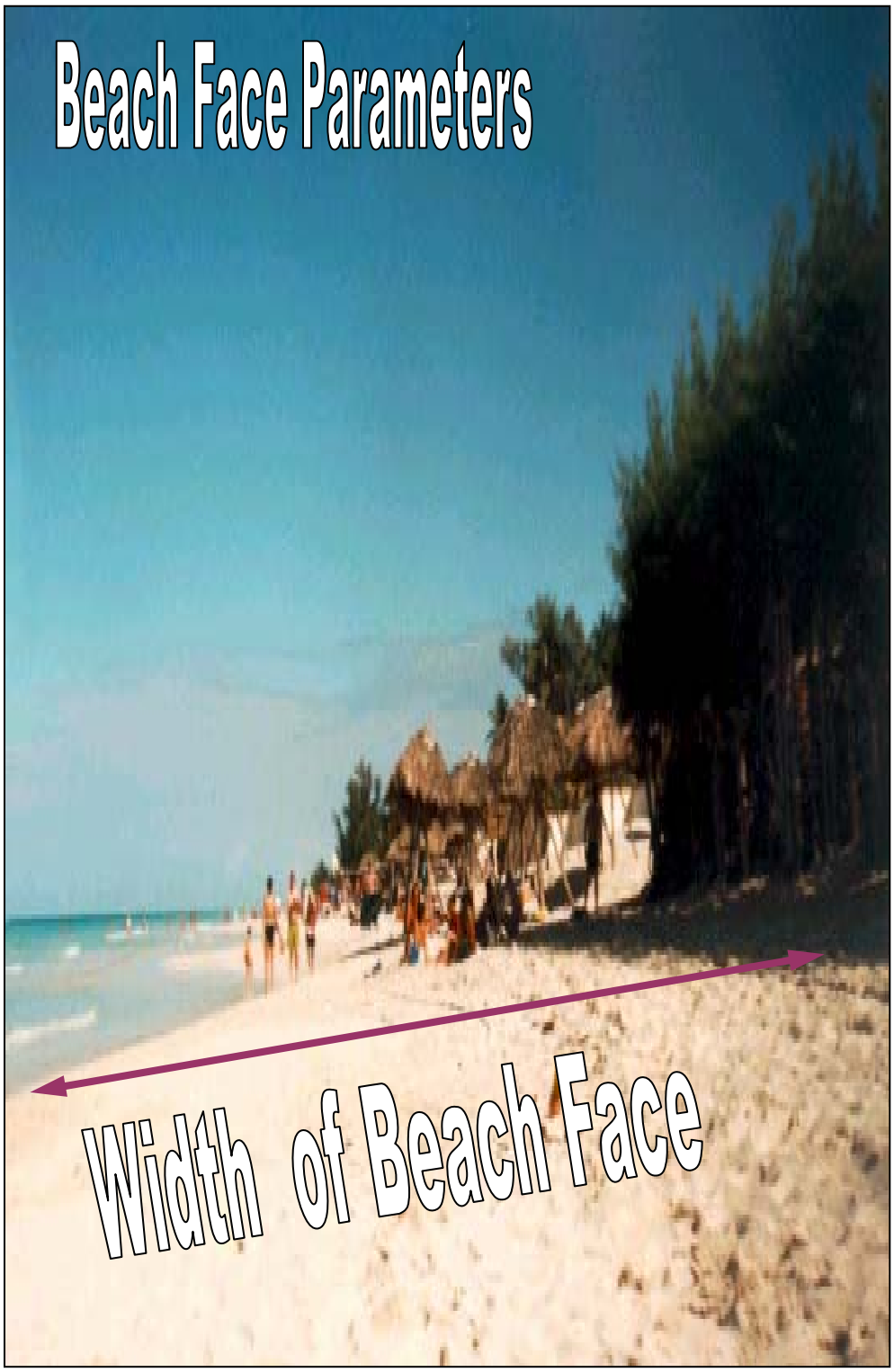


Figure B3: Example of Beach Face Parameters

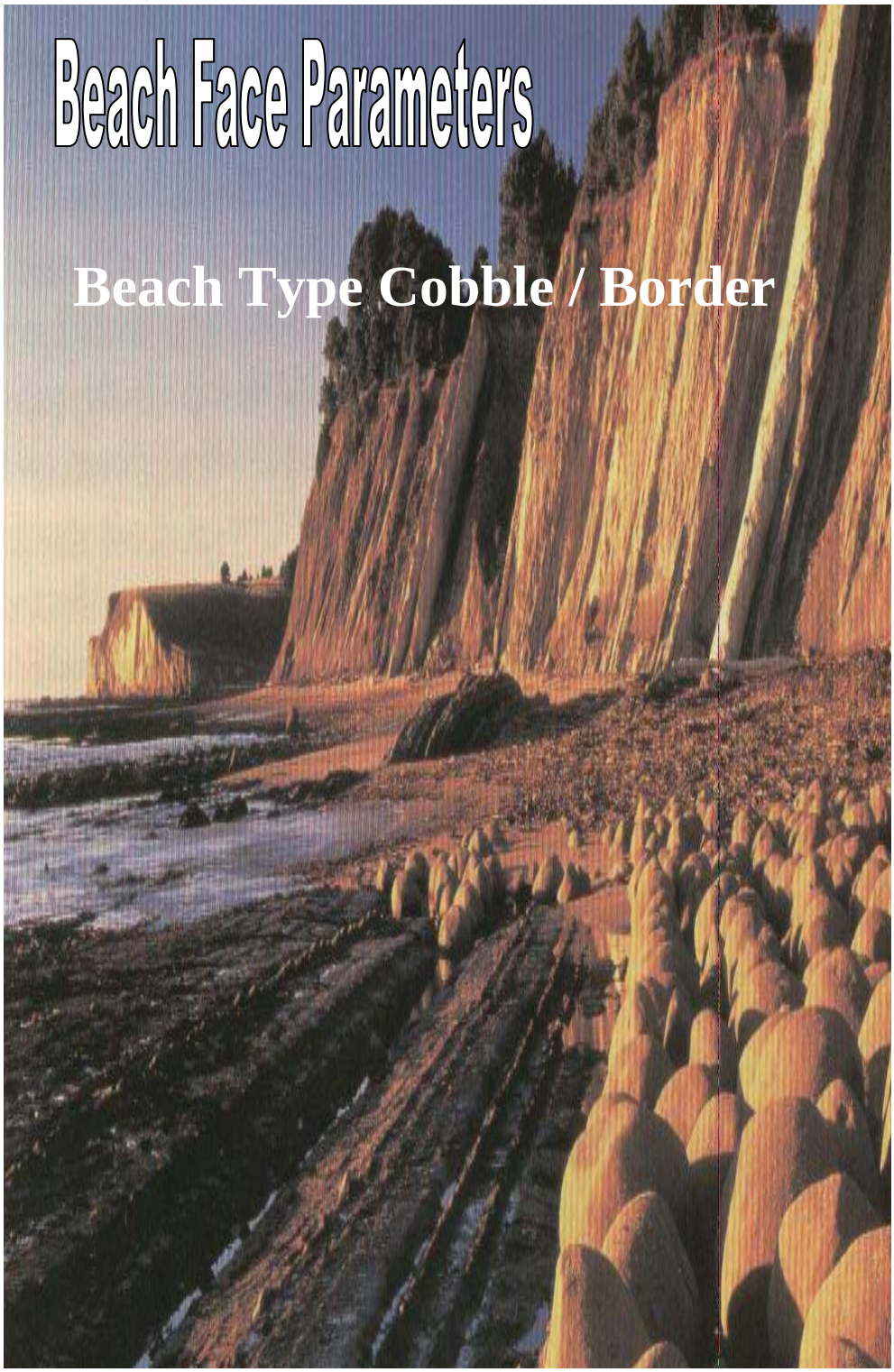


Figure B4: Example of Beach Face Parameters

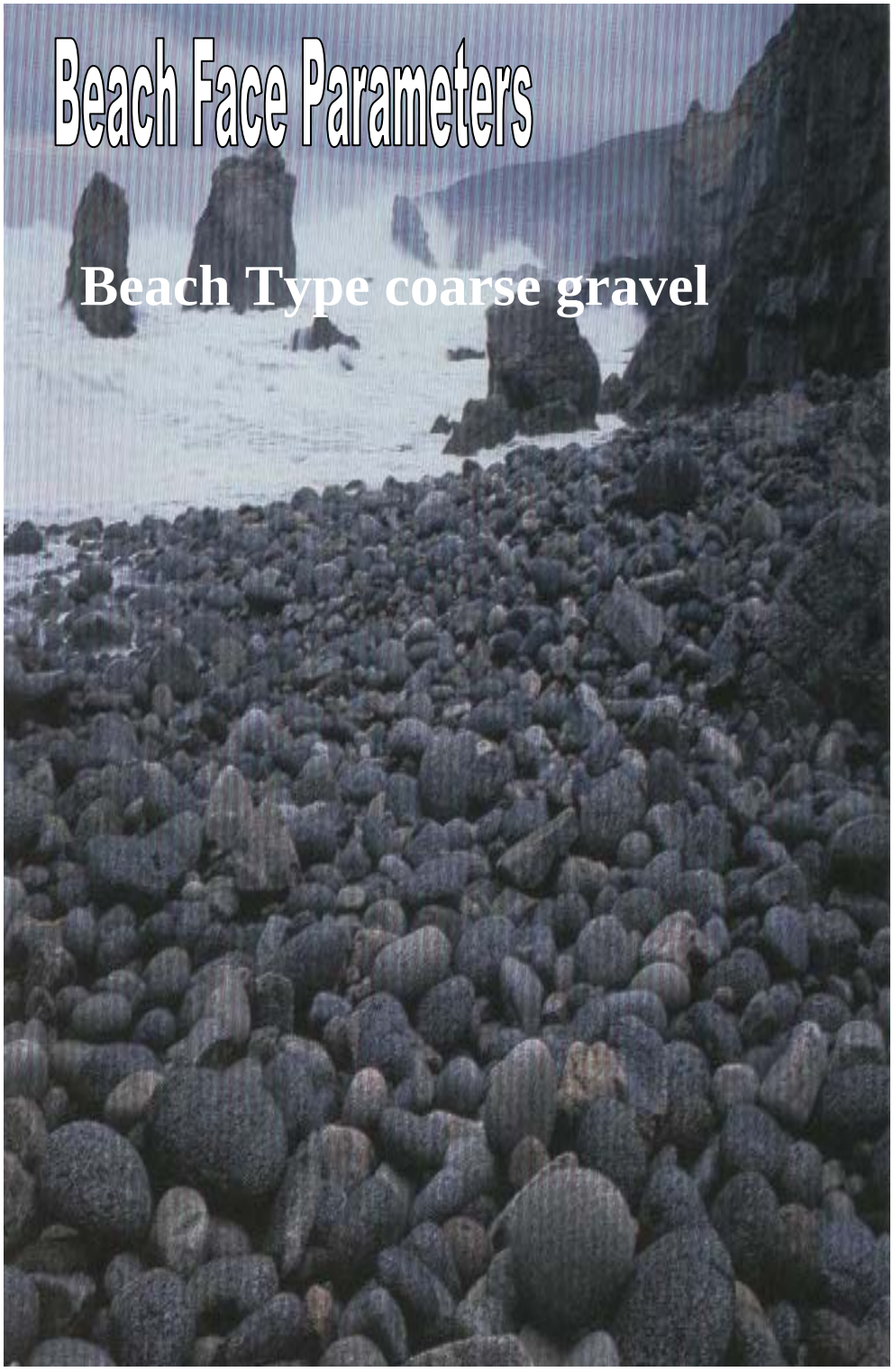


Figure B5: Example of Beach Face Parameters

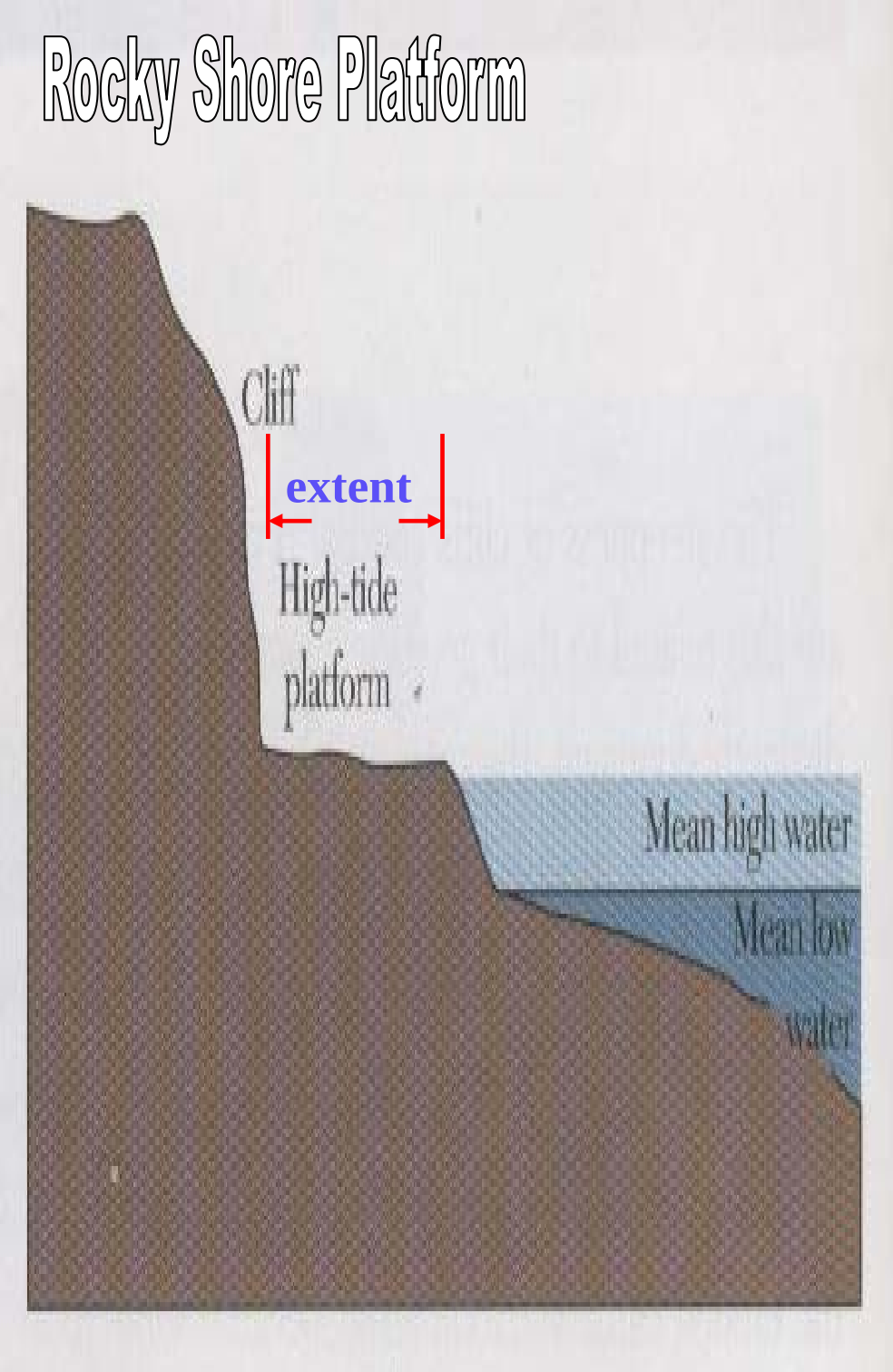


Figure B6: Example of Rocky Shore Platform

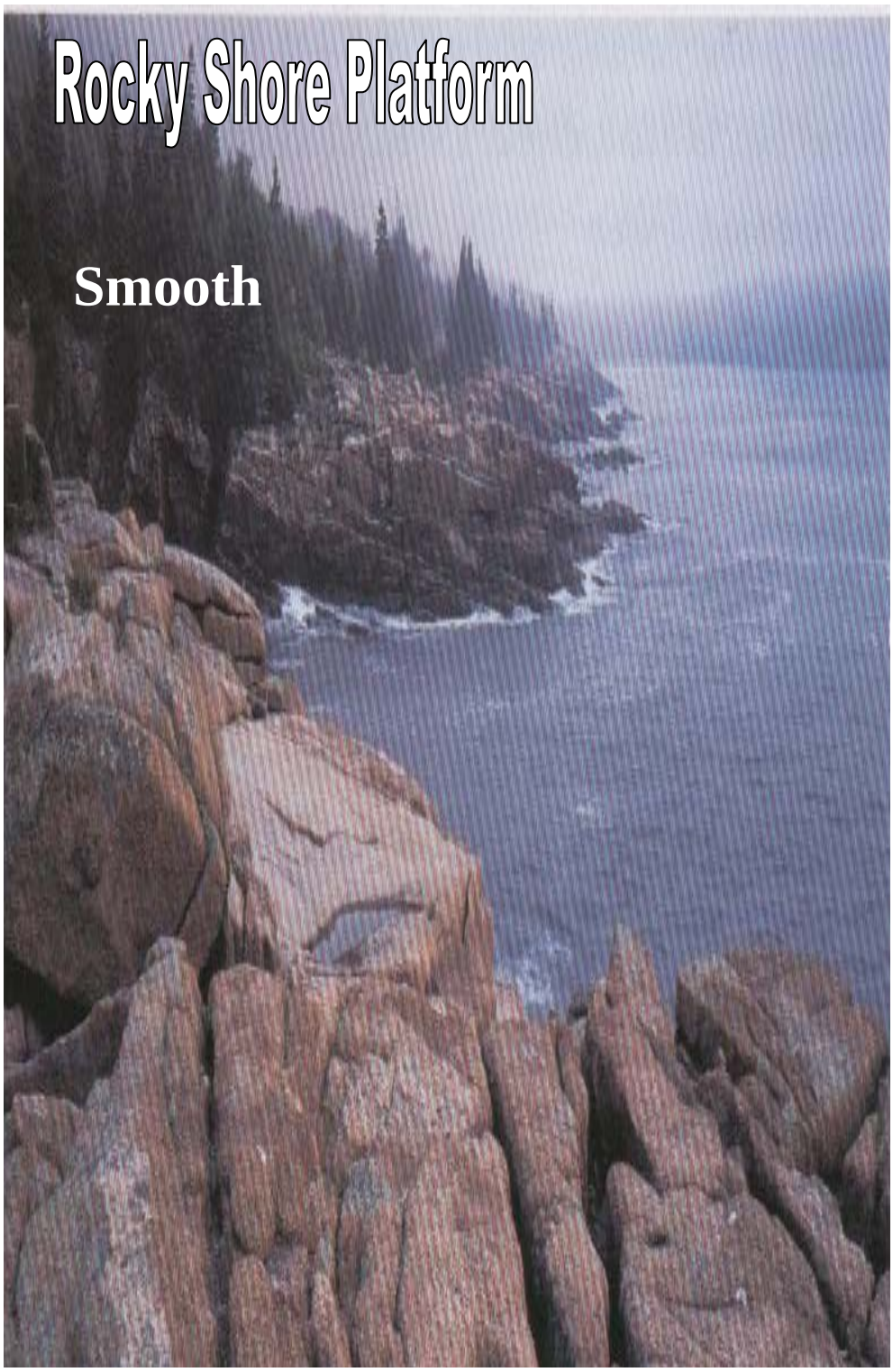


Figure B7: Example of Rocky Shore Platform

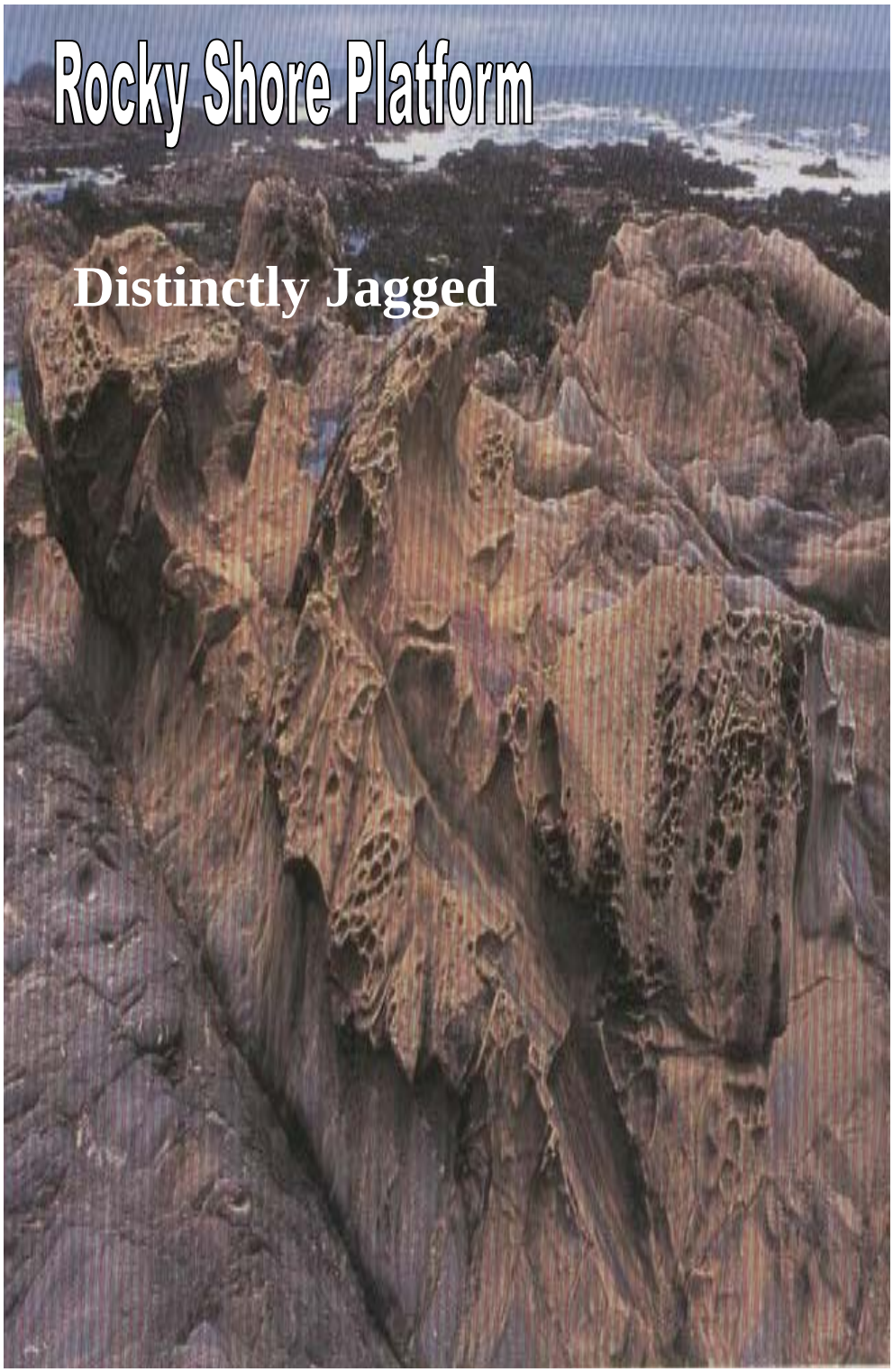
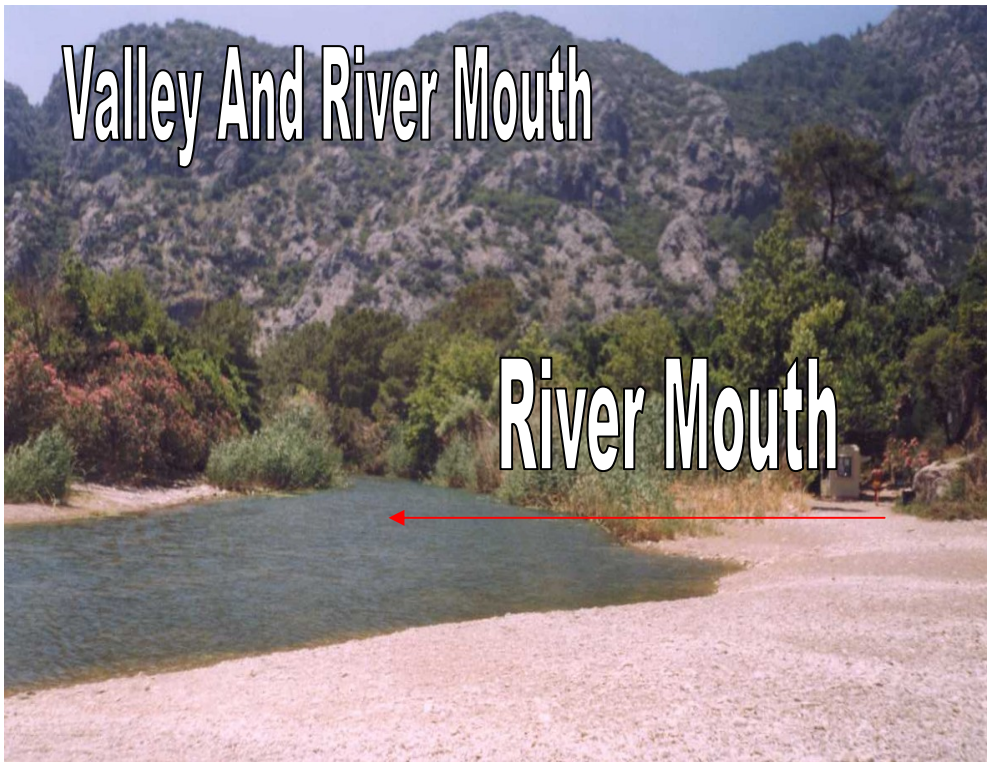


Figure B8: Example of Rocky Shore Platform

Figure B 9 B 11: Examples of Dunes



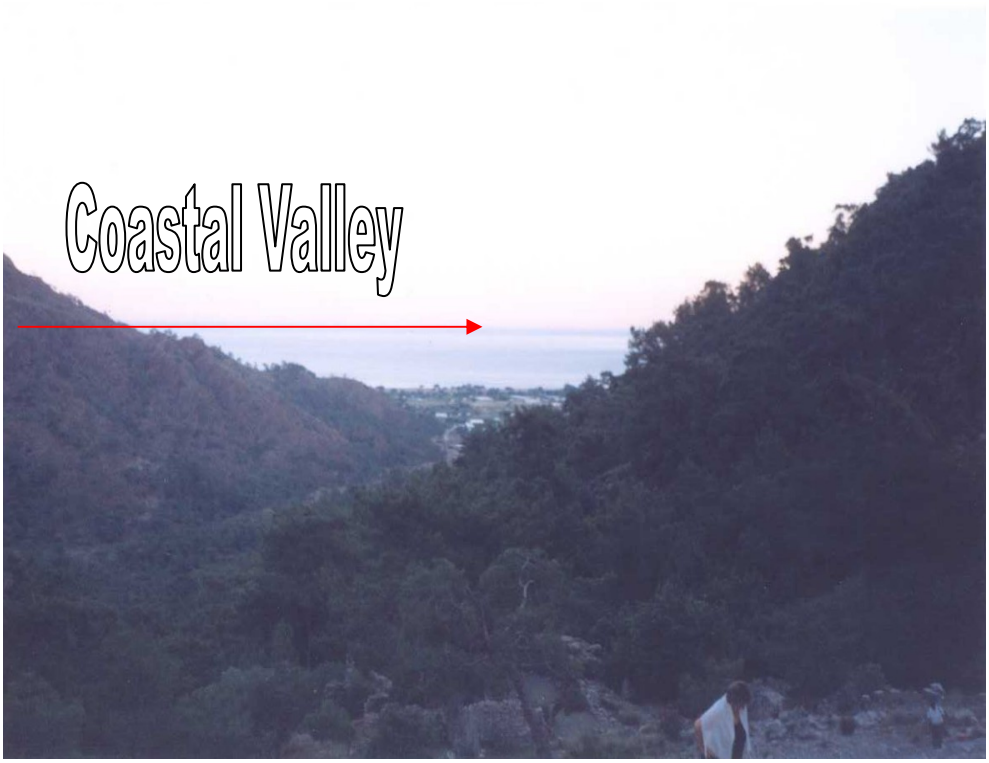
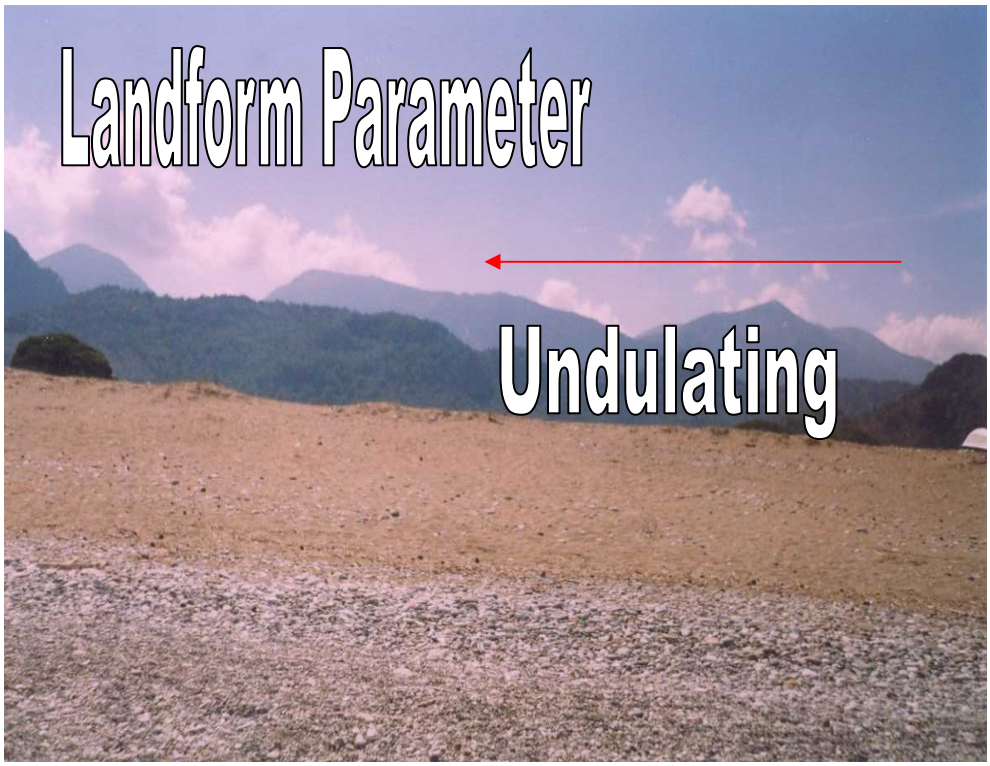


Figure B12 B 13: Examples of Dunes



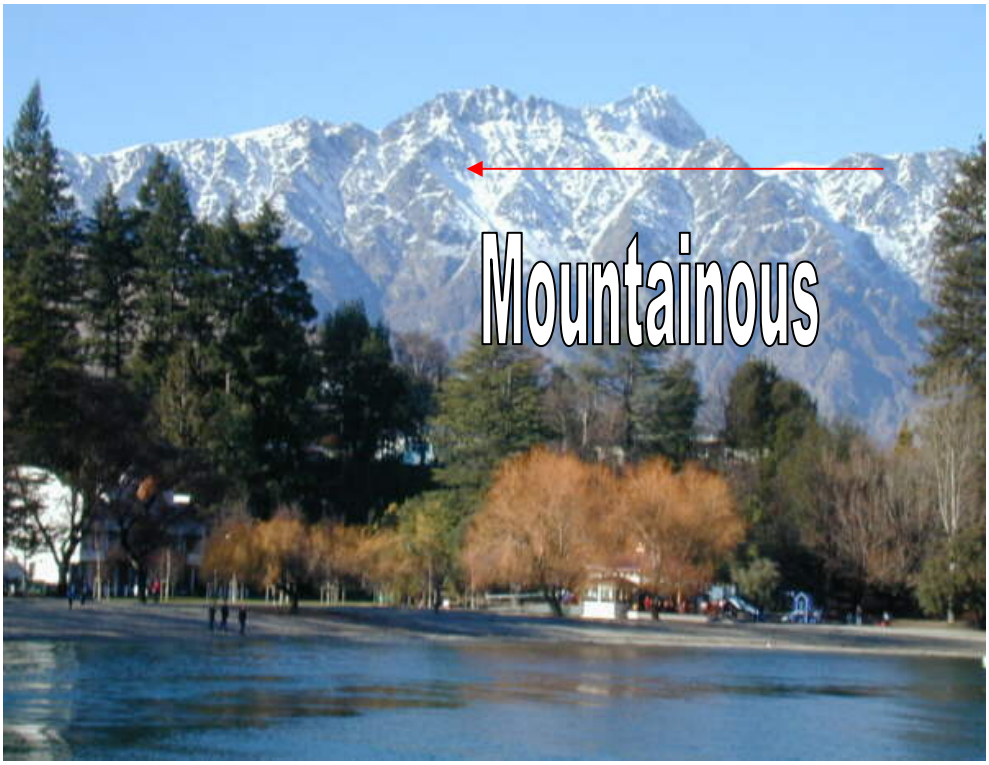


Figure B14 B15: Examples of Landform Parameter

Figure B16 B17: Examples of Tide Parameterandform Parameters

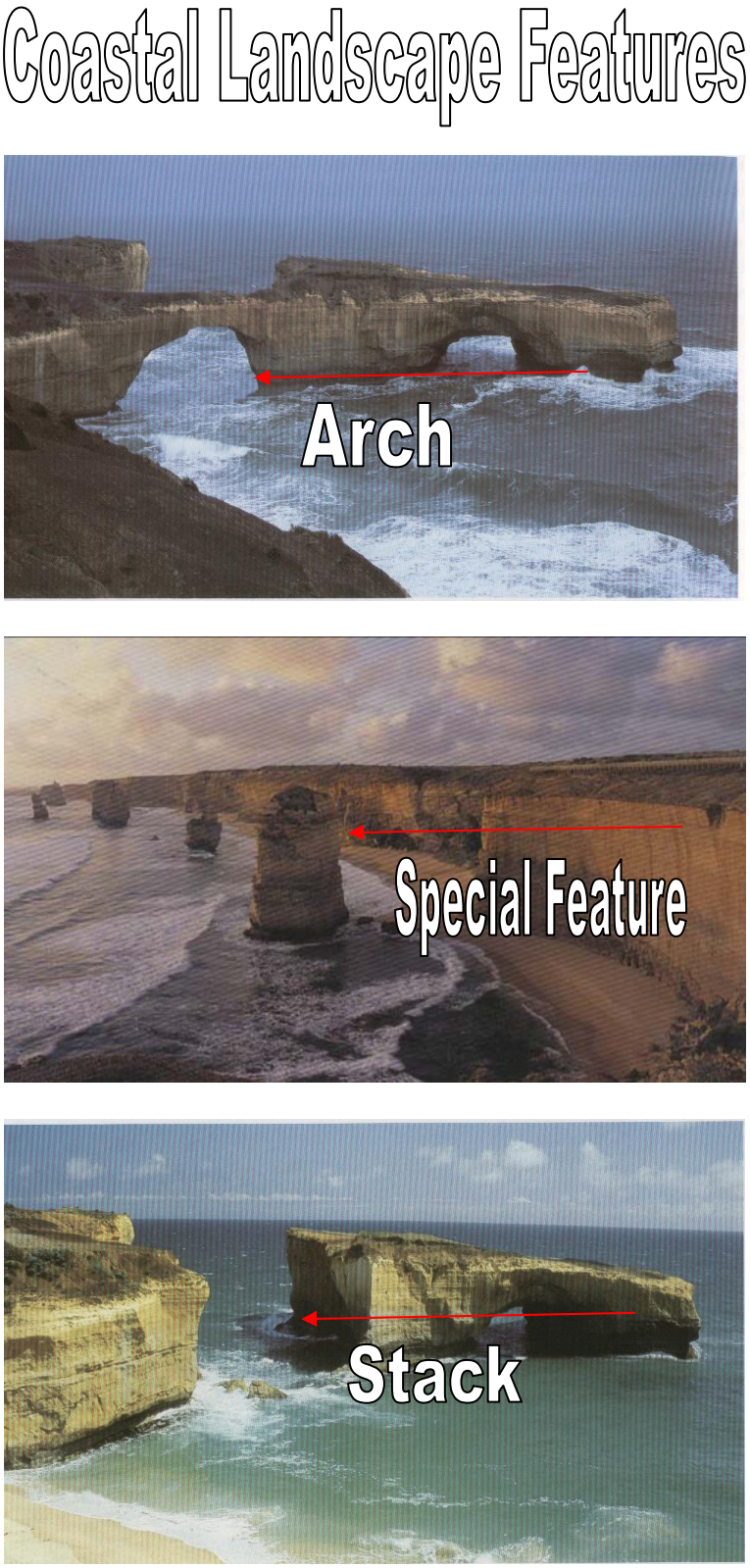


Figure B18 B19 B20: Examples of Coastal Landscape Features

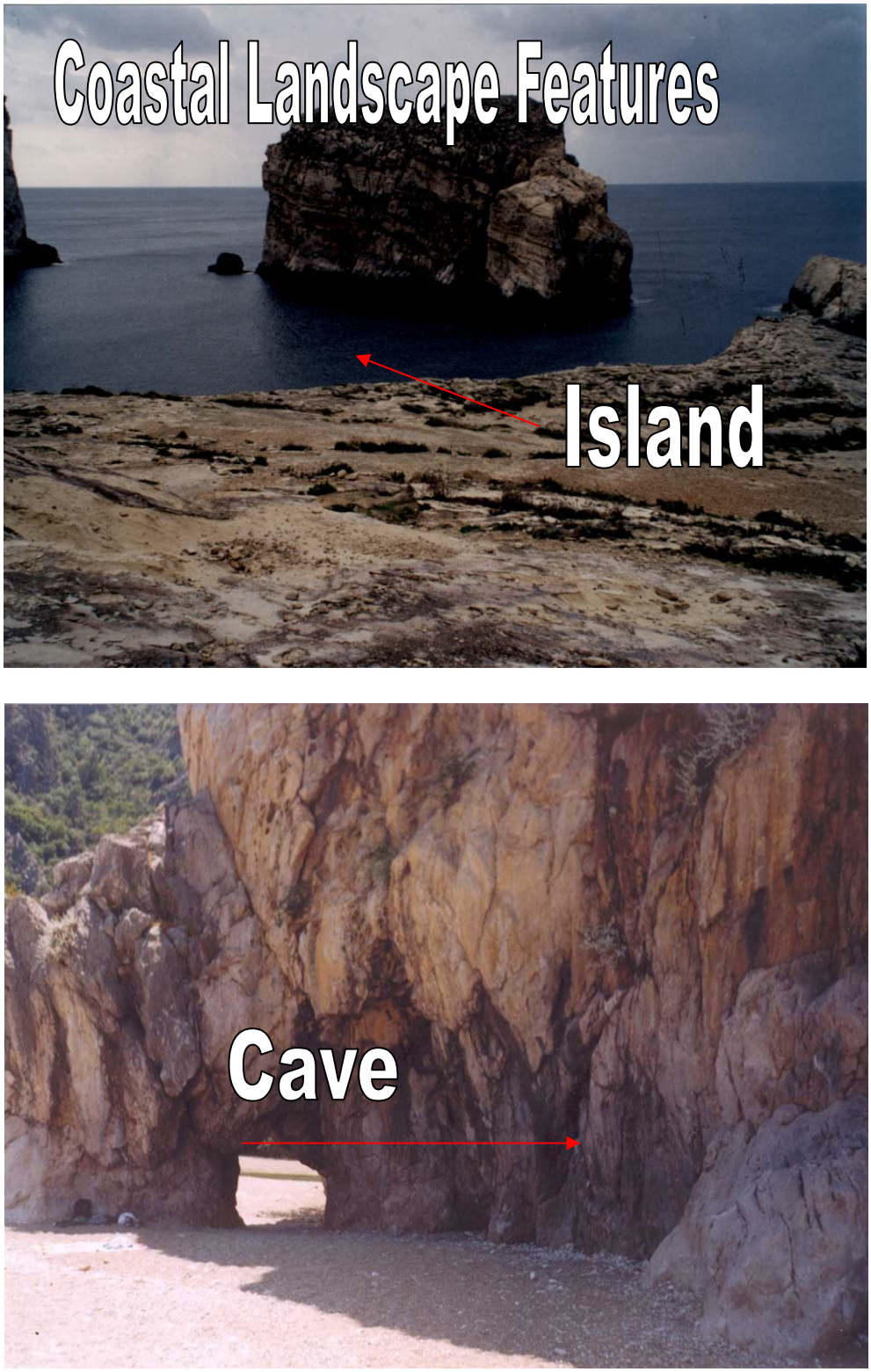


Figure B 21 B22: Examples of Coastal Landscape Features

Figure B 23: Example of Vistas of Far Places Parameter

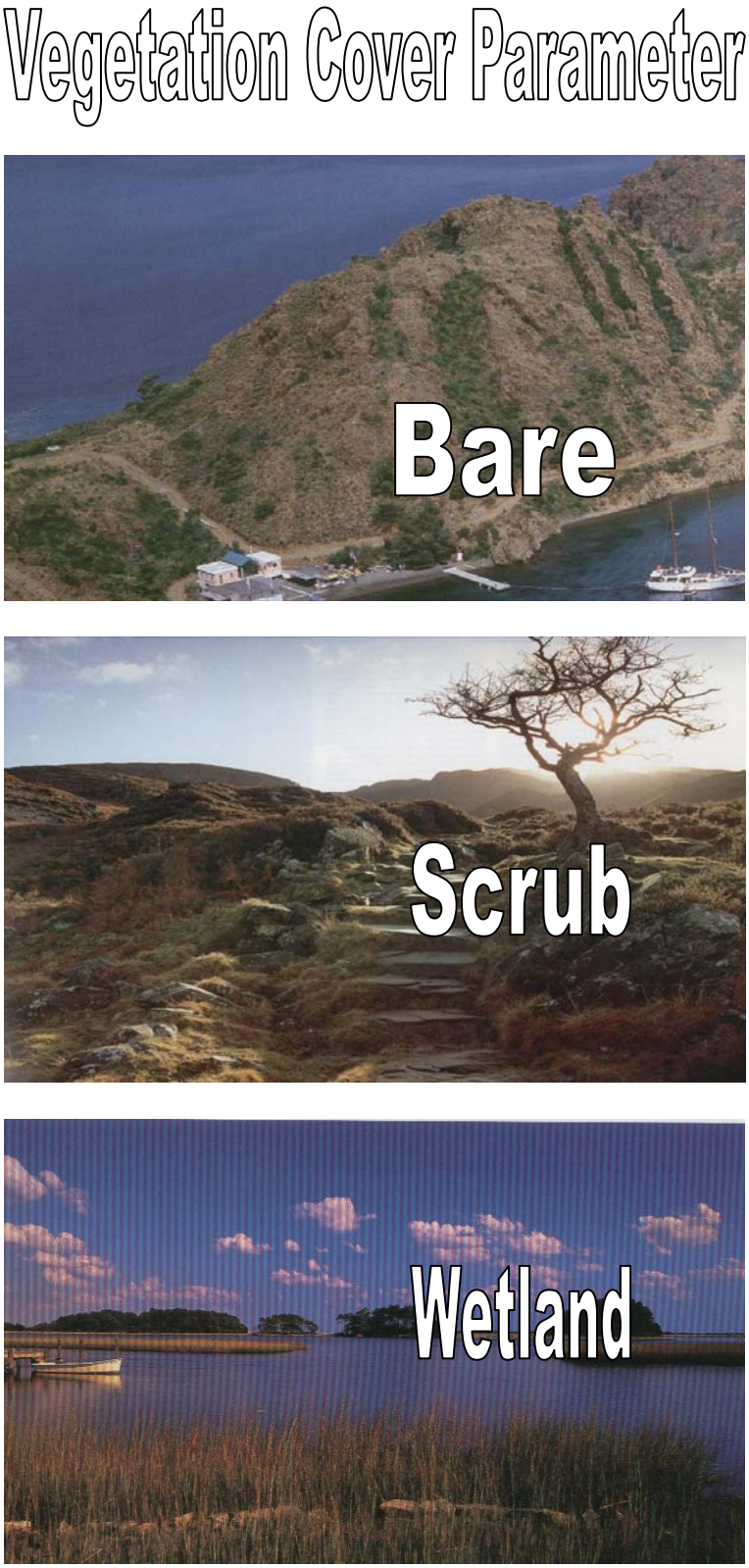


Figure B 24 B 25 B 26: Examples of Vegetation Cover Parameter

Figure B 27 B28 B28: Examples of Vegetation Cover

Figure B 29 B 30: Examples of Water Colour and Clarity

Figure B 31 Example of Sewage

Figure B 32: Examples of Built Environment

Figure B 33 B34: Examples of Built Environment

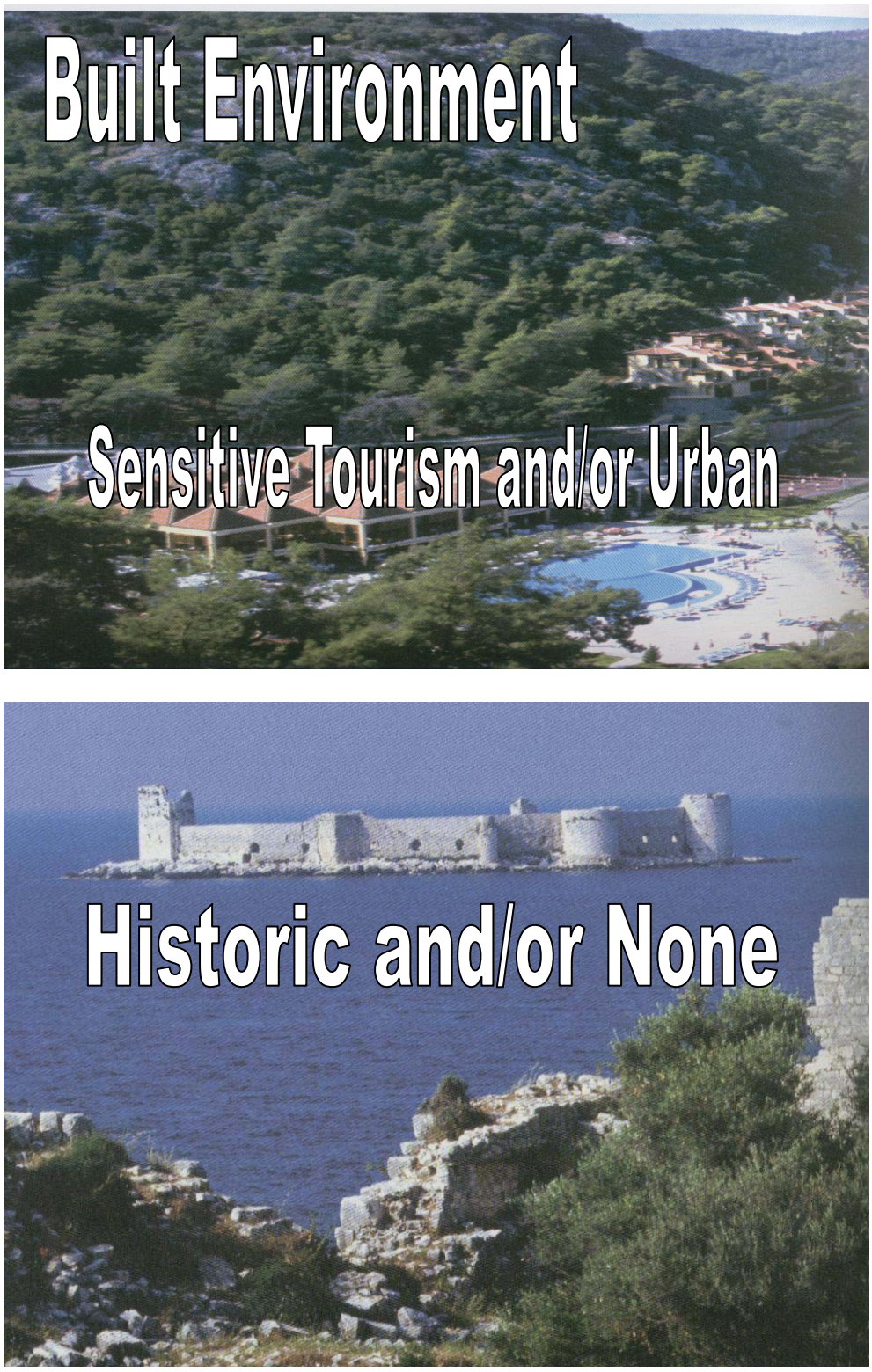


Figure B 35 B36: Examples of Built Environment

Figure B 37: Examples of Skyline

Figure B 38: Examples of Litter

Figure B 39: Examples of Nonbuilt Environment

Figure B 40: Examples of Noise Disturbance

Figure B41: Examples of Access Type

Figure B42: Examples of Utilities

APPENDIX C

FUZZY LOGIC APPROACH WEIGHTS OF PARAMETERS

For the Fuzzy Logic Approach computations the weight matrix for the physical, and human factors were decided with equal weights as "1/2,1/2,".
To re-form weight matrices statistical work based on the results of the questionnaires were carried out. In this study the rates given for the parameters as importance level 4 and 5 are taken into consideration.
The statistical computations to find out weights of assessment parameters are carried out at following steps for each subset; Physical, Human..

Step 1:

In the computations to find out the weights of assessment parameters importance levels (4 and 5) taken into consideration.

Step 2:

For each parameter of subsets, to bring out the difference of the rating of the importance levels 4 and 5, the weighted averages methodology is used. Then for each parameter "Rated Weights"(RW) are obtained.

Step 3:

To re-form the weight matrices the final weights of the parameters, are calculated by dividing the rated weights of the parameters of a subset to the summation of all rated weights of parameters of a subset.

COMPUTATIONS:

Computation of Weights For Physical Parameters are Presented as Follows:

- Computation for the assessment parameter Cliff (Data From Table 4)

Step 1;

Parameter		Level of Importance	
		4	5
Cliff	Height	64	54
	Slope	53	52
	Special Features	58	110

It is seen from the above given Table that, the Cliff Height gets importance levels 4 and 5 selected 64 and 54 times out of 270.

Step 2;

Total RW of Cliff = (RW of Height + RW of Slope + RW of Special Features)

$$\text{Total RW of Cliff} = \left[\frac{(64\times 4)+(54\times 5)}{270}+\frac{(53\times 4)+(52\times 5)}{270}+\frac{(58\times 4)+(110\times 5)}{270}\right]$$

=(1.9481 + 1.7481+ 2.8963)

=**6.5926**

Rate Factors of Elements of the Sub-Group Cliff;

$$\text{Factor For Cliff Height} = \frac{1.9481}{6.5926} = 0.2955$$

$$\text{Factor For Cliff Slope} = \frac{1.7481}{6.5926} = 0.2652$$

$$\text{Factor For Cliff Special Features} = \frac{2.8963}{6.5926} = 0.4393$$

Rated Weight for the parameter "Cliff" .is defined as 6.5926 / 3 = **2.1975** ⇐

- ❖ Computation for the assessment parameter Beach Face (Data From Table 4)

Step 1;

Parameters			Level Of Importance	
			4	5
Beach Face	Type	Sand	51	146
		Pebble/Gravel	45	36
		Cobble Boulder	31	31
	Width		58	112
	Colour		57	87

Beach Face parameters are given as; Type, Width and Colour in CSES table. In the questionnaire forms (Table 4) for the applicability of the form, Beach Face Type subdivided into elements such as Sand, Pebble, and Cobble Boulder. To reflect the importance of the elements the rated weights of elements are compared, the one, which has the highest rated weight, is taken as representative element of the type.

Step 2;

$$\text{RW Sand} = \frac{(51\times 4)+(146\times 5)}{270} = 3.4593$$

$$\text{RW Pebble} = \frac{(45\times 4)+(36\times 5)}{270} = 1.3333$$

$$\text{RW Rocky} = \frac{(31\times 4)+(31\times 5)}{270} = 1.0333$$

Looking at rated weights of sub-parameters of Beach Face Type, it is seen that Sand gets the maximum Rated Weight. So it is taken as representative in the computations of the Rated Weight of the Beach Face.

Total RW of Beach Face= (RW of Type +RW of Width + RW of Color)

$$= \left[3.4593+\frac{(58\times 4)+(112\times 5)}{270}+\frac{(57\times 4)+(87\times 5)}{270}\right]$$

= (3.4593 + 2.9333 + 2.4556)

= 8.8481

Rate Factors of Elements of the Sub Group Beach Face Type;

$$\text{Factor For Beach Face Type} = \frac{3.4593}{8.8481} = 0{,}3910$$

$$\text{Factor For Beach Face Width} = \frac{2.9333}{8.8481} = 0.3315$$

$$\text{Factor For Beach Face Color} = \frac{2.4556}{8.8481} = 0.2775$$

Rated Weight for the parameter "Beach Face" .is defined as 8.8481 / 3 = **2.9494** ⇐

- ❖ Computation for the assessment parameter Rocky Shore Platform (Data From Table 4)

Step 1;

Parameter		Level of Importance	
		4	5
Rocky Shore Platform	Slope	52	36
	Extent	53	39
	Roughness	54	81

Step 2;

Total RW of Rocky Shore Platform = (RW of Slope + RW of Extend + RW of roughness

$$= \left[\frac{(52 \times 4) + (36 \times 5)}{270} + \frac{(53 \times 4) + (39 \times 5)}{270} + \frac{(54 \times 4) + (81 \times 5)}{270} \right]$$

= (1.4370 + 1.5074+ 2.3000)

= **5.2444**

Rate Factors of Elements of the Sub Group Cliff;

$$\text{Factor For Rocky Shore Slope} = \frac{1.4370}{5.2444} = 0.2740$$

$$\text{Factor For Rocky Shore Extent} = \frac{1.5074}{5.2444} = 0.2874$$

$$\text{Factor For Rocky Shore Extent} = \frac{2.3000}{5.2444} = 0.4386$$

Rated Weight for the parameter "Beach Face" .is defined as 5.2444 / 3 = **1.4781**⇐

- ❖ Computation for the assessment parameters Sand Dunes and Valley and River Mouth (Data From Table 4)

Step 1;

Parameters	Level Of Importance	
	4	5
Sand Dunes	40	39
Valley and River Mouth	75	86

Step 2;

RW of Sand Dunes = $\frac{(40\times 4)+(39\times 5)}{270}$ = **1.3148⇐**

RW of Valley and River Mouth = $\frac{(75\times 4)+(86\times 5)}{270}$ = **2.7037⇐**

- Computation for the assessment parameter Skyline Land Form (Data From Table 2)

Step 1;

Parameter		Level Of Importance	
		4	5
Skyline Land Form	Flat	43	38
	Undulating	66	27
	Mountainous	53	114

As for the Land Form, for applicability of the questionnaire, parameter is given with 3 sub elements such as; Flat, Undulating, Mountainous.

Step 2,

RW Flat = $\frac{(43\times 4)+(38\times 5)}{270}$ = 1.3407

RW Undulating = $\frac{(66\times 4)+(27\times 5)}{270}$ = 1.4778

RW Mountainous = $\frac{(53\times 4)+(114\times 5)}{270}$ = **2.8963⇐**

The Rated Weight of Land Form is taken as the biggest Rated Weight of the sub-elements, i.e. mountainous.

- *Computation for the assessment parameter Tide (Data From Table 2)*

Step 1,

Parameters	Level of Importance	
	4	5
Tides	33	39
Coastal Landscape Features	53	184
Vistas of Far Places	65	123

Step 2;

RW of Tides = $\frac{(33\times 4)+(39\times 5)}{270}$ = **1.2111⇐**

RW of Coastal Landscape Features = $\frac{(53\times 4)+(184\times 5)}{270}$ = **4.1926⇐**

RW of Vistas of Far Places = $\frac{(40\times 4)+(39\times 5)}{270}$ = **3.2407⇐**

- *Computation for the assessment parameters Water Colour and Clarity Natural Vegetation Cover,*

Step 1,

Parameters	Level of Importance	
	4	5
Water Colour & Clarity	21	240
Vegetation Cover	71	159
Vegetation Debris	41	126

Step 2;

RW of Water Colour and Clarity = $\frac{(21\times 4)+(240\times 5)}{270}$ = **4.7556⇐**

RW of Vegetation Cover = $\frac{(71\times 4)+(159\times 5)}{270}$ = **3.9963⇐**

RW of Seaweed Banquets = $\frac{(41\times 4)+(126\times 5)}{270}$ = **2.9407⇐**

Summation of the RW's of the elements of the Physical Parameters is calculated and then the weights of the parameters are found by taking the ratio of the RW of the parameter to the total of the RW of Physical parameters.

E.g. for 'Cliff' weight of parameter Cliff is calculated as (2.1975 / 34.1478 = 0.064)

Step 3 of Physical parameters;

Parameter	**RW**	**Weight**
Cliff	2,1975	0,064
Beach Face	2,9494	0,086
Rocky Shore Platform	1,7481	0,051
Sand Dunes	1,3148	0,039
Valley and River Mouth	2,7037	0,079
Land Form	2,8963	0,085
Tides	1,2111	0,036
Coastal Landscape Features	4,1936	0,121
Vistas of Far Places	3,2407	0,095
Water Colour & Clarity	4,7556	0,140
Vegetation Cover	3,9963	0,117
Vegetation Debris	2,9407	0,086
Total	**34,1478**	

The Weight of the Cliff distributed among its elements using the factors found for that element. As shown below.

Cliff;

Parameter		Weight of Cliff (1)	Factor For Elements (2)	Weight Of Sub Parameter (1x2)
Cliff	Height	0,0644	0,2955	0,0191
	Slope		0,2652	0,0171
	Special Features		0,4393	0,0283

Beach Face;

Parameter		Weight of Cliff (1)	Factor For Elements (2)	Weight Of Sub Parameter (1x2)
Beach Face	Type	0,0864	0,3910	0,0338
	Width		0,3315	0,0287
	Colour		0,2775	0,0240

Rocky Shore Platform;

Parameter		Weight of Cliff (1)	Factor For Elements (2)	Weight Of Sub Parameter (1x2)
Rocky Shore Platform	Slope	0,0512	0,2740	0,0140
	Extend		0,2874	0,0147
	Roughness		0,4386	0,0225

Computation of Weights For Human Parameters:

For the applicability of the questionnaire Built Environment and Utilities are governed with one question, whereas the Historical Features, which is a very special part of the Built Environment, was asked as a question by itself. To reflect the positive effect of the votes for the historical features on the Built Environment and Utilities a positive reflecting application is used as;

Parameter Built Environment and Utilities has 40 votes for attribute 4 and 206 votes for attribute 5, total votes for 4 and 5 is 246 .

Process:
Built Environment and Utilities

For Attribute 4 → 40+63x0.8+160x0.2 = 122
For Attribute 5 → 206+160x0.8+63x0.2=410
Sum of 122 and 410 makes 532.

To keep the meaning of the votes on lower attribute which are attribute 1,2,3 the number of total votes on attribute 4 and 5 should be kept same as 246. So these votes are distributed again considering the effect of Historical features as shown below.

Revised Votes on Attribute 4 = 246 x 122/532=56
Revised Votes on Attribute 5 = 246 x 410/532=190
This revised numbers are used both for Built Environment and Utilities.

Step1;

Parameter	Level of Importance	
	4	5
Disturbance Factor	39	205
Litter	13	246
Sewages	13	246
Non-Built Environment	62	60
Built Environment	56	190
Access Type	53	114
Skyline	40	190
Utilities	56	190

Step 2;

RW of Disturbance Factor = $\frac{(39\times 4)+(205\times 5)}{270}$ = **4.3741⇐**

RW of Litter = $\frac{(13\times 4)+(246\times 5)}{270}$ = **4.7481⇐**

RW of Sewages = $\frac{(13\times 4)+(246\times 5)}{270}$ = **4.7481⇐**

RW of Non-Built Environment = $\frac{(62\times 4)+(60\times 5)}{270}$ = **2.0296⇐**

RW of Built Environment = $\frac{(56\times 4)+(190\times 5)}{270}$ = **4.3481⇐**

RW of Access Type = $\frac{(53\times 4)+(114\times 5)}{270}$ = **2.8963⇐**

RW of Skyline = $\frac{(56\times 4)+(190\times 5)}{270}$ = **4.3481⇐**

RW of Utilities = $\frac{(56\times 4)+(190\times 5)}{270}$ = **4.3481⇐**

Then the weights of the parameters are calculated by the same approach with physical parameters.
E.g. weight of parameter Litter is 4.7481/31.8417= 0.149

Step 3;

Parameter	RW	Weight
Disturbance Factor	4,3741	**0,137**
Litter	4,7481	**0,149**
Sewages	4,7481	**0,149**
Non-Built Environment	2,0296	**0,064**
Built Environment	4,3481	**0,137**
Access Type	2,8963	**0,091**
Skyline	4,3481	**0,137**
Utilities	4,3481	**0,137**
Total	**31,8407**	

The list of computed weights is given in Table 5.

APPENDIX D

MEMBERSHIP GRADING MATRICES

$M_1 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,3	0,0	0,0
3	0,0	0,3	1,0	0,3	0,0
4	0,0	0,0	0,5	1,0	0,5
5	0,0	0,0	0,0	0,5	1,0

$M_2 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,5	0,0	0,0
3	0,0	0,5	1,0	0,5	0,0
4	0,0	0,0	0,5	1,0	0,5
5	0,0	0,0	0,0	0,5	1,0

$M_3 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,3	0,0	0,0
3	0,0	0,0	1,0	0,3	0,0
4	0,0	0,0	0,0	1,0	0,3
5	0,0	0,0	0,0	0,0	1,0

$M_4 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,0	0,0
4	0,0	0,0	0,0	1,0	0,0
5	0,0	0,0	0,0	0,0	1,0

$M_5 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,2	1,0	0,2	0,0
4	0,0	0,0	0,2	1,0	0,6
5	0,0	0,0	0,0	0,6	1,0

$M_6 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,6	0,0
4	0,0	0,0	0,6	1,0	0,0
5	0,0	0,0	0,0	0,0	1,0

$M_7 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,5	0,0	0,0
3	0,0	0,5	1,0	0,5	0,0
4	0,0	0,0	0,5	1,0	0,5
5	0,0	0,0	0,0	0,2	1,0

$M_8 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,2	0,0	0,0
3	0,0	0,2	1,0	0,5	0,0
4	0,0	0,0	0,5	1,0	0,4
5	0,0	0,0	0,0	0,4	1,0

$M_9 =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,1	0,0	0,0
3	0,0	0,1	1,0	0,6	0,0
4	0,0	0,0	0,6	1,0	0,5
5	0,0	0,0	0,0	0,5	1,0

$M_{10} =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,0	0,0
4	0,0	0,0	0,0	1,0	0,0
5	0,0	0,0	0,0	0,0	1,0

$M_{11} =$

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,0	0,0
4	0,0	0,0	0,0	1,0	0,1
5	0,0	0,0	0,0	0,1	1,0

M_{12} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,0	1,0	0,3	0,0	0,0
3	0,0	0,6	1,0	0,6	0,0
4	0,0	0,0	0,6	1,0	0,2
5	0,0	0,0	0,0	0,2	1,0

M_{13} =

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,0	0,0
4	0,0	0,0	0,0	1,0	0,0
5	0,0	0,0	0,0	0,0	1,0

M_{14} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,0	1,0	0,2	0,0	0,0
3	0,0	0,0	1,0	0,2	0,0
4	0,0	0,0	0,0	1,0	0,2
5	0,0	0,0	0,0	0,0	1,0

M_{15} =

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,0	0,0
4	0,0	0,0	0,0	1,0	0,3
5	0,0	0,0	0,0	0,3	1,0

M_{16} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,2	1,0	0,2	0,0	0,0
3	0,0	0,5	1,0	0,5	0,0
4	0,0	0,0	0,5	1,0	0,2
5	0,0	0,0	0,0	0,2	1,0

M_{17} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,2	1,0	0,2	0,1	0,0
3	0,0	0,2	1,0	0,2	0,0
4	0,0	0,0	0,2	1,0	0,2
5	0,0	0,0	0,0	0,2	1,0

M_{18} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,2	1,0	0,0	0,0	0,0
3	0,0	0,0	1,0	0,2	0,0
4	0,0	0,0	0,2	1,0	0,0
5	0,0	0,0	0,0	0,2	1,0

M_{19} =

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,2	1,0	0,0	0,2	0,0
3	0,0	0,0	0,0	0,0	0,0
4	0,0	0,2	0,0	1,0	0,2
5	0,0	0,0	0,0	0,2	1,0

M_{20} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,2	1,0	0,2	0,0	0,0
3	0,0	0,2	1,0	0,2	0,0
4	0,0	0,0	0,2	1,0	0,2
5	0,0	0,0	0,0	0,2	1,0

M_{21} =

	1	2	3	4	5
1	1,0	0,0	0,2	0,0	0,0
2	0,0	0,0	0,0	0,0	0,0
3	0,3	0,0	1,0	0,0	0,1
4	0,0	0,0	0,0	0,0	0,0
5	0,0	0,0	0,2	0,0	1,0

M_{22} =

	1	2	3	4	5
1	1,0	0,0	0,2	0,0	0,0
2	0,0	0,0	0,0	0,0	0,0
3	0,2	0,0	1,0	0,0	0,2
4	0,0	0,0	0,0	0,0	0,0
5	0,0	0,0	0,2	0,0	1,0

M_{23} =

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,0	1,0	0,2	0,0	0,0
3	0,0	0,2	1,0	0,2	0,0
4	0,0	0,0	0,3	1,0	0,0
5	0,0	0,0	0,0	0,0	1,0

M_{24} =

	1	2	3	4	5
1	1,0	0,2	0,0	0,0	0,0
2	0,2	1,0	0,0	0,2	0,0
3	0,0	0,0	0,0	0,0	0,0
4	0,0	0,2	0,0	1,0	0,2
5	0,0	0,0	0,0	0,2	1,0

M_{25} =

	1	2	3	4	5
1	1,0	0,4	0,0	0,0	0,0
2	0,4	1,0	0,2	0,0	0,0
3	0,0	0,4	1,0	0,2	0,0
4	0,0	0,0	0,4	1,0	0,0
5	0,0	0,0	0,0	0,0	1,0

M_{26} =

	1	2	3	4	5
1	1,0	0,0	0,0	0,0	0,0
2	0,2	1,0	0,0	0,0	0,0
3	0,0	0,2	1,0	0,0	0,0
4	0,0	0,0	0,2	1,0	0,0
5	0,0	0,0	0,0	0,2	1,0

APPENDIX E

ASSESSMENT MATRICES

Table E 1: Assessment Matrices for Alara Coast Middle Section

Alara Coast Middle Section, Mersin

Assessment Matrices

No;	Assessment Parameters	Graded Attributes	Weights Of Parameters	Input Matrices d_i	A Matrices	Fuzzy Assessment Matrices: Grade Matrices G_i Attributes (1-5)					R Matrices	Fuzzy Weighted Assessment Matrix R_m Attributes (1-5)				
						1	2	3	4	5		1	2	3	4	5
	Physical															
1	Cliff Height (1-1)	1	0,019	1 0 0 0 0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,019**	0,000	0,000	0,000	0,000
2	Cliff Slope (1-2)	1	0,017	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,017**	0,000	0,000	0,000	0,000
3	Special Features (1-3)	1	0,028	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type (2-1)	4	0,034	0 0 0 1 0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width (2-2)	3	0,029	0 0 1 0 0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,006**	**0,029**	**0,006**	0,000
6	Beach Color (2-3)	3	0,024	0 0 1 0 0		0,00	0,00	**1,00**	**0,60**	0,00		0,000	0,000	**0,024**	**0,014**	0,000
7	Shore Slope (3-1)	1	0,014	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent (3-2)	1	0,015	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness (3-3)	1	0,022	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,022**	0,000	0,000	0,000	0,000
10	Dunes (4)	4	0,039	0 0 0 1 0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,039**	0,000
11	Valley (5)	1	0,079	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform (6)	2	0,085	0 1 0 0 0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,085**	**0,025**	0,000	0,000
13	Tides (7)	5	0,036	0 0 0 0 1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	1	0,122	1 0 0 0 0		**1,00**	**0,20**	0,00	0,00	0,00		**0,121**	**0,024**	0,000	0,000	0,000
15	Vistas (9)	4	0,095	0 0 0 1 0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color (10)	3	0,139	0 0 1 0 0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,070**	**0,140**	**0,070**	0,000
17	Vegetation Cover (11)	4	0,117	0 0 0 1 0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,023**	**0,117**	**0,023**
18	Seaweed (12)	4	0,086	0 0 0 1 0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,017**	**0,086**	0,000
	WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P											**0,316**	**0,185**	**0,258**	**0,461**	**0,087**
	Human															
20	Disturbance Factor (1)	5	0,137	0 0 0 0 1	A_H	0,00	0,00	0,00	**0,20**	**1,00**	R_H	0,000	0,000	0,000	**0,027**	**0,137**
21	Litter (2)	3	0,149	0 0 1 0 0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
22	Sewage (3)	5	0,149	0 0 0 0 1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
23	Non-built Environment (4)	5	0,064	0 0 0 0 1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,013**	0,000	**0,064**
24	Built Environment (5)	3	0,137	0 0 1 0 0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,027**	**0,137**	**0,027**	0,000
25	Access Type (6)	5	0,091	0 0 0 0 1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
26	Skyline (7)	2	0,137	0 1 0 0 0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
27	Utilities (8)	5	0,137	0 0 0 0 1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
	WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H											**0,055**	**0,194**	**0,356**	**0,130**	**0,578**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	Weights Of Subsets W_F		Attributes (1-5) 1	2	3	4	5
Weighted Averages Matrix of Subset Physical V_P	1/2	Matrix K	**0,316**	**0,185**	**0,258**	**0,461**	**0,087**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,055**	**0,194**	**0,356**	**0,130**	**0,578**

Final Assessment Matrix (W_F x K)

Final Assessment Matrix - Membership Degree(R)							
			0,185	**0,189**	**0,307**	**0,295**	**0,333**

Table E 2: Assessment Matrices for Alara Coast East Section

Alara Coast East Section, Mersin																					
Assessment Matrices																					
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**											
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	1	0,019	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,019**	0,000	0,000	0,000	0,000
2	Cliff Slope	(1-2)	1	0,017	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,017**	0,000	0,000	0,000	0,000
3	Special Features	(1-3)	1	0,028	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	3	0,029	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,006**	**0,029**	**0,006**	0,000
6	Beach Color	(2-3)	3	0,024	0	0	1	0	0		0,00	0,00	**1,00**	**0,60**	0,00		0,000	0,000	**0,024**	**0,014**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	3	0,039	0	0	1	0	0		0,00	0,00	**1,00**	0,00	0,00		0,000	0,000	**0,039**	0,000	0,000
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	2	0,085	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,085**	**0,025**	0,000	0,000
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	1	0,122	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,121**	**0,024**	0,000	0,000	0,000
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	3	0,139	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,070**	**0,140**	**0,070**	0,000
17	Vegetation Cover	(11)	3	0,117	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,023**	**0,117**	**0,023**	0,000
18	Seaweed	(12)	4	0,086	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,017**	**0,086**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,316**	**0,208**	**0,391**	**0,329**	**0,064**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	3	0,149	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment	(5)	2	0,137	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000
24	Access Type	(6)	5	0,091	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
25	Skyline	(7)	2	0,137	0	1	0	0	0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
26	Utilities	(8)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,055**	**0,303**	**0,246**	**0,103**	**0,578**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix											**Weights Of Subsets W_F**						**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P											1/2					**Matrix K**	**0,316**	**0,208**	**0,391**	**0,329**	**0,064**
Weighted Averages Matrix of Subset Human V_H											1/2						**0,055**	**0,303**	**0,246**	**0,103**	**0,578**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix - Membership Degree(R)																	**0,185**	**0,256**	**0,319**	**0,216**	**0,321**

Table E 3: Assessment Matrices for Alara Coast West Section

Alara West Coast, Mersin																					
Assessment Matrices																					
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**											
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	1	0,019	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,019**	0,000	0,000	0,000	0,000
2	Cliff Slope	(1-2)	1	0,017	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,017**	0,000	0,000	0,000	0,000
3	Special Features	(1-3)	1	0,028	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	3	0,029	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,006**	**0,029**	**0,006**	0,000
6	Beach Color	(2-3)	3	0,024	0	0	1	0	0		0,00	0,00	**1,00**	**0,60**	0,00		0,000	0,000	**0,024**	**0,014**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	4	0,039	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,039**	0,000
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	1	0,085	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,085**	**0,017**	0,000	0,000	0,000
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	1	0,122	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,121**	**0,024**	0,000	0,000	0,000
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	3	0,139	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,070**	**0,140**	**0,070**	0,000
17	Vegetation Cover	(11)	4	0,117	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,023**	**0,117**	**0,023**
18	Seaweed	(12)	4	0,086	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,017**	**0,086**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,401**	**0,117**	**0,233**	**0,461**	**0,087**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	3	0,149	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment	(5)	3	0,137	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,027**	**0,137**	**0,027**	0,000
24	Access Type	(6)	5	0,091	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
25	Skyline	(7)	2	0,137	0	1	0	0	0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
26	Utilities	(8)	4	0,137	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,027**	**0,137**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,055**	**0,194**	**0,383**	**0,239**	**0,441**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	**Weights Of Subsets W_F**		**Attributes (1-5)**				
			1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P	1/2	**Matrix K**	**0,401**	**0,117**	**0,233**	**0,461**	**0,087**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,055**	**0,194**	**0,383**	**0,239**	**0,441**
Final Assessment Matrix (W_F x K)							
Final Assessment Matrix - Membership Degree R)			**0,228**	**0,155**	**0,308**	**0,350**	**0,264**

Table E 4: Assessment Matrices for Cıralı Karaburun

Çıralı Karaburun Kemer, Antalya																						
Assessment Matrices																						
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**												
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	3	0,019	0	0	1	0	0		0,00	**0,30**	**1,00**	**0,30**	0,00		0,000	**0,006**	**0,019**	**0,006**	0,000
2	Cliff Slope	(1-2)	5	0,017	0	0	0	0	1		0,00	0,00	0,00	**0,50**	**1,00**		0,000	0,000	0,000	**0,009**	**0,017**
3	Special Features	(1-3)	3	0,028	0	0	1	0	0		0,00	0,00	**1,00**	**0,30**	0,00		0,000	0,000	**0,028**	**0,008**	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	4	0,029	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color	(2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	2	0,039	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,039**	0,000	0,000	0,000
11	Valley	(5)	4	0,079	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,10**		0,000	0,000	0,000	**0,079**	**0,008**
12	Landform	(6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	5	0,139	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,028**	**0,140**
17	Vegetation Cover	(11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,051**	**0,044**	**0,189**	**0,394**	**0,534**
Human																					
20	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
21	Litter	(2)	4	0,149	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
22	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
23	Non-built Environment	(4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
24	Built Environment	(5)	4	0,137	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
25	Access Type	(6)	4	0,091	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,018**	0,000	**0,091**	**0,018**
26	Skyline	(7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
27	Utilities	(8)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	0,000	**0,018**	**0,113**	**0,431**	**0,671**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix					**Weights Of Subsets W_F**												**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P					1/2											**Matrix K**	**0,051**	**0,044**	**0,189**	**0,394**	**0,534**
Weighted Averages Matrix of Subset Human V_H					1/2												**0,000**	**0,018**	**0,113**	**0,431**	**0,671**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix - Membership Degree(R)																	**0,026**	**0,031**	**0,151**	**0,412**	**0,603**

Table E 5: Assessment Matrices for Dedeman Hotel Region, Antalya

Dedeman Hotel Region, Antalya

Assessment Matrices

No;	Assessment Parameters		Graded Attributes	Weights Of Parameters	Input Matrices d_i					A Matrices	Fuzzy Assessment Matrices: Grade Matrices G_i Attributes (1-5)					R Matrices	Fuzzy Weighted Assessment Matrix R_m Attributes (1-5)				
	Physical										1	2	3	4	5		1	2	3	4	5
1	Cliff Height	(1-1)	3	0,019	0	0	1	0	0	A_P	0,00	**0,30**	**1,00**	**0,30**	0,00	R_P	0,000	**0,006**	**0,019**	**0,006**	0,000
2	Cliff Slope	(1-2)	5	0,017	0	0	0	0	1		0,00	0,00	0,00	**0,50**	**1,00**		0,000	0,000	0,000	**0,009**	**0,017**
3	Special Features	(1-3)	5	0,028	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,028**
4	Beach Type	(2-1)	1	0,034	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,034**	0,000	0,000	0,000	0,000
5	Beach Width	(2-2)	1	0,029	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,029**	0,000	0,000	0,000	0,000
6	Beach Color	(2-3)	1	0,024	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,024**	0,000	0,000	0,000	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	2	0,085	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,085**	**0,025**	0,000	0,000
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	4	0,122	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,20**		0,000	0,000	0,000	**0,121**	**0,024**
15	Vistas	(9)	2	0,095	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,095**	0,000	0,000	0,000
16	Water Color	(10)	5	0,139	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,028**	**0,140**
17	Vegetation Cover	(11)	4	0,117	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,023**	**0,117**	**0,023**
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,256**	**0,186**	**0,068**	**0,298**	**0,354**
Human																					
19	Disturbance Factor	(1)	4	0,137	0	0	0	1	0	A_H	0,00	**0,20**	0,00	**1,00**	**0,20**	R_H	0,000	**0,027**	0,000	**0,137**	**0,027**
20	Litter	(2)	2	0,149	0	1	0	0	0		**0,20**	**1,00**	**0,20**	0,00	0,00		**0,030**	**0,149**	**0,030**	0,000	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0		**1,00**	0,00	**0,20**	0,00	0,00		**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	2	0,137	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000
24	Access Type	(6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	1	0,137	1	0	0	0	0		**1,00**	**0,40**	0,00	0,00	0,00		**0,137**	**0,055**	0,000	0,000	0,000
26	Utilities	(8)	1	0,137	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,137**	0,000	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,385**	**0,459**	**0,100**	**0,156**	**0,177**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	Weights Of Subsets W_F		Attributes (1-5) 1	2	3	4	5
Weighted Averages Matrix of Subset Physical V_P	1/2	Matrix K	**0,256**	**0,186**	**0,068**	**0,298**	**0,354**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,385**	**0,459**	**0,100**	**0,156**	**0,177**

Final Assessment Matrix (W_F x K)

Final Assessment Matrix - Membership Degree(R)							
			0,320	**0,322**	**0,084**	**0,227**	**0,266**

Table E 6: Assessment Matrices for Hurma Region Göksu, Mersin

Hurma Region Göksu, Mersin

Assessment Matrices

No;	Assessment Parameters	Graded Attributes	Weights Of Parameters	Input Matrices d_i	A Matrices	Fuzzy Assessment Matrices: Grade Matrices G_i Attributes (1-5)					R Matrices	Fuzzy Weighted Assessment Matrix R_m Attributes (1-5)				
	Physical					**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	1	0,019	1 0 0 0 0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,019**	0,000	0,000	0,000	0,000
2	Cliff Slope (1-2)	1	0,017	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,017**	0,000	0,000	0,000	0,000
3	Special Features (1-3)	1	0,028	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type (2-1)	5	0,034	0 0 0 0 1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,034**
5	Beach Width (2-2)	4	0,029	0 0 0 1 0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color (2-3)	4	0,024	0 0 0 1 0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope (3-1)	1	0,014	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent (3-2)	1	0,015	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness (3-3)	1	0,022	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,022**	0,000	0,000	0,000	0,000
10	Dunes (4)	2	0,039	0 1 0 0 0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,039**	0,000	0,000	0,000
11	Valley (5)	1	0,079	1 0 0 0 0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform (6)	4	0,085	0 0 0 1 0		0,00	0,00	**0,60**	**1,00**	**0,20**		0,000	0,000	**0,051**	**0,085**	**0,017**
13	Tides (7)	5	0,036	0 0 0 0 1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	5	0,122	0 0 0 0 1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,121**
15	Vistas (9)	5	0,095	0 0 0 0 1		0,00	0,00	0,00	**0,30**	**1,00**		0,000	0,000	0,000	**0,029**	**0,095**
16	Water Color (10)	2	0,139	0 1 0 0 0		**0,20**	**1,00**	**0,20**	0,00	0,00		**0,028**	**0,140**	**0,028**	0,000	0,000
17	Vegetation Cover (11)	3	0,117	0 0 1 0 0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,023**	**0,117**	**0,023**	0,000
18	Seaweed (12)	3	0,086	0 0 1 0 0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,086**	**0,017**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P												**0,223**	**0,202**	**0,303**	**0,207**	**0,320**
Human																
19	Disturbance Factor (1)	5	0,137	0 0 0 0 1	A_H	0,00	0,00	0,00	**0,20**	**1,00**	R_H	0,000	0,000	0,000	**0,027**	**0,137**
20	Litter (2)	3	0,149	0 0 1 0 0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
21	Sewage (3)	5	0,149	0 0 0 0 1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment (4)	5	0,064	0 0 0 0 1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment (5)	5	0,137	0 0 0 0 1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
24	Access Type (6)	5	0,091	0 0 0 0 1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
25	Skyline (7)	5	0,137	0 0 0 0 1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
26	Utilities (8)	4	0,137	0 0 0 1 0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,027**	**0,137**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H												0,000	**0,030**	**0,219**	**0,212**	**0,714**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	Weights Of Subsets W_F		Attributes (1-5) 1	2	3	4	5
Weighted Averages Matrix of Subset Physical V_P	1/2	Matrix K	**0,223**	**0,202**	**0,303**	**0,207**	**0,320**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,000**	**0,030**	**0,219**	**0,212**	**0,714**

Final Assessment Matrix (W_F x K)

Final Assessment Matrix - Membership Degree(R)							
			0,111	**0,116**	**0,261**	**0,209**	**0,517**

Table E 7: Assessment Matrices for Karaburun Akyar, Mersin

Karaburun Akyar, Mersin																					
Assessment Matrices																					
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**												
									A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	2	0,02	0	1	0	0	0	A_P	0,00	**1,00**	**0,30**	0,00	0,00	R_P	0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope (1-2)	4	0,02	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,50**		0,000	0,000	**0,009**	**0,017**	**0,009**
3	Special Features (1-3)	2	0,03	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type (2-1)	1	0,03	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,034**	0,000	0,000	0,000	0,000
5	Beach Width (2-2)	1	0,03	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,029**	0,000	0,000	0,000	0,000
6	Beach Color (2-3)	1	0,02	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,024**	0,000	0,000	0,000	0,000
7	Shore Slope (3-1)	4	0,01	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,50**		0,000	0,000	**0,007**	**0,014**	**0,007**
8	Shore Extent (3-2)	4	0,01	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,40**		0,000	0,000	**0,007**	**0,015**	**0,006**
9	Shore roughness (3-3)	4	0,02	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	**0,50**		0,000	0,000	**0,013**	**0,022**	**0,011**
10	Dunes (4)	1	0,04	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley (5)	1	0,08	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform (6)	3	0,08	0	0	1	0	0		0,00	**0,60**	**1,00**	**0,60**	0,00		0,000	**0,051**	**0,085**	**0,051**	0,000
13	Tides (7)	5	0,04	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	3	0,12	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas (9)	2	0,09	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,095**	0,000	0,000	0,000
16	Water Color (10)	3	0,14	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,070**	**0,140**	**0,070**	0,000
17	Vegetation Cover (11)	4	0,12	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,023**	**0,117**	**0,023**
18	Seaweed (12)	5	0,09	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,204**	**0,263**	**0,420**	**0,348**	**0,178**
Human																					
20	Disturbance Factor (1)	5	0,14	0	0	0	0	1	A_H	0,00	0,00	0,00	**0,20**	**1,00**	R_H	0,000	0,000	0,000	**0,027**	**0,137**
21	Litter (2)	4	0,15	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
22	Sewage (3)	5	0,15	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
23	Non-built Environment (4)	5	0,06	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,013**	0,000	**0,064**
24	Built Environment (5)	4	0,14	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
25	Access Type (6)	5	0,09	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
26	Skyline (7)	5	0,14	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
27	Utilities (8)	5	0,14	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																0,000	0,000	**0,113**	**0,359**	**0,744**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix			**Weights Of Subsets W_F**													**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P			1/2												**Matrix K**	**0,204**	**0,263**	**0,420**	**0,348**	**0,178**
Weighted Averages Matrix of Subset Human V_H			1/2													**0,000**	**0,000**	**0,113**	**0,359**	**0,744**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix - Membership Degree (R)																**0,102**	**0,132**	**0,267**	**0,353**	**0,461**

Table E 8: Assessment Matrices for Kızkalesi, Mersin

Kızkalesi, Mersin																					
Assessment Matrices																					
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**											
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	1	0,019	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,019**	0,000	0,000	0,000	0,000
2	Cliff Slope	(1-2)	1	0,017	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,017**	0,000	0,000	0,000	0,000
3	Special Features	(1-3)	1	0,028	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	3	0,029	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,006**	**0,029**	**0,006**	0,000
6	Beach Color	(2-3)	3	0,024	0	0	1	0	0		0,00	0,00	**1,00**	**0,60**	0,00		0,000	0,000	**0,024**	**0,014**	0,000
7	Shore Slope	(3-1)	2	0,014	0	1	0	0	0		0,00	**1,00**	**0,50**	0,00	0,00		0,000	**0,014**	**0,007**	0,000	0,000
8	Shore Extent	(3-2)	2	0,015	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,015**	**0,003**	0,000	0,000
9	Shore roughness	(3-3)	2	0,022	0	1	0	0	0	A_P	0,00	**1,00**	**0,10**	0,00	0,00	R_P	0,000	**0,022**	**0,002**	0,000	0,000
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	1	0,085	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,085**	**0,017**	0,000	0,000	0,000
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	2	0,122	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,121**	**0,024**	0,000	0,000
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	3	0,139	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,070**	**0,140**	**0,070**	0,000
17	Vegetation Cover	(11)	1	0,117	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000
18	Seaweed	(12)	4	0,086	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,017**	**0,086**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,385**	**0,288**	**0,246**	**0,305**	**0,064**
Human																					
19	Disturbance Factor	(1)	1	0,137	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,137**	0,000	0,000	0,000	0,000
20	Litter	(2)	2	0,149	0	1	0	0	0		**0,20**	**1,00**	**0,20**	0,00	0,00		**0,030**	**0,149**	**0,030**	0,000	0,000
21	Sewage	(3)	1	0,149	1	0	0	0	0		**1,00**	0,00	**0,20**	0,00	0,00		**0,149**	0,000	**0,030**	0,000	0,000
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	3	0,137	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,027**	**0,137**	**0,027**	0,000
24	Access Type	(6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	3	0,137	0	0	1	0	0		0,00	**0,40**	**1,00**	**0,20**	0,00		0,000	**0,055**	**0,137**	**0,027**	0,000
26	Utilities	(8)	1	0,137	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,137**	0,000	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,535**	**0,322**	**0,346**	**0,073**	0,000
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix					**Weights Of Subsets W_F**												**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P					1/2											**Matrix K**	**0,385**	**0,288**	**0,246**	**0,305**	**0,064**
Weighted Averages Matrix of Subset Human V_H					1/2												**0,535**	**0,322**	**0,346**	**0,073**	**0,000**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix - Membership Degree(R)																	**0,460**	**0,305**	**0,296**	**0,189**	**0,032**

Table E 9: Assessment Matrices for Konyaaltı Beach East Section , Antalya

Konyaaltı Beach East Section, Antalya

Assessment Matrices

No;	Assessment Parameters	Graded Attributes	Weights Of Parameters	Input Matrices d_i	A Matrices	Fuzzy Assessment Matrices: Grade Matrices G_i Attributes (1-5)	R Matrices	Fuzzy Weighted Assessment Matrix R_m Attributes (1-5)
	Physical					1 2 3 4 5		1 2 3 4 5
1	Cliff Height (1-1)	2	0,019	0 1 0 0 0		0,00 **1,00** **0,30** 0,00 0,00		0,000 **0,019** **0,006** 0,000 0,000
2	Cliff Slope (1-2)	3	0,017	0 0 1 0 0		0,00 **0,50** **1,00** **0,50** 0,00		0,000 **0,009** **0,017** **0,009** 0,000
3	Special Features (1-3)	2	0,028	0 1 0 0 0		0,00 **1,00** **0,30** 0,00 0,00		0,000 **0,028** **0,008** 0,000 0,000
4	Beach Type (2-1)	4	0,034	0 0 0 1 0		0,00 0,00 0,00 **1,00** 0,00		0,000 0,000 0,000 **0,034** 0,000
5	Beach Width (2-2)	4	0,029	0 0 0 1 0		0,00 0,00 **0,20** **1,00** **0,60**		0,000 0,000 **0,006** **0,029** **0,017**
6	Beach Color (2-3)	4	0,024	0 0 0 1 0		0,00 0,00 **0,60** **1,00** 0,00		0,000 0,000 **0,014** **0,024** 0,000
7	Shore Slope (3-1)	1	0,014	1 0 0 0 0		**1,00** 0,00 0,00 0,00 0,00		**0,014** 0,000 0,000 0,000 0,000
8	Shore Extent (3-2)	1	0,015	1 0 0 0 0		**1,00** 0,00 0,00 0,00 0,00		**0,015** 0,000 0,000 0,000 0,000
9	Shore roughness (3-3)	1	0,022	1 0 0 0 0	A_P	**1,00** 0,00 0,00 0,00 0,00	R_P	**0,022** 0,000 0,000 0,000 0,000
10	Dunes (4)	1	0,039	1 0 0 0 0		**1,00** 0,00 0,00 0,00 0,00		**0,039** 0,000 0,000 0,000 0,000
11	Valley (5)	1	0,079	1 0 0 0 0		**1,00** 0,00 0,00 0,00 0,00		**0,079** 0,000 0,000 0,000 0,000
12	Landform (6)	5	0,085	0 0 0 0 1		0,00 0,00 0,00 **0,20** **1,00**		0,000 0,000 0,000 **0,017** **0,085**
13	Tides (7)	5	0,036	0 0 0 0 1		0,00 0,00 0,00 0,00 **1,00**		0,000 0,000 0,000 0,000 **0,036**
14	Landscape Features (8)	2	0,122	0 1 0 0 0		0,00 **1,00** **0,20** 0,00 0,00		0,000 **0,121** **0,024** 0,000 0,000
15	Vistas (9)	4	0,095	0 0 0 1 0		0,00 0,00 0,00 **1,00** **0,30**		0,000 0,000 0,000 **0,095** **0,029**
16	Water Color (10)	4	0,139	0 0 0 1 0		0,00 0,00 **0,50** **1,00** **0,20**		0,000 0,000 **0,070** **0,140** **0,028**
17	Vegetation Cover (11)	1	0,117	1 0 0 0 0		**1,00** **0,20** 0,00 0,00 0,00		**0,117** **0,023** 0,000 0,000 0,000
18	Seaweed (12)	5	0,086	0 0 0 0 1		0,00 0,00 0,00 **0,20** **1,00**		0,000 0,000 0,000 **0,017** **0,086**
	WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P							**0,286** **0,201** **0,145** **0,364** **0,280**
Human								
19	Disturbance Factor (1)	4	0,137	0 0 0 1 0		0,00 **0,20** 0,00 **1,00** **0,20**		0,000 **0,027** 0,000 **0,137** **0,027**
20	Litter (2)	4	0,149	0 0 0 1 0		0,00 0,00 **0,20** **1,00** **0,20**		0,000 0,000 **0,030** **0,149** **0,030**
21	Sewage (3)	5	0,149	0 0 0 0 1		0,00 0,00 **0,20** 0,00 **1,00**		0,000 0,000 **0,030** 0,000 **0,149**
22	Non-built Environment (4)	1	0,064	1 0 0 0 0	A_H	**1,00** 0,00 **0,20** 0,00 0,00	R_H	**0,064** 0,000 **0,013** 0,000 0,000
23	Built Environment (5)	2	0,137	0 1 0 0 0		0,00 **1,00** **0,20** 0,00 0,00		0,000 **0,137** **0,027** 0,000 0,000
24	Access Type (6)	2	0,091	0 1 0 0 0		**0,20** **1,00** 0,00 **0,20** 0,00		**0,018** **0,091** 0,000 **0,018** 0,000
25	Skyline (7)	1	0,137	1 0 0 0 0		**1,00** **0,40** 0,00 0,00 0,00		**0,137** **0,055** 0,000 0,000 0,000
26	Utilities (8)	3	0,137	0 0 1 0 0		0,00 **0,20** **1,00** 0,00 0,00		0,000 **0,027** **0,137** 0,000 0,000
	WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H							**0,218** **0,337** **0,236** **0,305** **0,206**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	Weights Of Subsets W_F		Attributes (1-5) 1 2 3 4 5
Weighted Averages Matrix of Subset Physical V_P	1/2	Matrix K	**0,286** **0,201** **0,145** **0,364** **0,280**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,218** **0,337** **0,236** **0,305** **0,206**

Final Assessment Matrix (W_F x K)

Final Assessment Matrix - Membership Degree(R)	1	2	3	4	5
	0,252	**0,269**	**0,191**	**0,334**	**0,243**

Table E 10: Assessment Matrices for Konyaaltı Beach Middle Section , Antalya

Konyaaltı Beach Middle Section, Antalya																					
Assessment Matrices																					
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**											
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	2	0,02	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope	(1-2)	3	0,02	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,009**	**0,017**	**0,009**	0,000
3	Special Features	(1-3)	2	0,03	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type	(2-1)	4	0,03	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	4	0,03	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color	(2-3)	4	0,02	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope	(3-1)	1	0,01	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,01	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,02	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	1	0,04	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	1	0,08	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	5	0,08	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides	(7)	5	0,04	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	2	0,12	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,121**	**0,024**	0,000	0,000
15	Vistas	(9)	4	0,09	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	4	0,14	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover	(11)	1	0,12	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000
18	Seaweed	(12)	5	0,09	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,286**	**0,201**	**0,145**	**0,364**	**0,280**
Human																					
19	Disturbance Factor	(1)	4	0,14	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,027**	0,000	**0,137**	**0,027**
20	Litter	(2)	4	0,15	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
21	Sewage	(3)	5	0,15	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	1	0,06	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	2	0,14	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000
24	Access Type	(6)	2	0,09	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	1	0,14	1	0	0	0	0		**1,00**	**0,40**	0,00	0,00	0,00		**0,137**	**0,055**	0,000	0,000	0,000
26	Utilities	(8)	1	0,14	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,137**	0,000	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,355**	**0,310**	**0,100**	**0,305**	**0,206**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix					**Weights Of Subsets W_F**												**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P					1/2											**Matrix K**	**0,286**	**0,201**	**0,145**	**0,364**	**0,280**
Weighted Averages Matrix of Subset Human V_H					1/2												**0,355**	**0,310**	**0,100**	**0,305**	**0,206**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix - Membership Degree (R)																	**0,321**	**0,255**	**0,123**	**0,334**	**0,243**

Table E 11: Assessment Matrices for Konyaaltı Beach West Section , Antalya

Konyaaltı Beach West Section, Antalya																					
Assessment Matrices																					
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**											
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	2	0,019	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope	(1-2)	3	0,017	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,009**	**0,017**	**0,009**	0,000
3	Special Features	(1-3)	2	0,028	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	4	0,029	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color	(2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	2	0,122	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,121**	**0,024**	0,000	0,000
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover	(11)	1	0,117	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,286**	**0,201**	**0,145**	**0,364**	**0,280**
Human																					
19	Disturbance Factor	(1)	1	0,137	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,137**	0,000	0,000	0,000	0,000
20	Litter	(2)	3	0,149	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	4	0,137	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
24	Access Type	(6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	2	0,137	0	1	0	0	0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
26	Utilities	(8)	4	0,137	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,027**	**0,137**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,274**	**0,257**	**0,287**	**0,321**	**0,149**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix											**Weights Of Subsets W_F**						**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P											1/2					**Matrix K**	**0,286**	**0,201**	**0,145**	**0,364**	**0,280**
Weighted Averages Matrix of Subset Human V_H											1/2						**0,274**	**0,257**	**0,287**	**0,321**	**0,149**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix - Membership Degree (R)																	**0,280**	**0,229**	**0,216**	**0,343**	**0,215**

Table E 12: Assessment Matrices for Antalya Lara Barınak, Antalya

Antalya Lara Barınak, Turkey																					
Assessment Matrices																					
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**A Matrices**	**Fuzzy Assessment Matrices**					**R Matrices**						
										Grade Matrices G_i						**Fuzzy Weighted Assessment Matrix R_m**				
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	4	0,019	0	0	0	1	0	A_P	0,00	0,00	**0,50**	**1,00**	**0,50**	R_P	0,000	0,000	**0,010**	**0,019**	**0,010**
2	Cliff Slope (1-2)	5	0,017	0	0	0	0	1		0,00	0,00	0,00	**0,50**	**1,00**		0,000	0,000	0,000	**0,009**	**0,017**
3	Special Features (1-3)	5	0,028	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,028**
4	Beach Type (2-1)	1	0,034	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,034**	0,000	0,000	0,000	0,000
5	Beach Width (2-2)	1	0,029	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,029**	0,000	0,000	0,000	0,000
6	Beach Color (2-3)	1	0,024	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,024**	0,000	0,000	0,000	0,000
7	Shore Slope (3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent (3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness (3-3)	1	0,022	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,022**	0,000	0,000	0,000	0,000
10	Dunes (4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley (5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform (6)	2	0,085	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,085**	**0,025**	0,000	0,000
13	Tides (7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	4	0,122	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,20**		0,000	0,000	0,000	**0,121**	**0,024**
15	Vistas (9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color (10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover (11)	1	0,117	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000
18	Seaweed (12)	3	0,086	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,086**	**0,017**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,373**	**0,108**	**0,191**	**0,401**	**0,171**
Human																					
19	Disturbance Factor (1)	1	0,137	1	0	0	0	0	A_H	**1,00**	0,00	0,00	0,00	0,00	R_H	**0,137**	0,000	0,000	0,000	0,000
20	Litter (2)	1	0,149	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,149**	**0,030**	0,000	0,000	0,000
21	Sewage (3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment (4)	1	0,064	1	0	0	0	0		**1,00**	0,00	**0,20**	0,00	0,00		**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment (5)	4	0,137	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
24	Access Type (6)	3	0,091	0	0	1	0	0		0,00	0,00	0,00	0,00	0,00		0,000	0,000	0,000	0,000	0,000
25	Skyline (7)	2	0,137	0	1	0	0	0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
26	Utilities (8)	2	0,137	0	1	0	0	0		**0,20**	**1,00**	0,00	0,00	0,00		**0,027**	**0,137**	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																**0,432**	**0,303**	**0,111**	**0,137**	**0,149**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix										**Weights Of Subsets W_F**						**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P										1/2					**Matrix K**	**0,373**	**0,108**	**0,191**	**0,401**	**0,171**
Weighted Averages Matrix of Subset Human V_H										1/2						**0,432**	**0,303**	**0,111**	**0,137**	**0,149**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix (R) - Membership Degree																**0,403**	**0,206**	**0,151**	**0,269**	**0,160**

Table E 13: Assessment Matrices for Çıralı Mid-section

Çıralı Mid-section, Turkey																						
Assessment Matrices																						
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**												
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	3	0,019	0	0	1	0	0		0,00	**0,30**	**1,00**	**0,30**	0,00		0,000	**0,006**	**0,019**	**0,006**	0,000
2	Cliff Slope	(1-2)	4	0,017	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,50**		0,000	0,000	**0,009**	**0,017**	**0,009**
3	Special Features	(1-3)	2	0,028	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	4	0,029	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color	(2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	2	0,039	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,039**	0,000	0,000	0,000
11	Valley	(5)	4	0,079	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,10**		0,000	0,000	0,000	**0,079**	**0,008**
12	Landform	(6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas	(9)	5	0,095	0	0	0	0	1		0,00	0,00	0,00	**0,30**	**1,00**		0,000	0,000	0,000	**0,029**	**0,095**
16	Water Color	(10)	5	0,139	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,028**	**0,140**
17	Vegetation Cover	(11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,051**	**0,073**	**0,177**	**0,327**	**0,592**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	4	0,149	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment	(5)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
24	Access Type	(6)	5	0,091	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
25	Skyline	(7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
26	Utilities	(8)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	0,000	0,000	**0,072**	**0,222**	**0,881**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix											**Weights Of Subsets W_F**						**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical VP											1/2					**Matrix K**	**0,051**	**0,073**	**0,177**	**0,327**	**0,592**
Weighted Averages Matrix of Subset Human VH											1/2						**0,000**	**0,000**	**0,072**	**0,222**	**0,881**
Final Assessment Matrix (WF x K)																					
Final Assessment Matrix (R) - Membership Degree																	**0,026**	**0,036**	**0,125**	**0,275**	**0,736**

Table E 14: Assessment Matrices for Lara Beach.

Lara Beach, Turkey																						
Assessment Matrices																						
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**												
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	1	0,019	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,019**	0,000	0,000	0,000	0,000
2	Cliff Slope	(1-2)	1	0,017	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,017**	0,000	0,000	0,000	0,000
3	Special Features	(1-3)	1	0,028	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	5	0,029	0	0	0	0	1		0,00	0,00	0,00	**0,60**	**1,00**		0,000	0,000	0,000	**0,017**	**0,029**
6	Beach Color	(2-3)	3	0,024	0	0	1	0	0		0,00	0,00	**1,00**	**0,60**	0,00		0,000	0,000	**0,024**	**0,014**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform	(6)	2	0,085	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,085**	**0,025**	0,000	0,000
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	1	0,122	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,121**	**0,024**	0,000	0,000	0,000
15	Vistas	(9)	5	0,095	0	0	0	0	1		0,00	0,00	0,00	**0,30**	**1,00**		0,000	0,000	0,000	**0,029**	**0,095**
16	Water Color	(10)	3	0,139	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,070**	**0,140**	**0,070**	0,000
17	Vegetation Cover	(11)	1	0,117	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,472**	**0,202**	**0,189**	**0,181**	**0,246**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	4	0,149	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	2	0,137	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000
24	Access Type	(6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	2	0,137	0	1	0	0	0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
26	Utilities	(8)	2	0,137	0	1	0	0	0		**0,20**	**1,00**	0,00	0,00	0,00		**0,027**	**0,137**	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,164**	**0,501**	**0,127**	**0,195**	**0,316**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix											**Weights Of Subsets W_F**						**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical VP											1/2					**Matrix K**	**0,472**	**0,202**	**0,189**	**0,181**	**0,246**
Weighted Averages Matrix of Subset Human VH											1/2						**0,164**	**0,501**	**0,127**	**0,195**	**0,316**
Final Assessment Matrix (WF x K)																					
Final Assessment Matrix (R) - Membership Degree																	**0,318**	**0,352**	**0,158**	**0,188**	**0,281**

Table E 15: Assessment Matrices for Phaselis Small Bay.

Phasalis Small Bay, Turkey																					
Assessment Matrices																					
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**												
									A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	2	0,019	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope (1-2)	3	0,017	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,009**	**0,017**	**0,009**	0,000
3	Special Features (1-3)	2	0,028	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type (2-1)	5	0,034	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,034**
5	Beach Width (2-2)	3	0,029	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,006**	**0,029**	**0,006**	0,000
6	Beach Color (2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope (3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent (3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness (3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes (4)	2	0,039	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,039**	0,000	0,000	0,000
11	Valley (5)	2	0,079	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,079**	0,000	0,000	0,000
12	Landform (6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides (7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas (9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color (10)	5	0,139	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,028**	**0,140**
17	Vegetation Cover (11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed (12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,051**	**0,180**	**0,196**	**0,243**	**0,526**
Human																					
19	Disturbance Factor (1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter (2)	5	0,149	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,030**	**0,149**
21	Sewage (3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment (4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment (5)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
24	Access Type (6)	5	0,091	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,018**	**0,091**
25	Skyline (7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
26	Utilities (8)	4	0,137	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,027**	**0,137**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																0,000	0,000	**0,070**	**0,212**	**0,863**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix			**Weights Of Subsets W_F**													**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P			1/2												**Matrix K**	**0,051**	**0,180**	**0,196**	**0,243**	**0,526**
Weighted Averages Matrix of Subset Human V_H			1/2													**0,000**	**0,000**	**0,070**	**0,212**	**0,863**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix (R) - Membership Degree																**0,026**	**0,090**	**0,133**	**0,228**	**0,695**

Table E 16: Assessment Matrices for Phaselis Large Bay.

Phaselis Large Bay, Turkey																						
Assessment Matrices																						
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**A Matrices**	**Fuzzy Assessment Matrices**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
										Grade Matrices G_i											
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	2	0,019	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope (1-2)	4	0,017	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,50**		0,000	0,000	**0,009**	**0,017**	**0,009**
3	Special Features (1-3)	2	0,028	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type (2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width (2-2)	4	0,029	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,60**		0,000	0,000	**0,006**	**0,029**	**0,017**
6	Beach Color (2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope (3-1)	2	0,014	0	1	0	0	0		0,00	**1,00**	**0,50**	0,00	0,00		0,000	**0,014**	**0,007**	0,000	0,000
8	Shore Extent (3-2)	3	0,015	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,50**	0,00		0,000	**0,003**	**0,015**	**0,007**	0,000
9	Shore roughness (3-3)	4	0,022	0	0	0	1	0	A_P	0,00	0,00	**0,60**	**1,00**	**0,50**	R_P	0,000	0,000	**0,013**	**0,022**	**0,011**
10	Dunes (4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley (5)	2	0,079	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,079**	0,000	0,000	0,000
12	Landform (6)	3	0,085	0	0	1	0	0		0,00	**0,60**	**1,00**	**0,60**	0,00		0,000	**0,051**	**0,085**	**0,051**	0,000
13	Tides (7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas (9)	1	0,095	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,095**	0,000	0,000	0,000	0,000
16	Water Color (10)	5	0,139	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,028**	**0,140**
17	Vegetation Cover (11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed (12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,134**	**0,195**	**0,284**	**0,277**	**0,416**
Human																				
19	Disturbance Factor (1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter (2)	5	0,149	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,030**	**0,149**
21	Sewage (3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment (4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment (5)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
24	Access Type (6)	4	0,091	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,018**	0,000	**0,091**	**0,018**
25	Skyline (7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
26	Utilities (8)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																0,000	**0,018**	**0,043**	**0,176**	**0,927**
Weighted Averages Matrix																				
Elements of Weighted Averages Matrix				**Weights Of Subsets W_F**												**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P				1/2											**Matrix K**	**0,134**	**0,195**	**0,284**	**0,277**	**0,416**
Weighted Averages Matrix of Subset Human V_H				1/2												**0,000**	**0,018**	**0,043**	**0,176**	**0,927**
Final Assessment Matrix (W_F x K)																				
Final Assessment Matrix (R) - Membership Degree																**0,067**	**0,106**	**0,163**	**0,226**	**0,671**

Table E 17: Assessment Matrices for Tekirova North.

Tekirova North, Turkey

Assessment Matrices

No;	Assessment Parameters		Graded Attributes	Weights Of Parameters	Input Matrices d_i					A Matrices	Fuzzy Assessment Matrices: Grade Matrices G_i Attributes (1-5)					R Matrices	Fuzzy Weighted Assessment Matrix R_m Attributes (1-5)				
	Physical										1	2	3	4	5		1	2	3	4	5
1	Cliff Height	(1-1)	2	0,019	0	1	0	0	0	A_P	0,00	**1,00**	**0,30**	0,00	0,00	R_P	0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope	(1-2)	2	0,017	0	1	0	0	0		0,00	**1,00**	**0,50**	0,00	0,00		0,000	**0,017**	**0,009**	0,000	0,000
3	Special Features	(1-3)	2	0,028	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type	(2-1)	4	0,034	0	0	0	1	0		0,00	0,00	0,00	**1,00**	0,00		0,000	0,000	0,000	**0,034**	0,000
5	Beach Width	(2-2)	5	0,029	0	0	0	0	1		0,00	0,00	0,00	**0,60**	**1,00**		0,000	0,000	0,000	**0,017**	**0,029**
6	Beach Color	(2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	5	0,079	0	0	0	0	1		0,00	0,00	0,00	**0,10**	**1,00**		0,000	0,000	0,000	**0,008**	**0,079**
12	Landform	(6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	2	0,122	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,121**	**0,024**	0,000	0,000
15	Vistas	(9)	5	0,095	0	0	0	0	1		0,00	0,00	0,00	**0,30**	**1,00**		0,000	0,000	0,000	**0,029**	**0,095**
16	Water Color	(10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover	(11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,090**	**0,186**	**0,131**	**0,309**	**0,555**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1	A_H	0,00	0,00	0,00	**0,20**	**1,00**	R_H	0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	1	0,149	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,149**	**0,030**	0,000	0,000	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0		**1,00**	0,00	**0,20**	0,00	0,00		**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	2	0,137	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000
24	Access Type	(6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	4	0,137	0	0	0	1	0		0,00	0,00	**0,40**	**1,00**	0,00		0,000	0,000	**0,055**	**0,137**	0,000
26	Utilities	(8)	2	0,137	0	1	0	0	0		**0,20**	**1,00**	0,00	0,00	0,00		**0,027**	**0,137**	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_B																	**0,258**	**0,394**	**0,125**	**0,182**	**0,286**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	Weights Of Subsets W_F		Attributes (1-5) 1	2	3	4	5
Weighted Averages Matrix of Subset Physical V_P	1/2	Matrix K	**0,090**	**0,186**	**0,131**	**0,309**	**0,555**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,258**	**0,394**	**0,125**	**0,182**	**0,286**

Final Assessment Matrix (W_F x K)

Final Assessment Matrix (R) - Membership Degree						
	0,174	**0,290**	**0,128**	**0,245**	**0,421**

Table E 18: Assessment Matrices for Tekirova South.

Tekirova South, Turkey																						
Assessment Matrices																						
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**Fuzzy Assessment Matrices**												
										A Matrices	**Grade Matrices G_i**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
	Physical										**Attributes (1-5)**						**Attributes (1-5)**				
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height	(1-1)	2	0,019	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,019**	**0,006**	0,000	0,000
2	Cliff Slope	(1-2)	2	0,017	0	1	0	0	0		0,00	**1,00**	**0,50**	0,00	0,00		0,000	**0,017**	**0,009**	0,000	0,000
3	Special Features	(1-3)	2	0,028	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,028**	**0,008**	0,000	0,000
4	Beach Type	(2-1)	5	0,034	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,034**
5	Beach Width	(2-2)	5	0,029	0	0	0	0	1		0,00	0,00	0,00	**0,60**	**1,00**		0,000	0,000	0,000	**0,017**	**0,029**
6	Beach Color	(2-3)	4	0,024	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	0,00		0,000	0,000	**0,014**	**0,024**	0,000
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes	(4)	2	0,039	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,039**	0,000	0,000	0,000
11	Valley	(5)	3	0,079	0	0	1	0	0		0,00	0,00	**1,00**	0,00	0,00		0,000	0,000	**0,079**	0,000	0,000
12	Landform	(6)	4	0,085	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	**0,20**		0,000	0,000	**0,051**	**0,085**	**0,017**
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover	(11)	5	0,117	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,023**	**0,117**
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,051**	**0,103**	**0,358**	**0,426**	**0,375**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	1	0,149	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,149**	**0,030**	0,000	0,000	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment	(5)	2	0,137	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000
24	Access Type	(6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline	(7)	3	0,137	0	0	1	0	0		0,00	**0,40**	**1,00**	**0,20**	0,00		0,000	**0,055**	**0,137**	**0,027**	0,000
26	Utilities	(8)	1	0,137	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,137**	0,000	0,000	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,368**	**0,312**	**0,206**	**0,073**	**0,286**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix											**Weights Of Subsets W_F**						**Attributes (1-5)**				
																	1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P											1/2					**Matrix K**	**0,051**	**0,103**	**0,358**	**0,426**	**0,375**
Weighted Averages Matrix of Subset Human V_H											1/2						**0,368**	**0,312**	**0,206**	**0,073**	**0,286**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix (R) - Membership Degree																	**0,209**	**0,208**	**0,282**	**0,249**	**0,331**

Table E 19: Assessment Matrices for Tisan Back Bay, Mersin.

Tisan Back Bay Mersin Turkey																					
Assessment Matrices																					
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**A Matrices**	**Fuzzy Assessment Matrices**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
										Grade Matrices G_i											
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	5	0,019	0	0	0	0	1	A_P	0,00	0,00	0,00	**0,50**	**1,00**	R_P	0,000	0,000	0,000	**0,010**	**0,019**
2	Cliff Slope (1-2)	5	0,017	0	0	0	0	1		0,00	0,00	0,00	**0,50**	**1,00**		0,000	0,000	0,000	**0,009**	**0,017**
3	Special Features (1-3)	3	0,028	0	0	1	0	0		0,00	0,00	**1,00**	**0,30**	0,00		0,000	0,000	**0,028**	**0,008**	0,000
4	Beach Type (2-1)	3	0,034	0	0	1	0	0		0,00	0,00	**1,00**	0,00	0,00		0,000	0,000	**0,034**	0,000	0,000
5	Beach Width (2-2)	2	0,029	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,029**	0,000	0,000	0,000
6	Beach Color (2-3)	2	0,024	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,024**	0,000	0,000	0,000
7	Shore Slope (3-1)	2	0,014	0	1	0	0	0		0,00	**1,00**	**0,50**	0,00	0,00		0,000	**0,014**	**0,007**	0,000	0,000
8	Shore Extent (3-2)	2	0,015	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,015**	**0,003**	0,000	0,000
9	Shore roughness (3-3)	2	0,022	0	1	0	0	0		0,00	**1,00**	**0,10**	0,00	0,00		0,000	**0,022**	**0,002**	0,000	0,000
10	Dunes (4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley (5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform (6)	3	0,085	0	0	1	0	0		0,00	**0,60**	**1,00**	**0,60**	0,00		0,000	**0,051**	**0,085**	**0,051**	0,000
13	Tides (7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	4	0,122	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,20**		0,000	0,000	0,000	**0,121**	**0,024**
15	Vistas (9)	2	0,095	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,095**	0,000	0,000	0,000
16	Water Color (10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover (11)	4	0,117	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,023**	**0,117**	**0,023**
18	Seaweed (12)	4	0,086	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,017**	**0,086**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,118**	**0,250**	**0,270**	**0,542**	**0,147**
Human																					
20	Disturbance Factor (1)	5	0,137	0	0	0	0	1	A_H	0,00	0,00	0,00	**0,20**	**1,00**	R_H	0,000	0,000	0,000	**0,027**	**0,137**
21	Litter (2)	4	0,149	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**
22	Sewage (3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
23	Non-built Environment (4)	5	0,064	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,013**	0,000	**0,064**
24	Built Environment (5)	4	0,137	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
25	Access Type (6)	4	0,091	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,018**	0,000	**0,091**	**0,018**
26	Skyline (7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
27	Utilities (8)	4	0,137	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,027**	**0,137**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																0,000	**0,018**	**0,141**	**0,541**	**0,535**
Weighted Averages Matrix																					
Elements of Weighted Averages Matrix										**Weights Of Subsets W_F**						**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P										1/2					**Matrix K**	**0,118**	**0,250**	**0,270**	**0,542**	**0,147**
Weighted Averages Matrix of Subset Human V_H										1/2						**0,000**	**0,018**	**0,141**	**0,541**	**0,535**
Final Assessment Matrix (W_F x K)																					
Final Assessment Matrix (R) - Membership Degree																**0,059**	**0,134**	**0,205**	**0,541**	**0,341**

Table E 20: Assessment Matrices for Tisan Tample, Mersin.

Tisan Tample, Mersin, Turkey

Assessment Matrices

No;	Assessment Parameters		Graded Attributes	Weights Of Parameters	Input Matrices d_i					A Matrices	Fuzzy Assessment Matrices: Grade Matrices G_i Attributes (1-5)					R Matrices	Fuzzy Weighted Assessment Matrix R_m Attributes (1-5)				
	Physical										1	2	3	4	5		1	2	3	4	5
1	Cliff Height	(1-1)	3	0,019	0	0	1	0	0		0,00	**0,30**	**1,00**	**0,30**	0,00		0,000	**0,006**	**0,019**	**0,006**	0,000
2	Cliff Slope	(1-2)	3	0,017	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,009**	**0,017**	**0,009**	0,000
3	Special Features	(1-3)	1	0,028	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,028**	0,000	0,000	0,000	0,000
4	Beach Type	(2-1)	3	0,034	0	0	1	0	0		0,00	0,00	**1,00**	0,00	0,00		0,000	0,000	**0,034**	0,000	0,000
5	Beach Width	(2-2)	2	0,029	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,029**	0,000	0,000	0,000
6	Beach Color	(2-3)	3	0,024	0	0	1	0	0		0,00	0,00	**1,00**	**0,60**	0,00		0,000	0,000	**0,024**	**0,014**	0,000
7	Shore Slope	(3-1)	3	0,014	0	0	1	0	0		0,00	**0,50**	**1,00**	**0,50**	0,00		0,000	**0,007**	**0,014**	**0,007**	0,000
8	Shore Extent	(3-2)	2	0,015	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,015**	**0,003**	0,000	0,000
9	Shore roughness	(3-3)	3	0,022	0	0	1	0	0	A_P	0,00	**0,10**	**1,00**	**0,60**	0,00	R_P	0,000	**0,002**	**0,022**	**0,013**	0,000
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley	(5)	2	0,079	0	1	0	0	0		0,00	**1,00**	0,00	0,00	0,00		0,000	**0,079**	0,000	0,000	0,000
12	Landform	(6)	4	0,085	0	0	0	1	0		0,00	0,00	**0,60**	**1,00**	**0,20**		0,000	0,000	**0,051**	**0,085**	**0,017**
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features	(8)	4	0,122	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,20**		0,000	0,000	0,000	**0,121**	**0,024**
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**
16	Water Color	(10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover	(11)	4	0,117	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,023**	**0,117**	**0,023**
18	Seaweed	(12)	4	0,086	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,017**	**0,086**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,067**	**0,146**	**0,295**	**0,693**	**0,157**
Human																					
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**
20	Litter	(2)	3	0,149	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment	(4)	5	0,064	0	0	0	0	1	A_H	0,00	0,00	**0,20**	0,00	**1,00**	R_H	0,000	0,000	**0,013**	0,000	**0,064**
23	Built Environment	(5)	3	0,137	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,027**	**0,137**	**0,027**	0,000
24	Access Type	(6)	4	0,091	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,018**	0,000	**0,091**	**0,018**
25	Skyline	(7)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,137**
26	Utilities	(8)	3	0,137	0	0	1	0	0		0,00	**0,20**	**1,00**	0,00	0,00		0,000	**0,027**	**0,137**	0,000	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	0,000	**0,103**	**0,465**	**0,176**	**0,505**

Weighted Averages Matrix

Elements of Weighted Averages Matrix	Weights Of Subsets W_F		Attributes (1-5) 1	2	3	4	5
Weighted Averages Matrix of Subset Physical V_P	1/2	Matrix K	**0,067**	**0,146**	**0,295**	**0,693**	**0,157**
Weighted Averages Matrix of Subset Human V_H	1/2		**0,000**	**0,103**	**0,465**	**0,176**	**0,505**

Final Assessment Matrix (W_F x K)

Final Assessment Matrix (R) Membership Degree							
			0,033	**0,124**	**0,380**	**0,435**	**0,331**

Table E 21: Assessment Matrices for Antalya Waterfalls.

Antalya Waterfalls, Turkey																							
Assessment Matrices																							
No;	**Assessment Parameters**		**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**A Matrices**	**Fuzzy Assessment Matrices**												
											Grade Matrices G_i					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**					
	Physical										**Attributes (1-5)**						**Attributes (1-5)**					
											1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**	
1	Cliff Height	(1-1)	4	0,019	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,50**		0,000	0,000	**0,010**	**0,019**	**0,010**	
2	Cliff Slope	(1-2)	5	0,017	0	0	0	0	1		0,00	0,00	0,00	**0,50**	**1,00**		0,000	0,000	0,000	**0,009**	**0,017**	
3	Special Features	(1-3)	5	0,028	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,028**	
4	Beach Type	(2-1)	1	0,034	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,034**	0,000	0,000	0,000	0,000	
5	Beach Width	(2-2)	1	0,029	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,029**	0,000	0,000	0,000	0,000	
6	Beach Color	(2-3)	1	0,024	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,024**	0,000	0,000	0,000	0,000	
7	Shore Slope	(3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000	
8	Shore Extent	(3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000	
9	Shore roughness	(3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000	
10	Dunes	(4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000	
11	Valley	(5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000	
12	Landform	(6)	2	0,085	0	1	0	0	0		0,00	**1,00**	**0,30**	0,00	0,00		0,000	**0,085**	**0,025**	0,000	0,000	
13	Tides	(7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**	
14	Landscape Features	(8)	5	0,122	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,121**	
15	Vistas	(9)	4	0,095	0	0	0	1	0		0,00	0,00	0,00	**1,00**	**0,30**		0,000	0,000	0,000	**0,095**	**0,029**	
16	Water Color	(10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**	
17	Vegetation Cover	(11)	1	0,117	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000	
18	Seaweed	(12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**	
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																	**0,373**	**0,108**	**0,105**	**0,279**	**0,354**	
Human																						
19	Disturbance Factor	(1)	5	0,137	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,027**	**0,137**	
20	Litter	(2)	4	0,149	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	**0,20**		0,000	0,000	**0,030**	**0,149**	**0,030**	
21	Sewage	(3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**	
22	Non-built Environment	(4)	1	0,064	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000	
23	Built Environment	(5)	2	0,137	0	1	0	0	0		0,00	**1,00**	**0,20**	0,00	0,00		0,000	**0,137**	**0,027**	0,000	0,000	
24	Access Type	(6)	1	0,091	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,091**	**0,018**	0,000	0,000	0,000	
25	Skyline	(7)	1	0,137	1	0	0	0	0		**1,00**	**0,40**	0,00	0,00	0,00		**0,137**	**0,055**	0,000	0,000	0,000	
26	Utilities	(8)	2	0,137	0	1	0	0	0		**0,20**	**1,00**	0,00	0,00	0,00		**0,027**	**0,137**	0,000	0,000	0,000	
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																	**0,319**	**0,346**	**0,100**	**0,177**	**0,316**	
Weighted Averages Matrix																						
Elements of Weighted Averages Matrix											**Weights Of Subsets W_F**						**Attributes (1-5)**					
																	1	**2**	**3**	**4**	**5**	
Weighted Averages Matrix of Subset Physical V_P											1/2					**Matrix K**	**0,373**	**0,108**	**0,105**	**0,279**	**0,354**	
Weighted Averages Matrix of Subset Human V_H											1/2						**0,319**	**0,346**	**0,100**	**0,177**	**0,316**	
Final Assessment Matrix (W_F x K)																						
Final Assessment Matrix (R) - Membership Degree																	**0,346**	**0,227**	**0,102**	**0,228**	**0,335**	

Table E 22: Assessment Matrices for Antalya Old Harbour.

Antalya Old Harbour, Turkey																						
Assessment Matrices																						
No;	**Assessment Parameters**	**Graded Attributes**	**Weights Of Parameters**	**Input Matrices d_i**					**A Matrices**	**Fuzzy Assessment Matrices**					**R Matrices**	**Fuzzy Weighted Assessment Matrix R_m**				
										Grade Matrices G_i											
	Physical									**Attributes (1-5)**						**Attributes (1-5)**				
										1	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
1	Cliff Height (1-1)	3	0,019	0	0	1	0	0		0,00	**0,30**	**1,00**	**0,30**	0,00		0,000	**0,006**	**0,019**	**0,006**	0,000
2	Cliff Slope (1-2)	4	0,017	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,50**		0,000	0,000	**0,009**	**0,017**	**0,009**
3	Special Features (1-3)	5	0,028	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,028**
4	Beach Type (2-1)	1	0,034	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,034**	0,000	0,000	0,000	0,000
5	Beach Width (2-2)	1	0,029	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,029**	0,000	0,000	0,000	0,000
6	Beach Color (2-3)	1	0,024	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,024**	0,000	0,000	0,000	0,000
7	Shore Slope (3-1)	1	0,014	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,014**	0,000	0,000	0,000	0,000
8	Shore Extent (3-2)	1	0,015	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,015**	0,000	0,000	0,000	0,000
9	Shore roughness (3-3)	1	0,022	1	0	0	0	0	A_P	**1,00**	0,00	0,00	0,00	0,00	R_P	**0,022**	0,000	0,000	0,000	0,000
10	Dunes (4)	1	0,039	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,039**	0,000	0,000	0,000	0,000
11	Valley (5)	1	0,079	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,079**	0,000	0,000	0,000	0,000
12	Landform (6)	5	0,085	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,085**
13	Tides (7)	5	0,036	0	0	0	0	1		0,00	0,00	0,00	0,00	**1,00**		0,000	0,000	0,000	0,000	**0,036**
14	Landscape Features (8)	3	0,122	0	0	1	0	0		0,00	0,00	**1,00**	**0,20**	0,00		0,000	0,000	**0,121**	**0,024**	0,000
15	Vistas (9)	1	0,095	1	0	0	0	0		**1,00**	0,00	0,00	0,00	0,00		**0,095**	0,000	0,000	0,000	0,000
16	Water Color (10)	4	0,139	0	0	0	1	0		0,00	0,00	**0,50**	**1,00**	**0,20**		0,000	0,000	**0,070**	**0,140**	**0,028**
17	Vegetation Cover (11)	1	0,117	1	0	0	0	0		**1,00**	**0,20**	0,00	0,00	0,00		**0,117**	**0,023**	0,000	0,000	0,000
18	Seaweed (12)	5	0,086	0	0	0	0	1		0,00	0,00	0,00	**0,20**	**1,00**		0,000	0,000	0,000	**0,017**	**0,086**
WEIGHTED AVERAGES MATRIX FOR SUBSET PHYSICAL V_P																**0,468**	**0,029**	**0,219**	**0,221**	**0,272**
Human																				
19	Disturbance Factor (1)	4	0,137	0	0	0	1	0		0,00	**0,20**	0,00	**1,00**	**0,20**		0,000	**0,027**	0,000	**0,137**	**0,027**
20	Litter (2)	3	0,149	0	0	1	0	0		0,00	**0,20**	**1,00**	**0,20**	0,00		0,000	**0,030**	**0,149**	**0,030**	0,000
21	Sewage (3)	5	0,149	0	0	0	0	1		0,00	0,00	**0,20**	0,00	**1,00**		0,000	0,000	**0,030**	0,000	**0,149**
22	Non-built Environment (4)	1	0,064	1	0	0	0	0	A_H	**1,00**	0,00	**0,20**	0,00	0,00	R_H	**0,064**	0,000	**0,013**	0,000	0,000
23	Built Environment (5)	4	0,137	0	0	0	1	0		0,00	0,00	**0,30**	**1,00**	0,00		0,000	0,000	**0,041**	**0,137**	0,000
24	Access Type (6)	2	0,091	0	1	0	0	0		**0,20**	**1,00**	0,00	**0,20**	0,00		**0,018**	**0,091**	0,000	**0,018**	0,000
25	Skyline (7)	2	0,137	0	1	0	0	0		**0,40**	**1,00**	**0,20**	0,00	0,00		**0,055**	**0,137**	**0,027**	0,000	0,000
26	Utilities (8)	4	0,137	0	0	0	1	0		0,00	0,00	**0,20**	**1,00**	0,00		0,000	0,000	**0,027**	**0,137**	0,000
WEIGHTED AVERAGES MATRIX FOR SUBSET HUMAN V_H																**0,137**	**0,285**	**0,287**	**0,459**	**0,177**
Weighted Averages Matrix																				
Elements of Weighted Averages Matrix									**Weights Of Subsets W_F**							**Attributes (1-5)**				
																1	**2**	**3**	**4**	**5**
Weighted Averages Matrix of Subset Physical V_P									1/2						**Matrix K**	**0,468**	**0,029**	**0,219**	**0,221**	**0,272**
Weighted Averages Matrix of Subset Human V_H									1/2							**0,137**	**0,285**	**0,287**	**0,459**	**0,177**
Final Assessment Matrix (W_F x K)																				
Final Assessment Matrix (R) - Membrship Degree																**0,302**	**0,157**	**0,253**	**0,340**	**0,224**

APPENDIX F

ASSESSMENT HISTOGRAMS

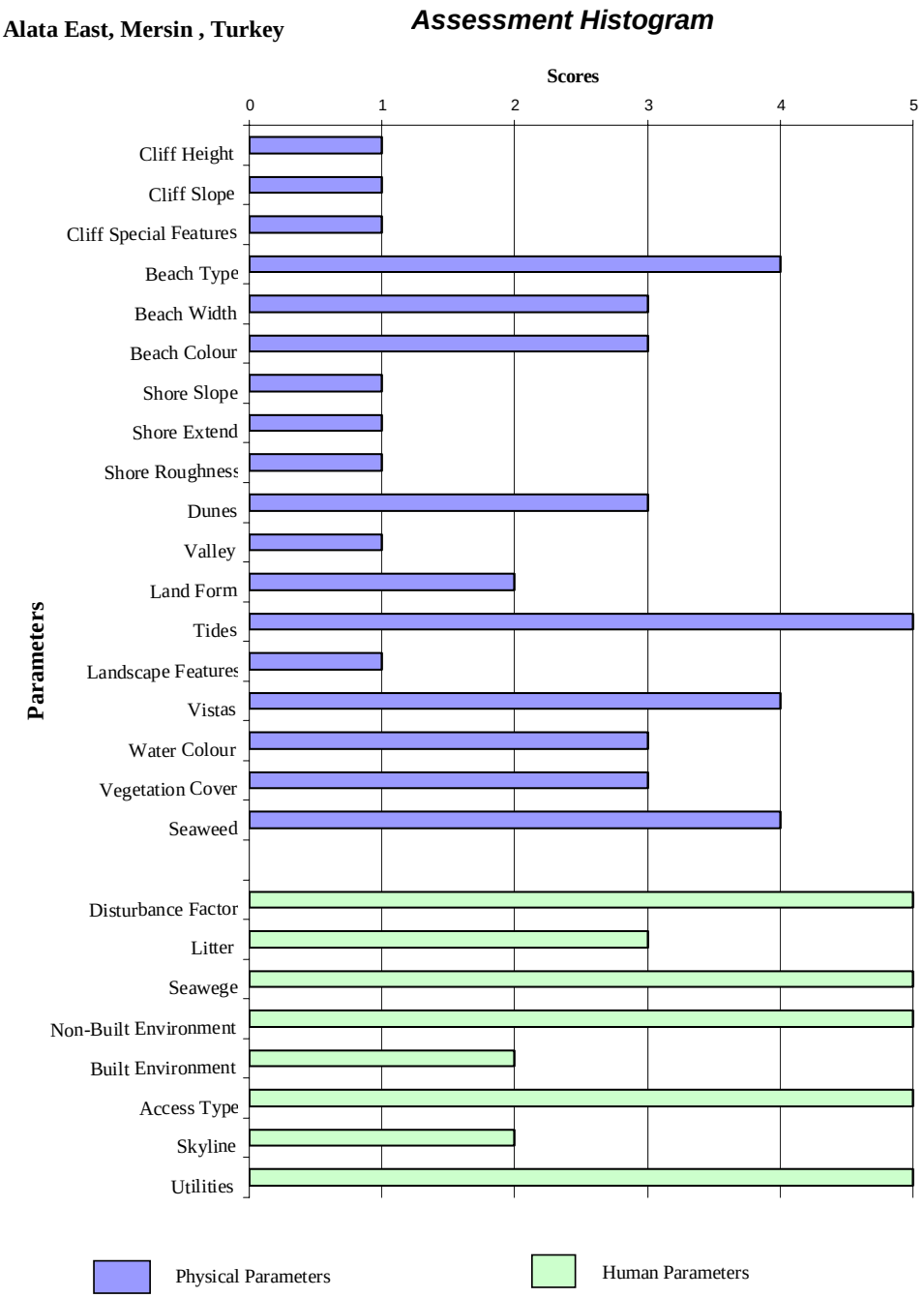


Figure F 1: Assessment Histogram of Alata East Mersin

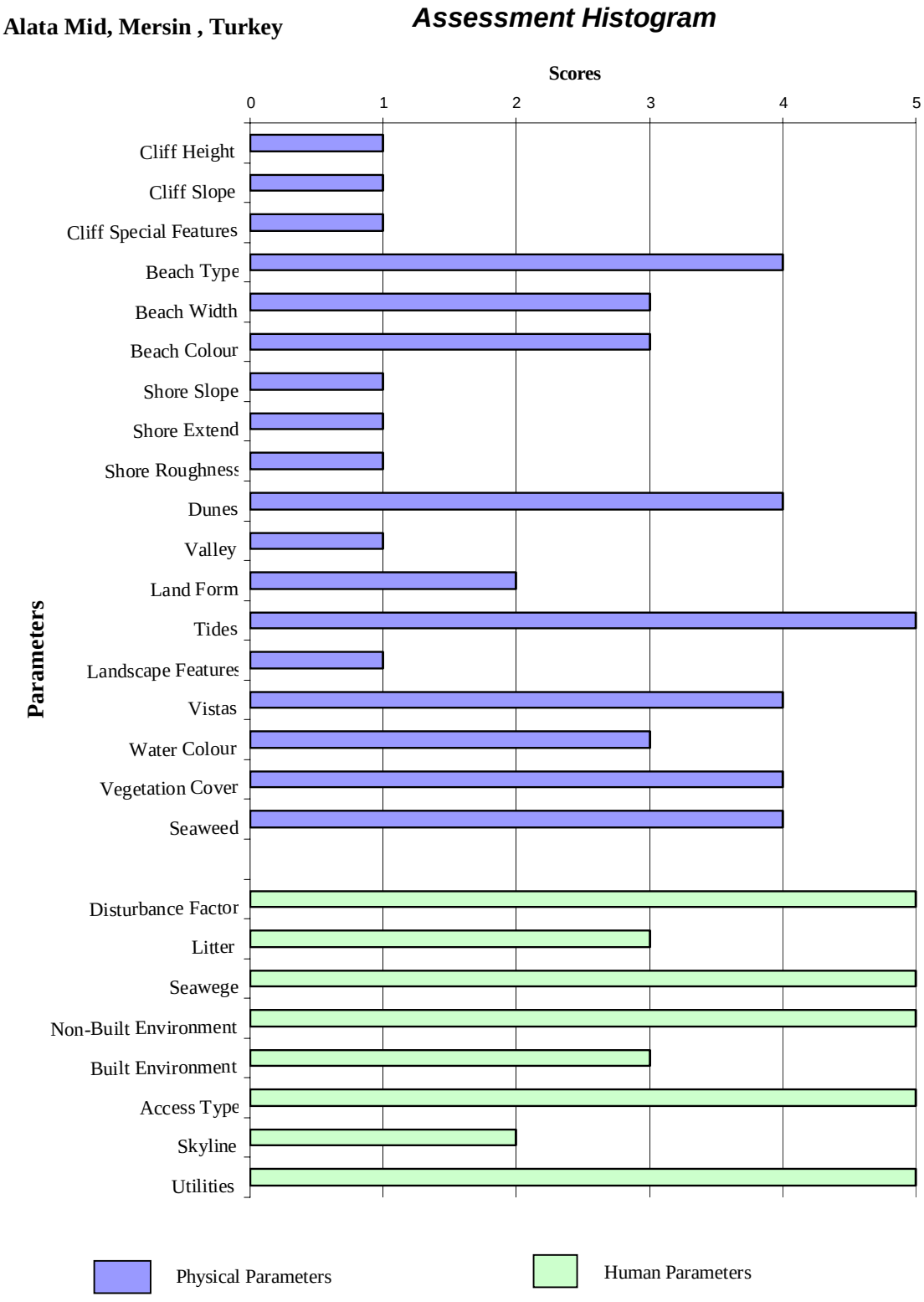


Figure F 2: Assessment Histogram of Alata Mid Mersin

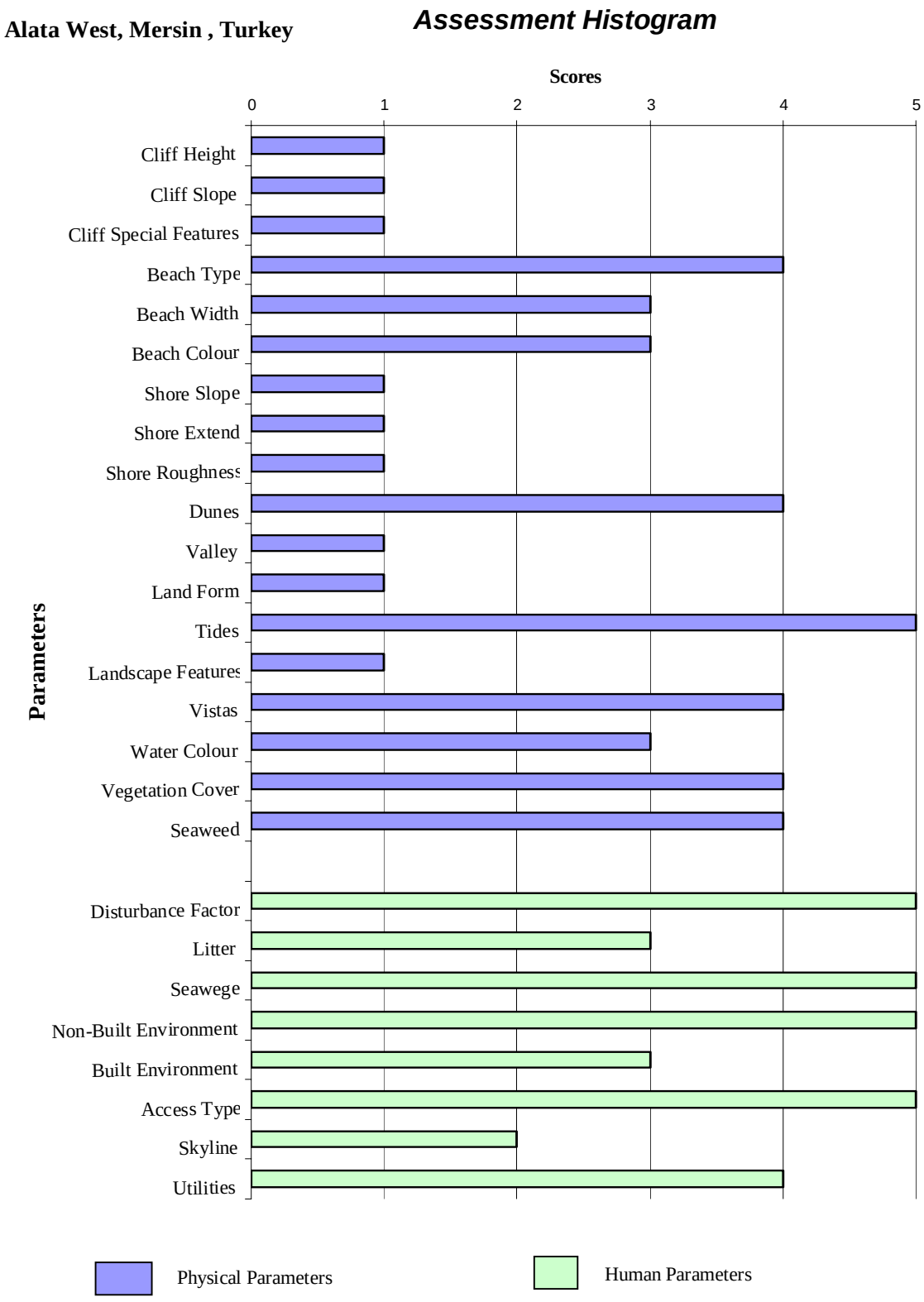


Figure F 3: Assessment Histogram of Alata West Mersin

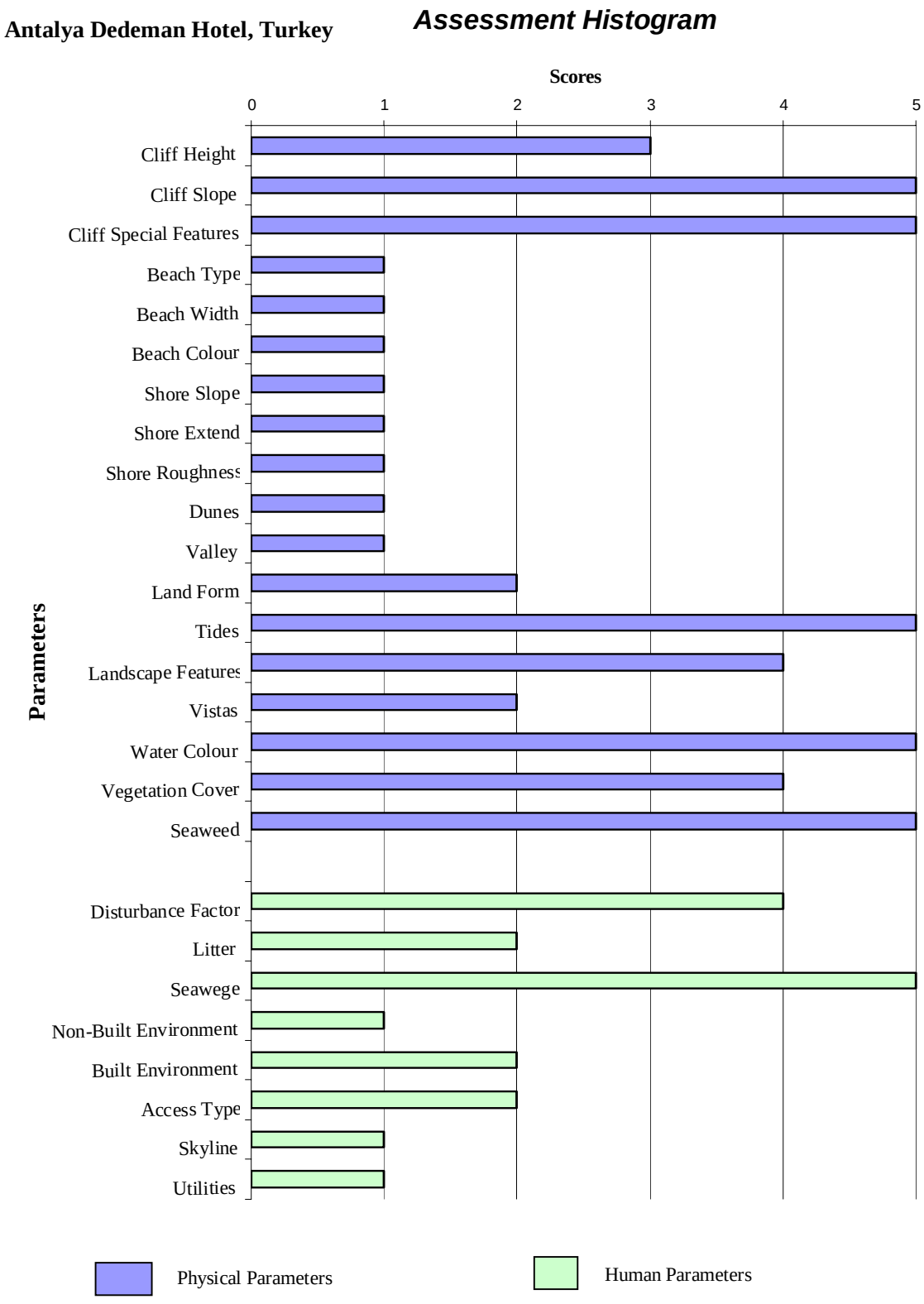


Figure F 4: Assessment Histogram of Antalya Dedeman Hotel Region

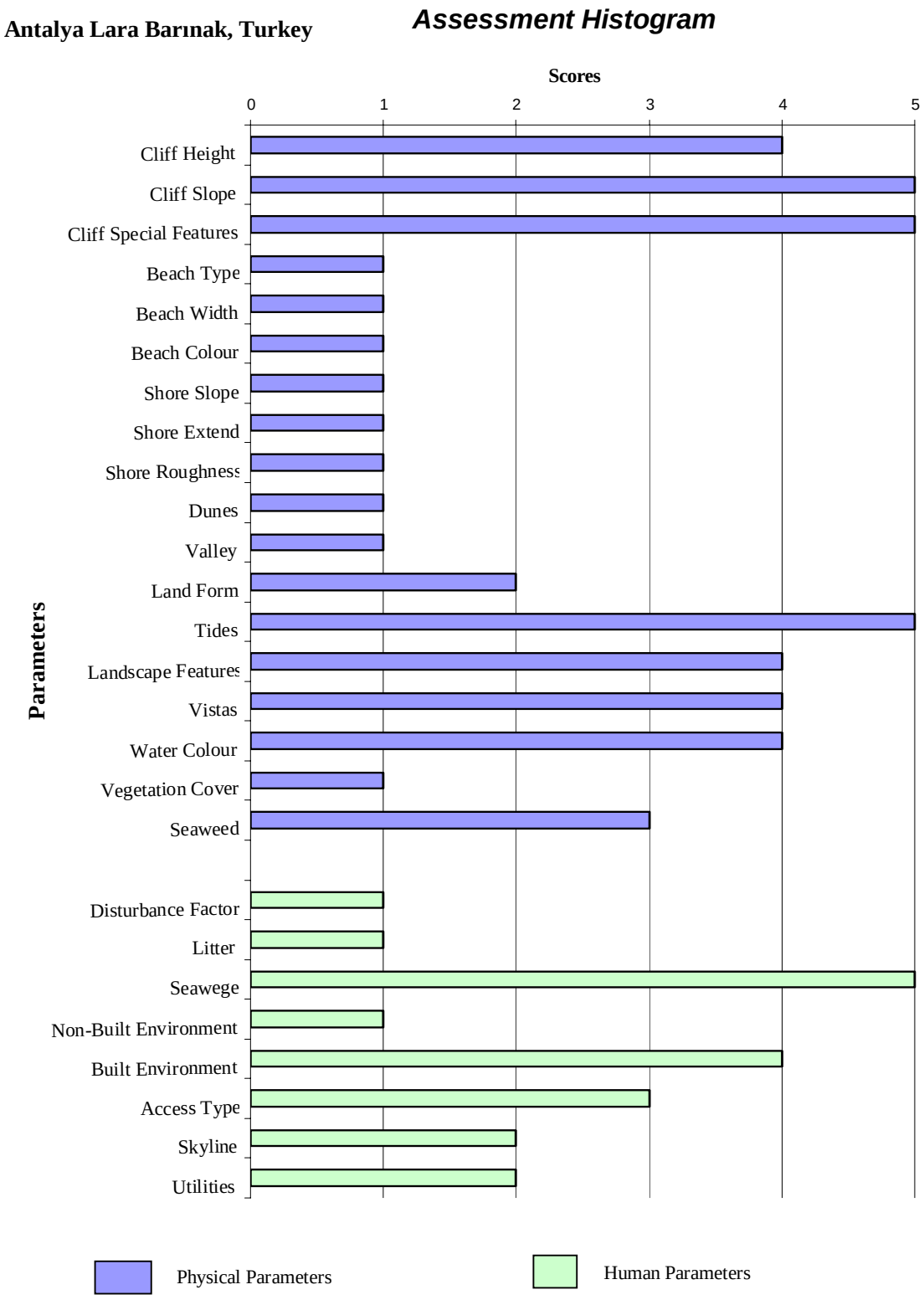


Figure F 5: Assessment Histogram of Antalya Lara Barınak

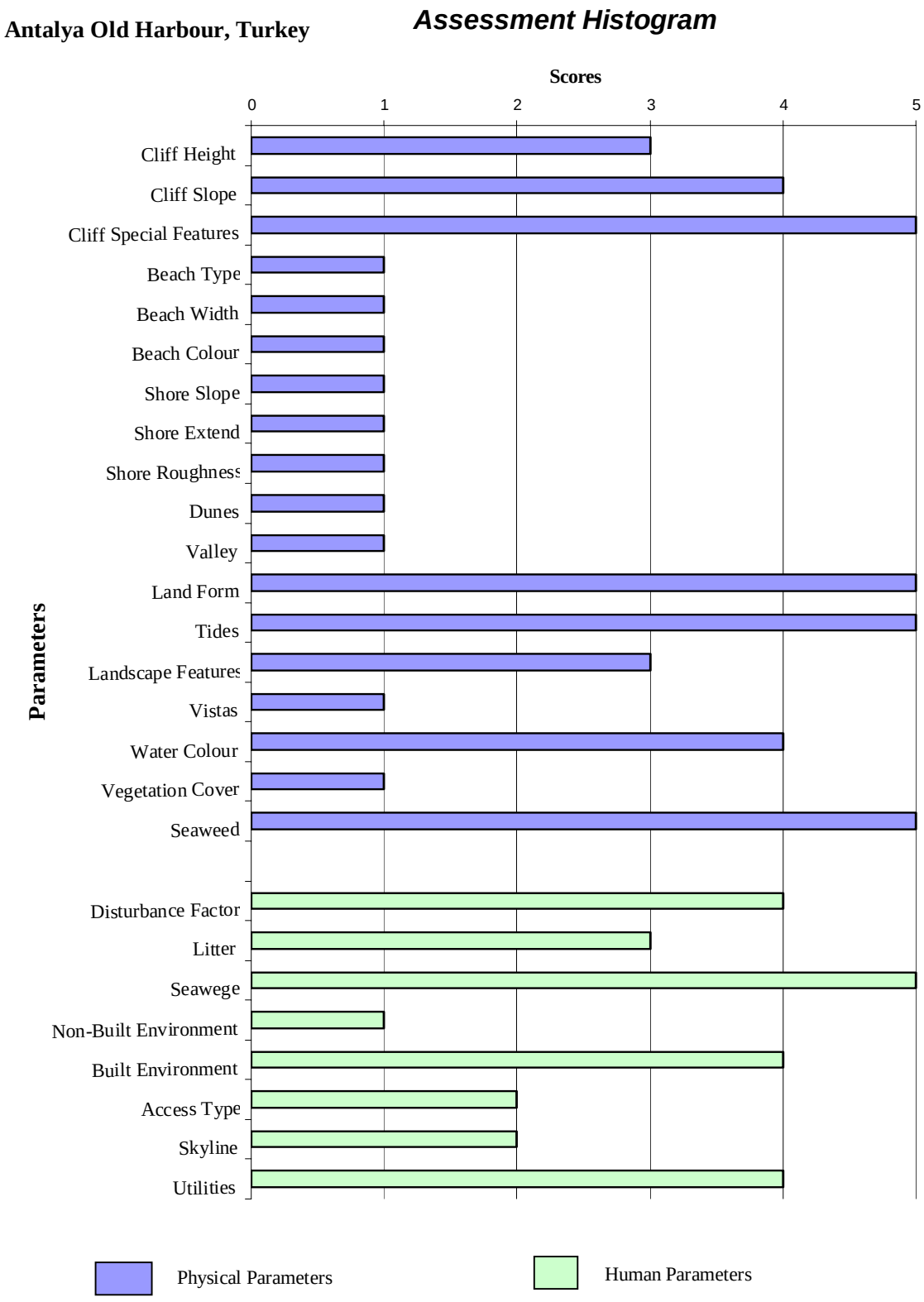


Figure F 6: Assessment Histogram of Antalya Old Harbour

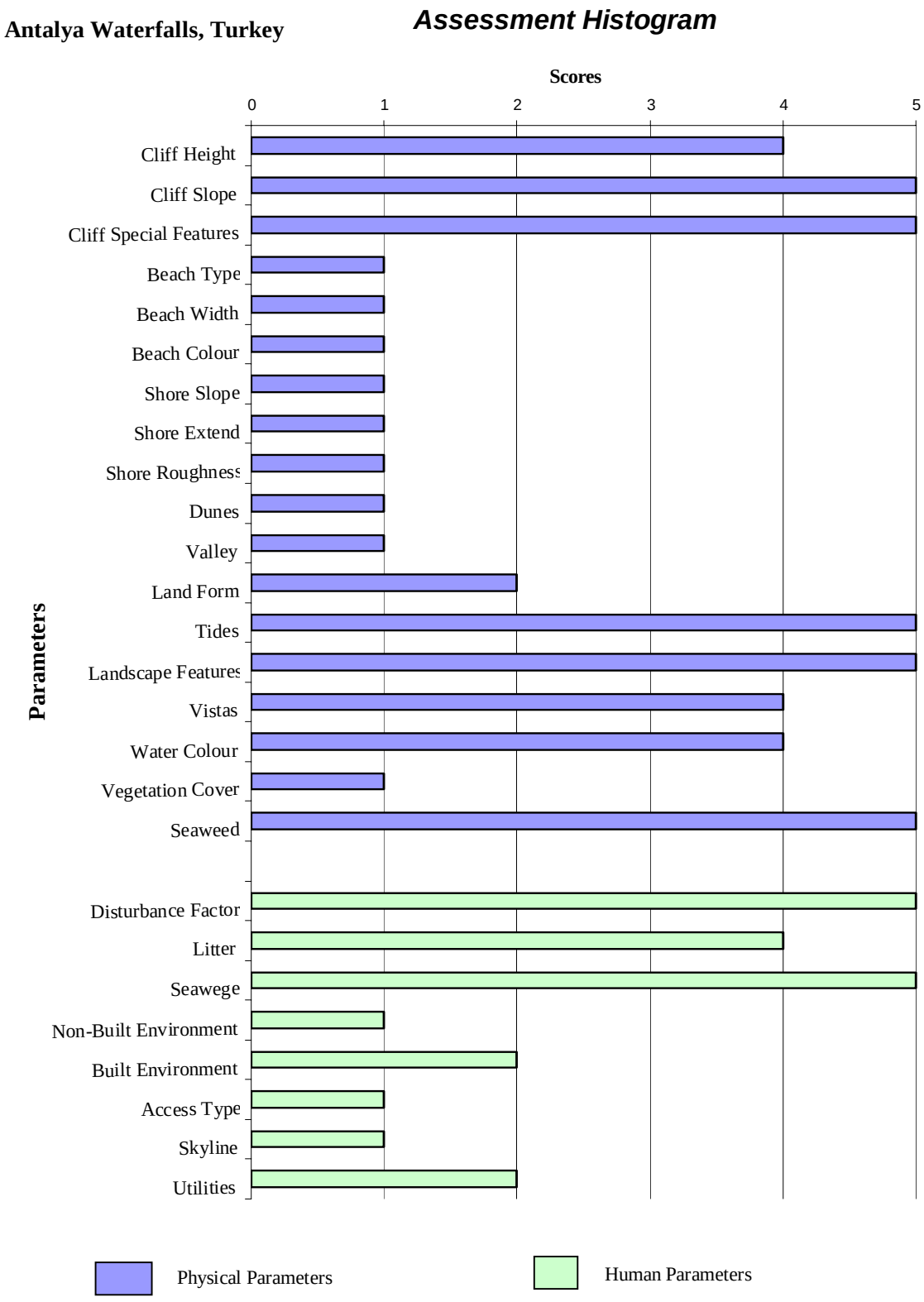


Figure F 7: Assessment Histogram of Antalya Waterfalls

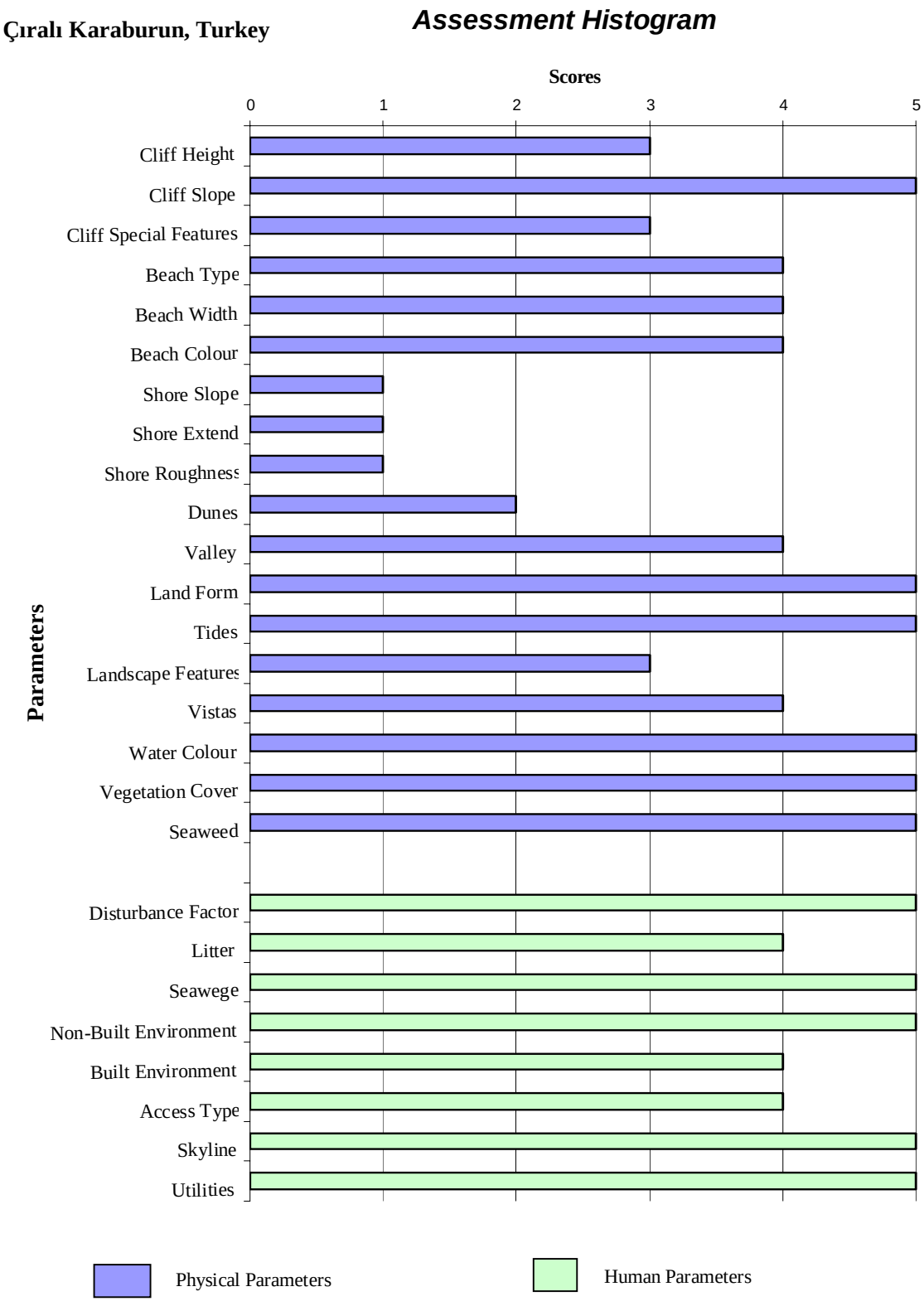


Figure F 8: Assessment Histogram of Çıralı Karaburun Kemer.

Figure F 9: Assessm9nt Histogram of Çıralı Mid Section, Kemer.

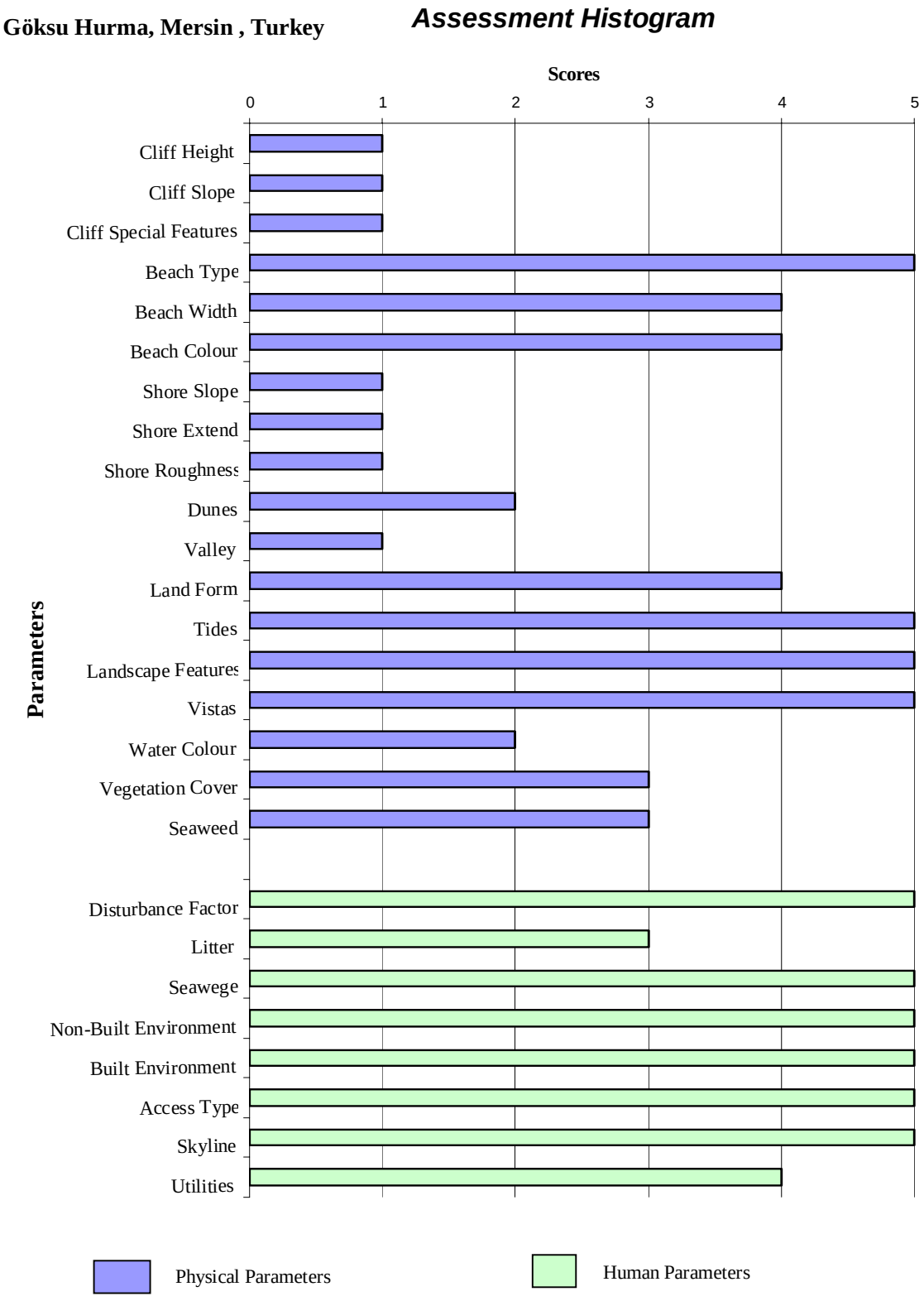


Figure F 10: Assessment Histogram of Göksu Hurma, Mersin.

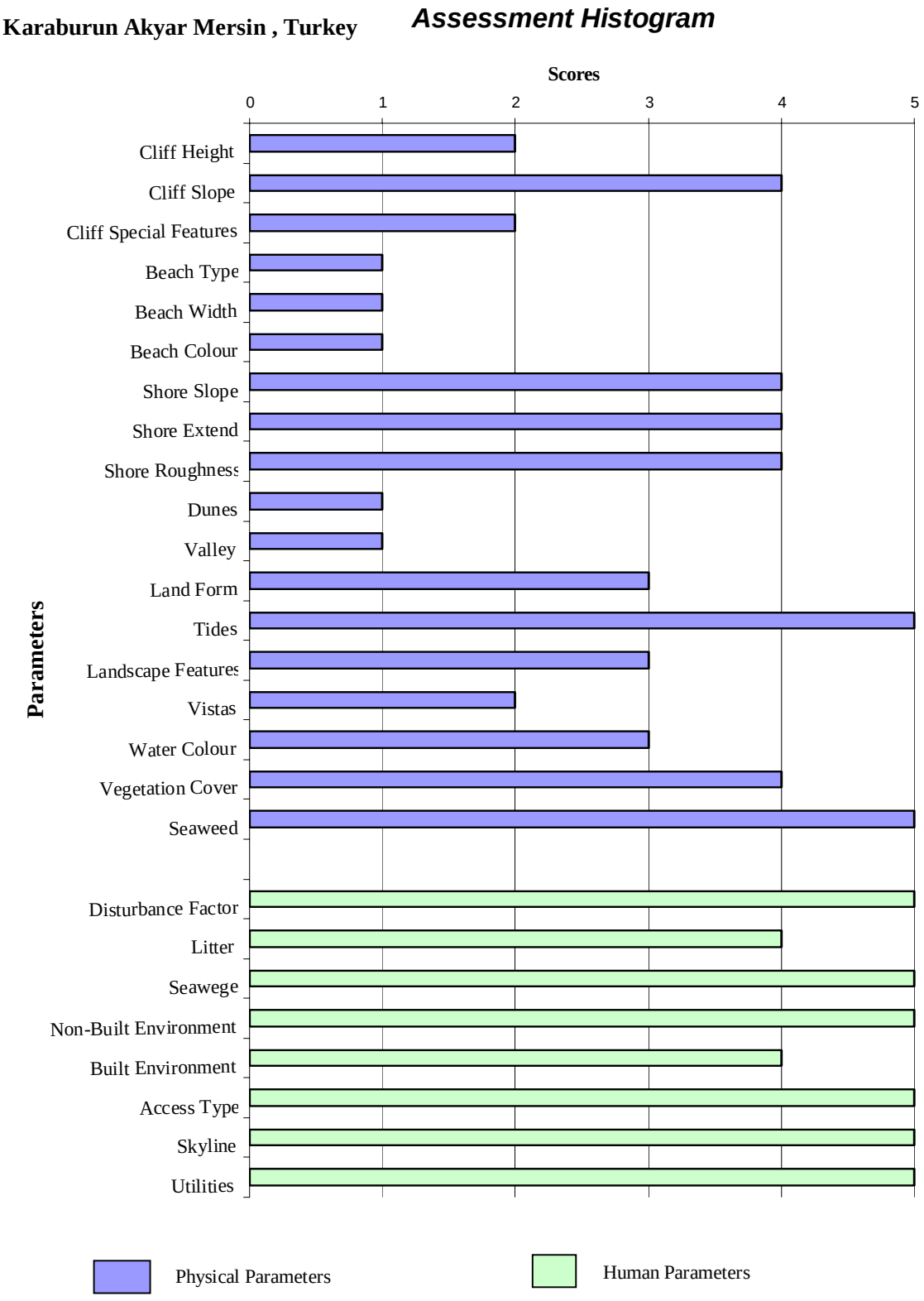


Figure F 11: Assessment Histogram of Karaburun Akyar Mersin.

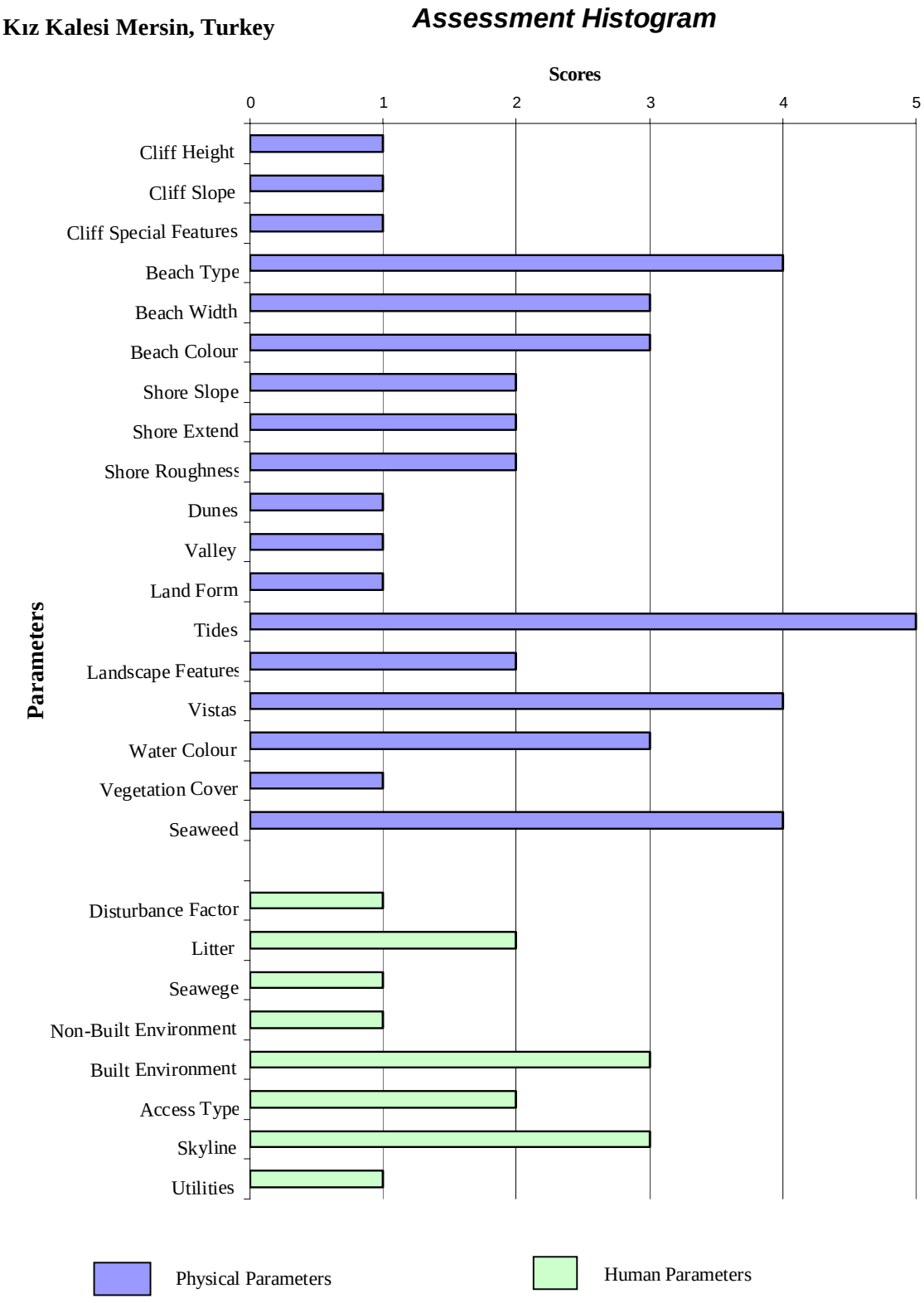


Figure F 12: Assessment Histogram of Kızkalesi Mersin.

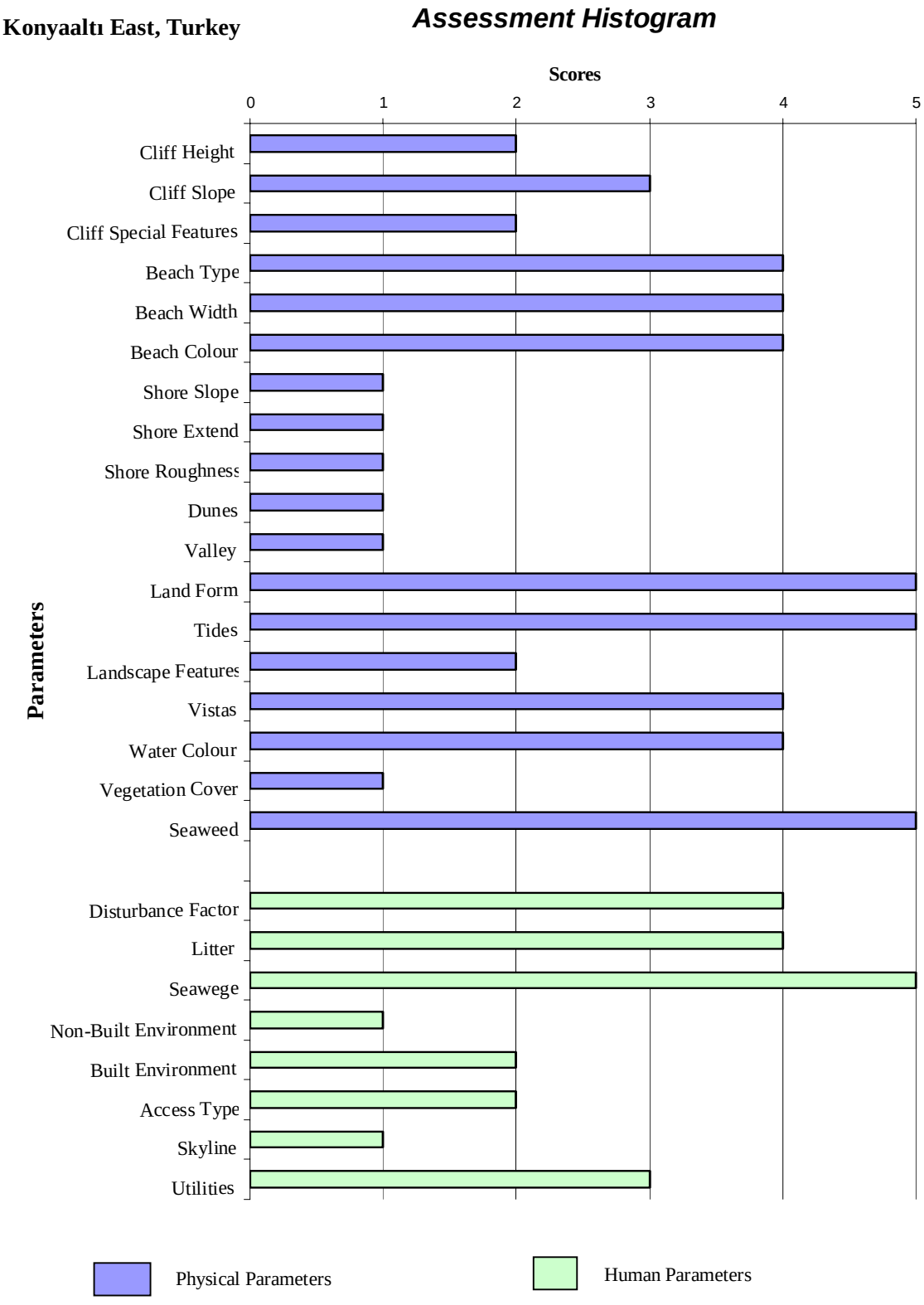


Figure F 13: Assessment Histogram of Konyaaltı East Antalya.

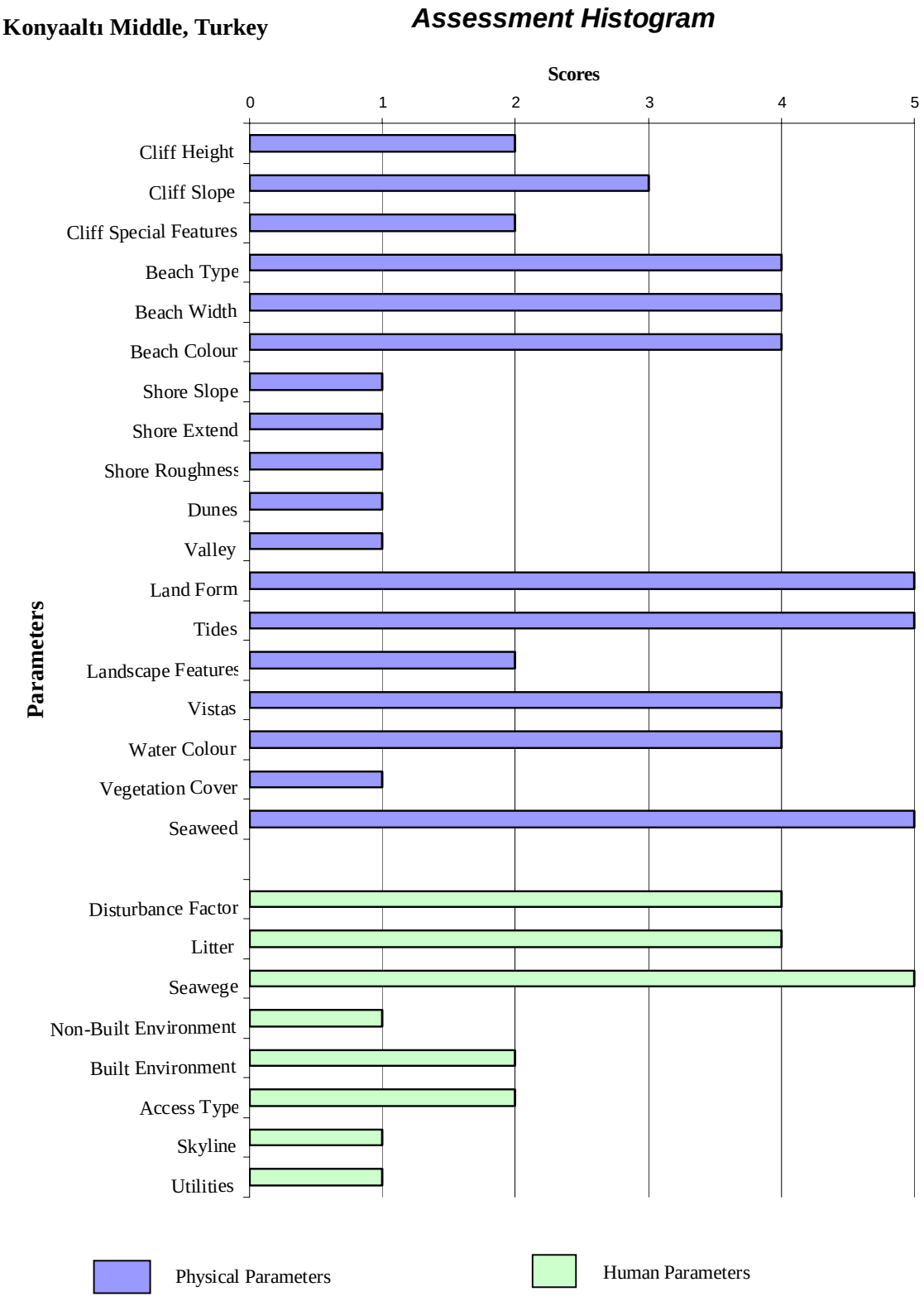


Figure F 14: Assessment Histogram of Konyaaltı East Antalya.

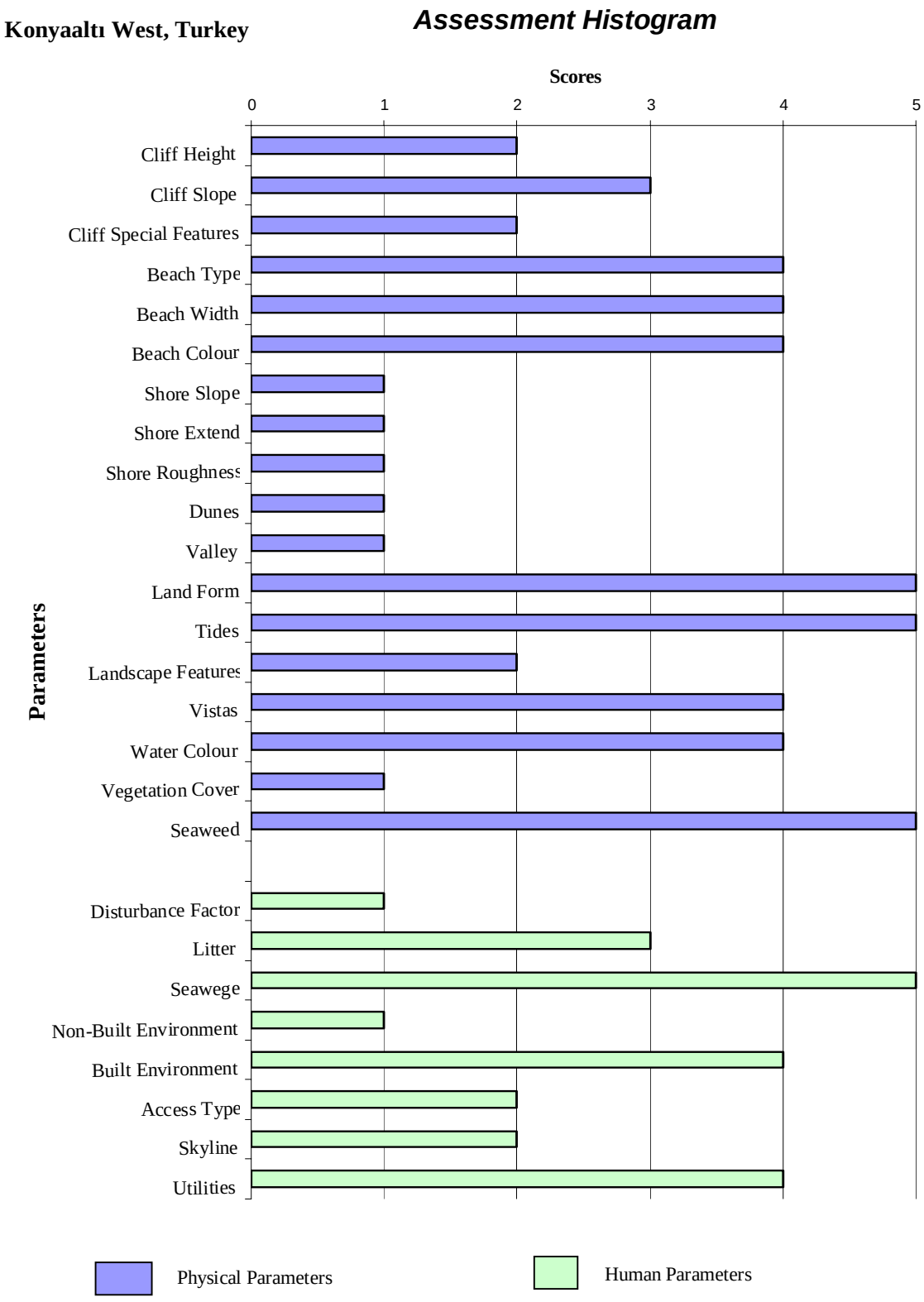


Figure F 15: Assessment Histogram of Konyaaltı West Antalya.

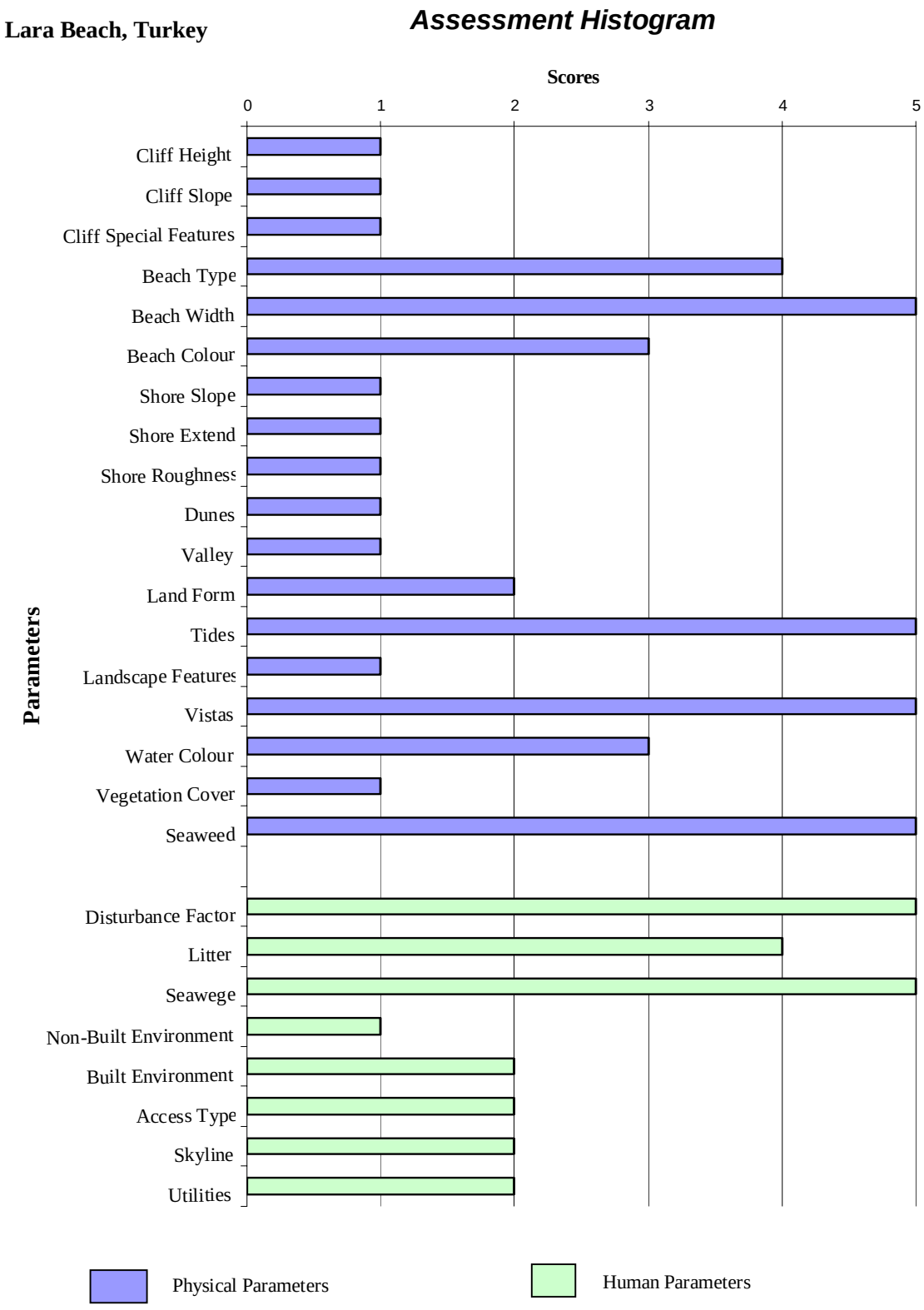


Figure F 16: Assessment Histogram of Lara Beach Antalya.

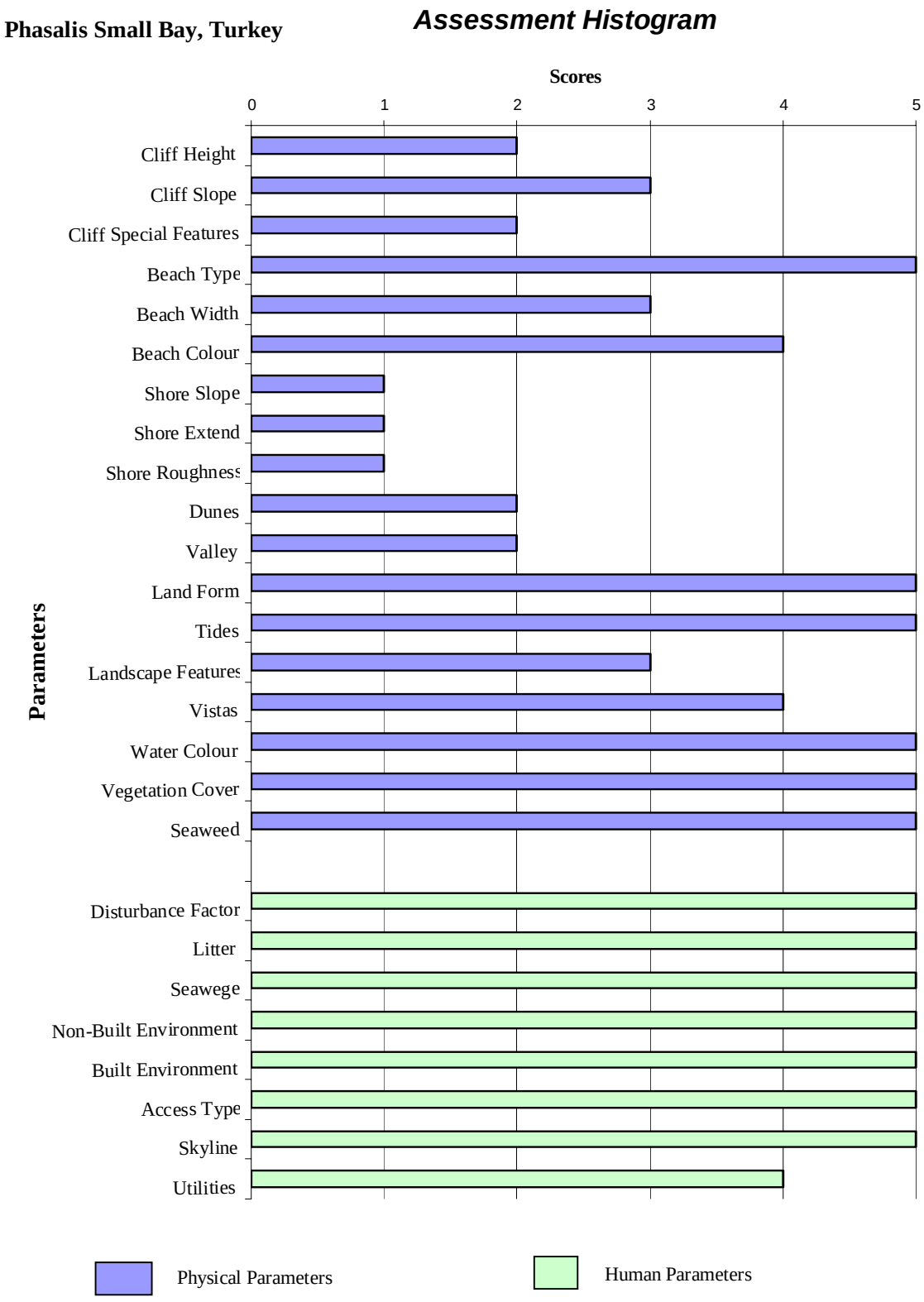


Figure F 17: Assessment Histogram of Phaselis Small Bay.

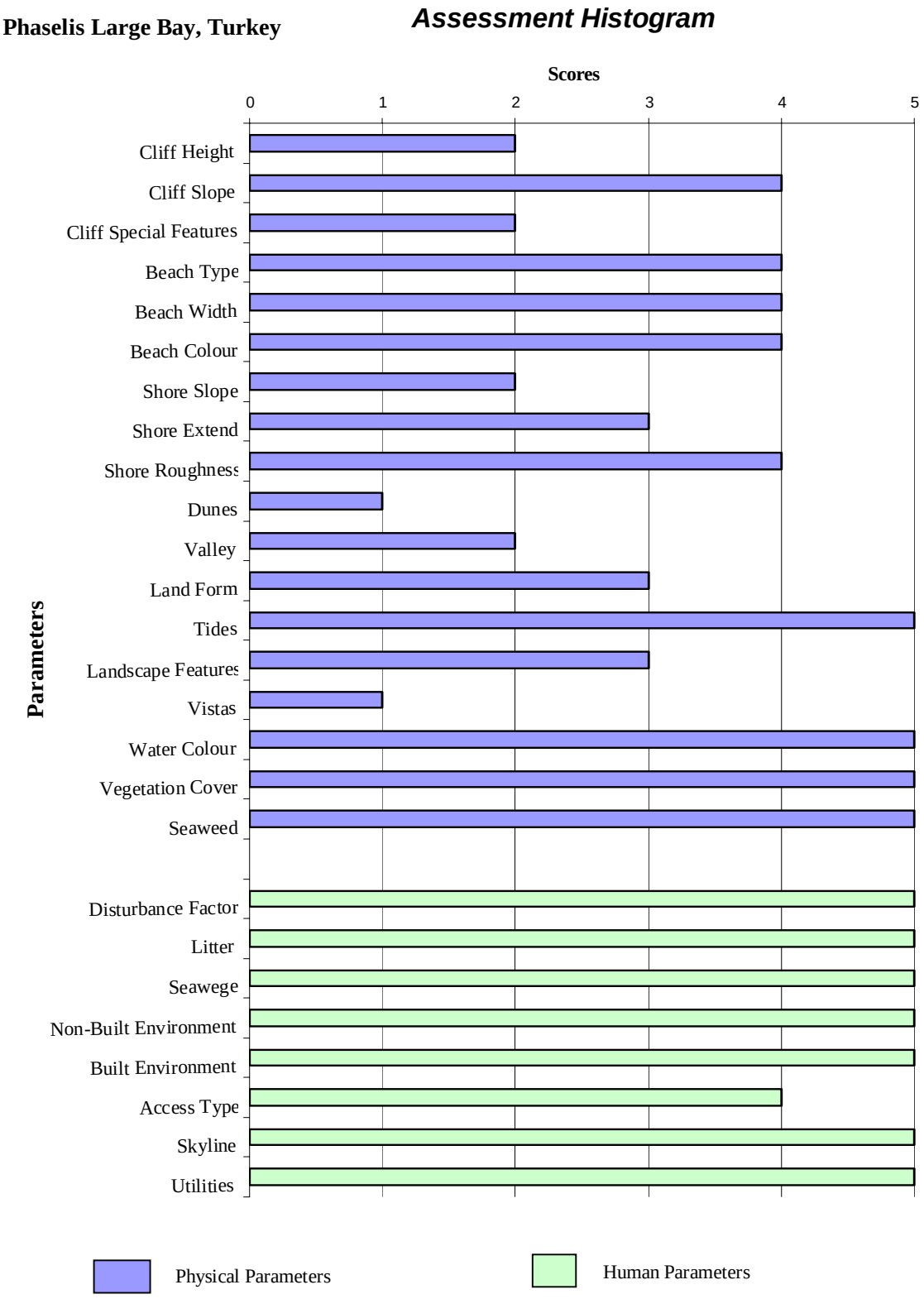


Figure F 18: Assessment Histogram of Phaselis Large Bay

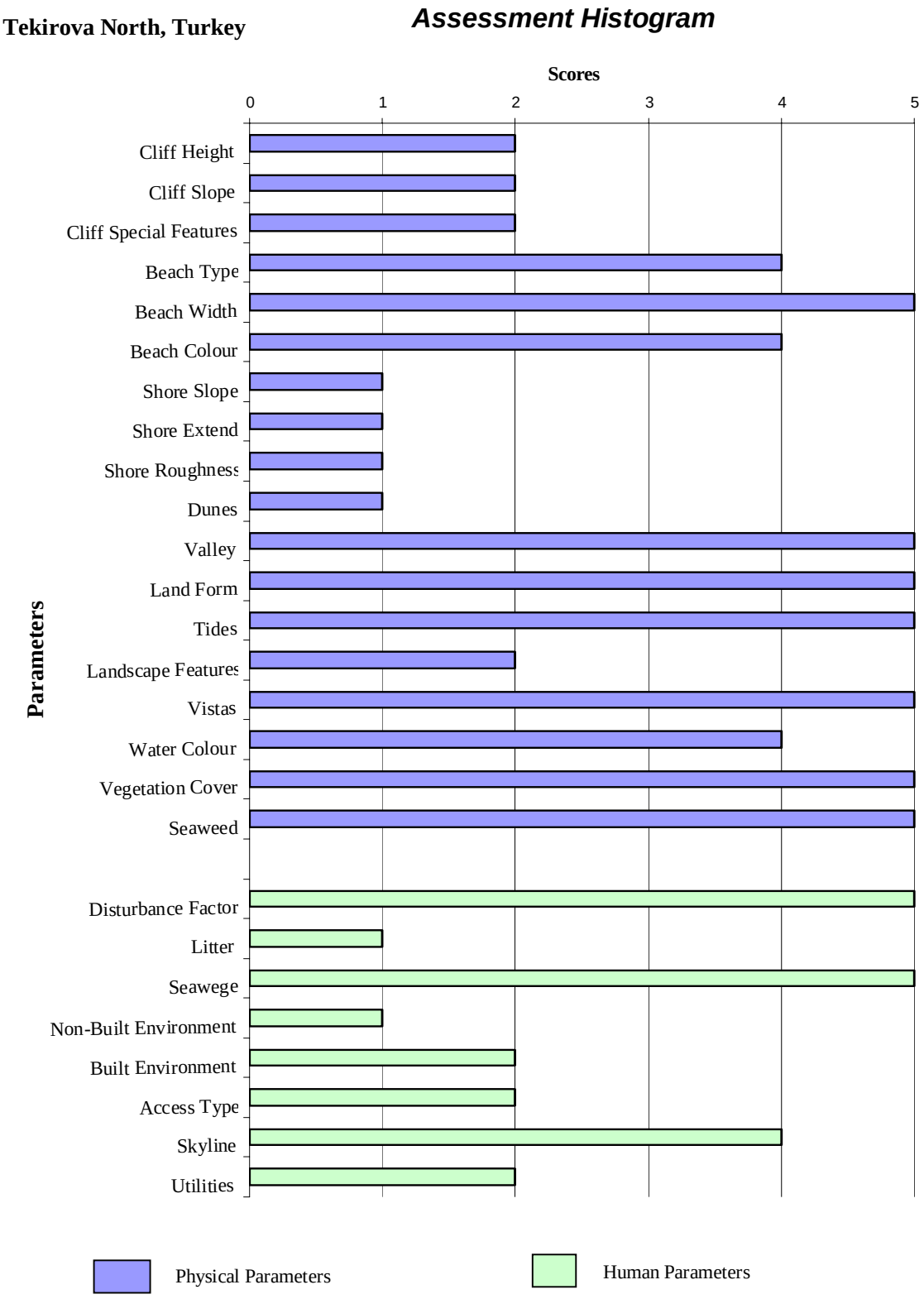


Figure F 19: Assessment Histogram of Tekirova North.

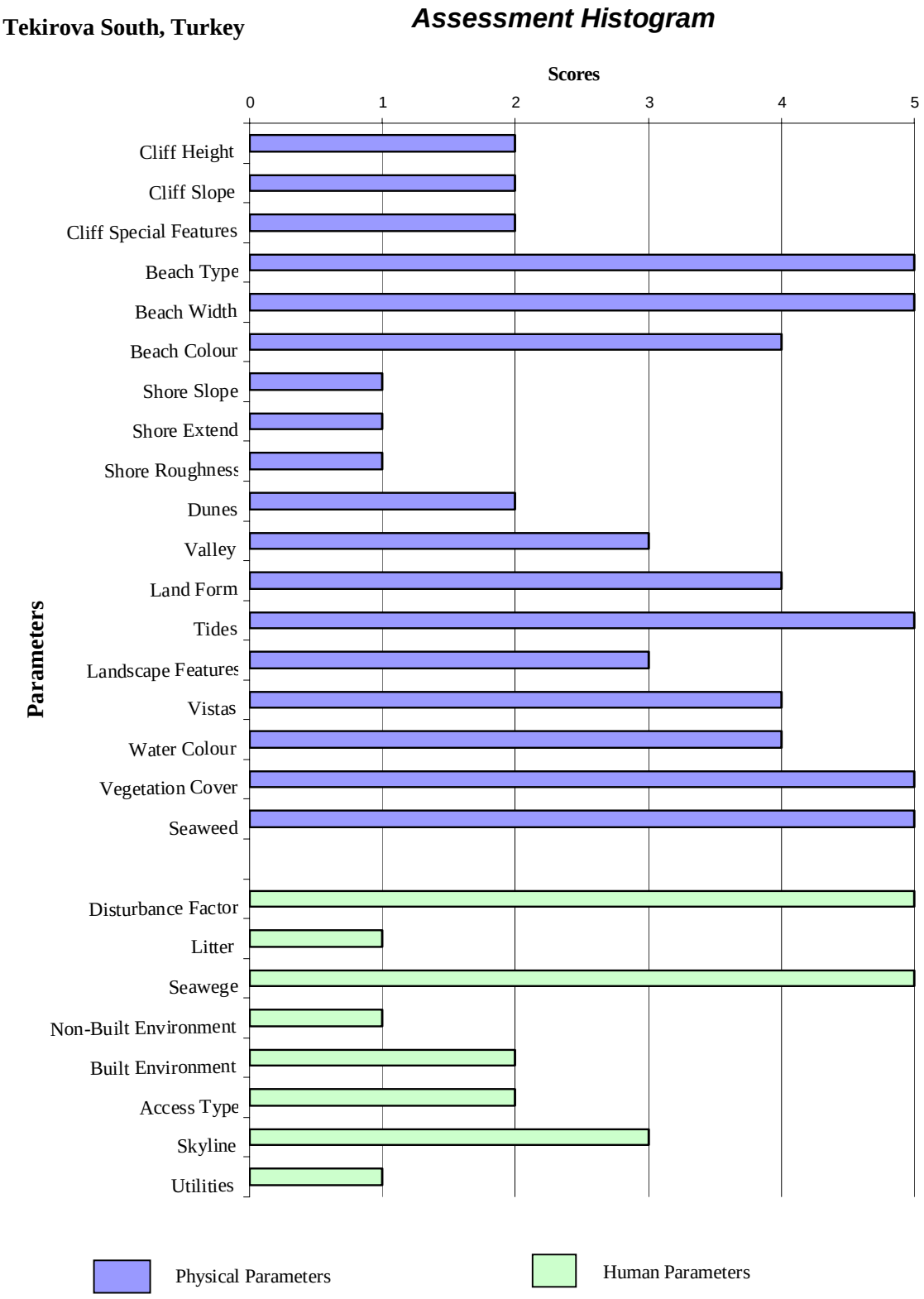


Figure F 20: Assessment Histogram of Tekirova South

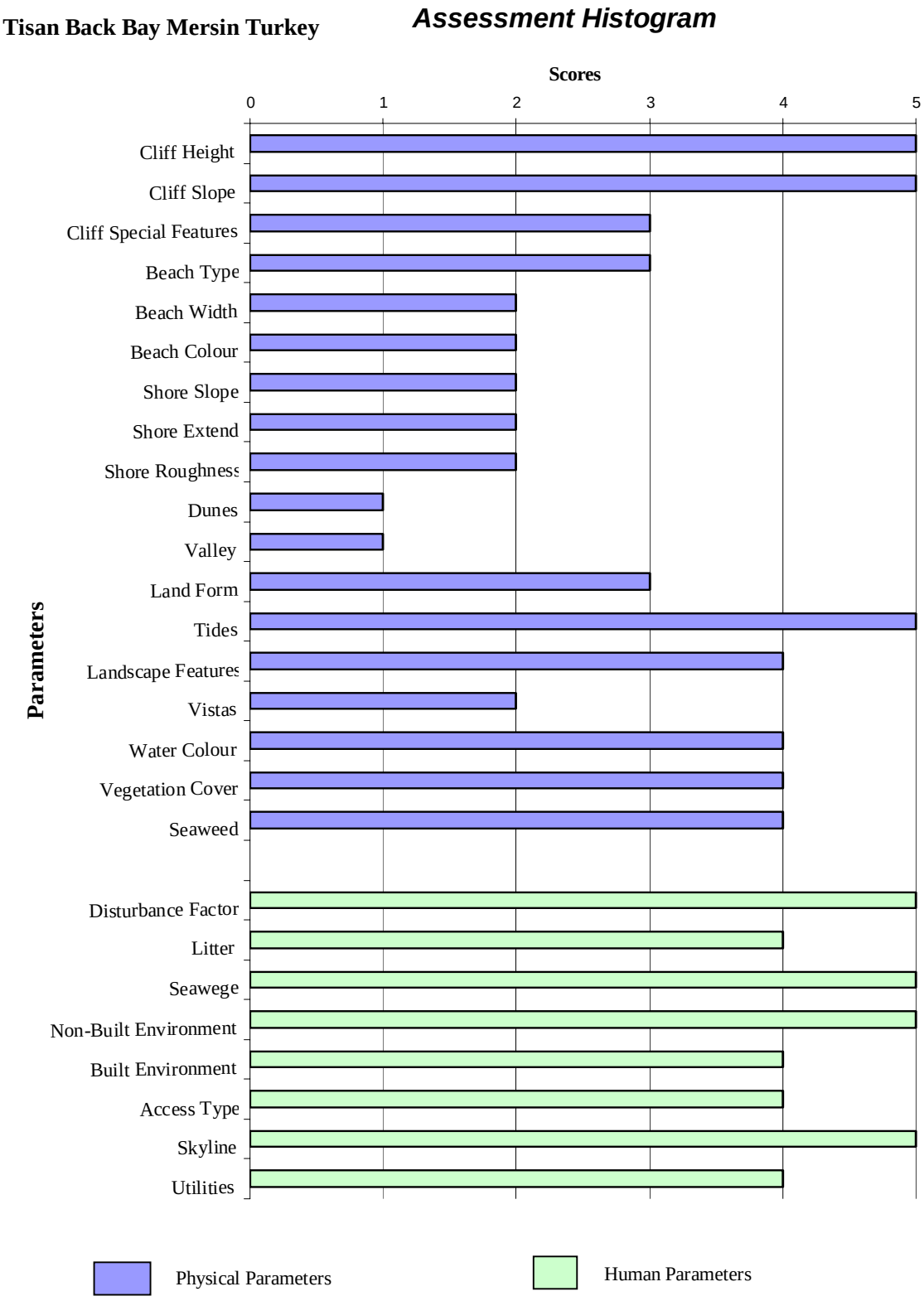


Figure F 21: Assessment Histogram of Tisan Back Bay, Mersin..

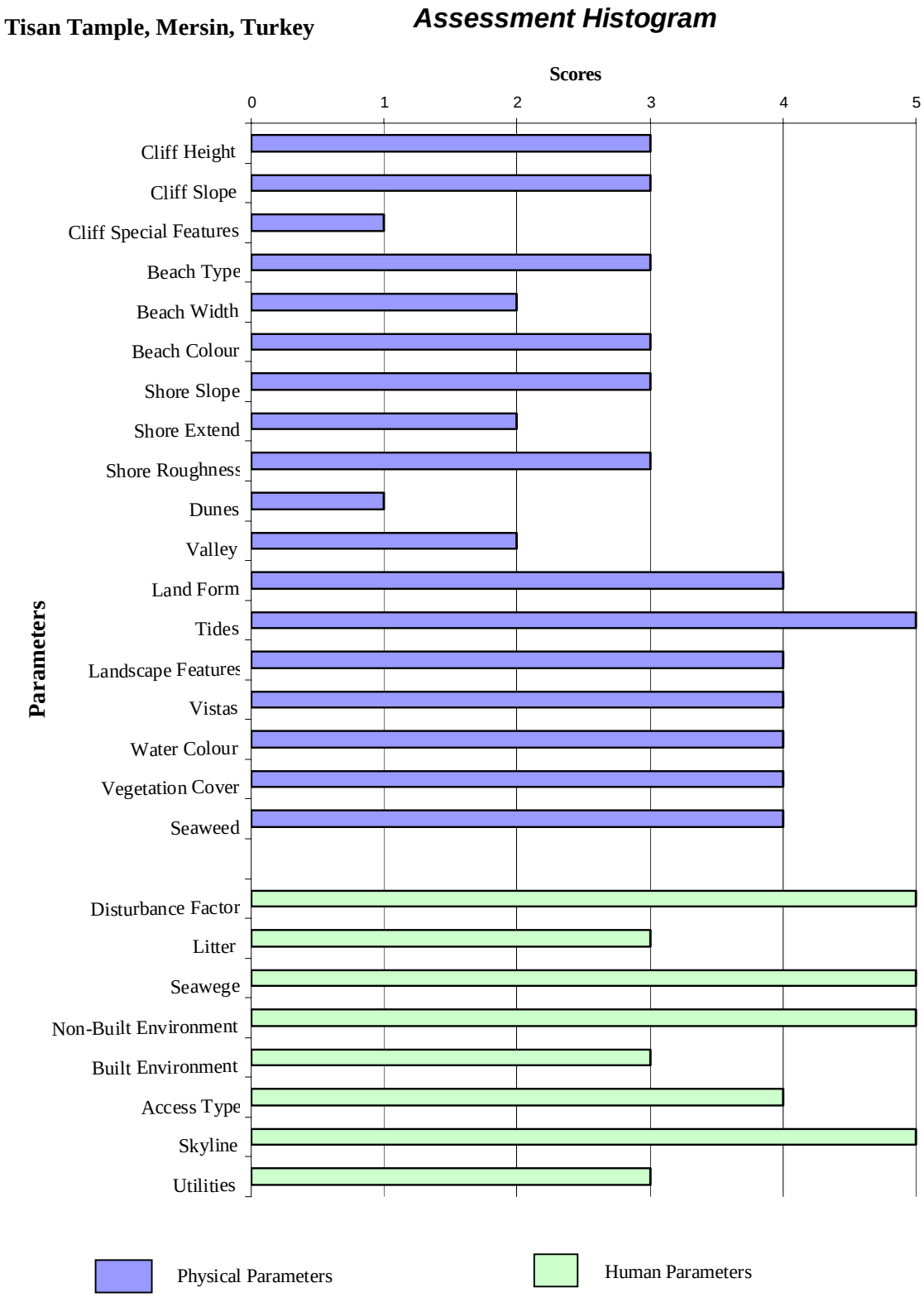
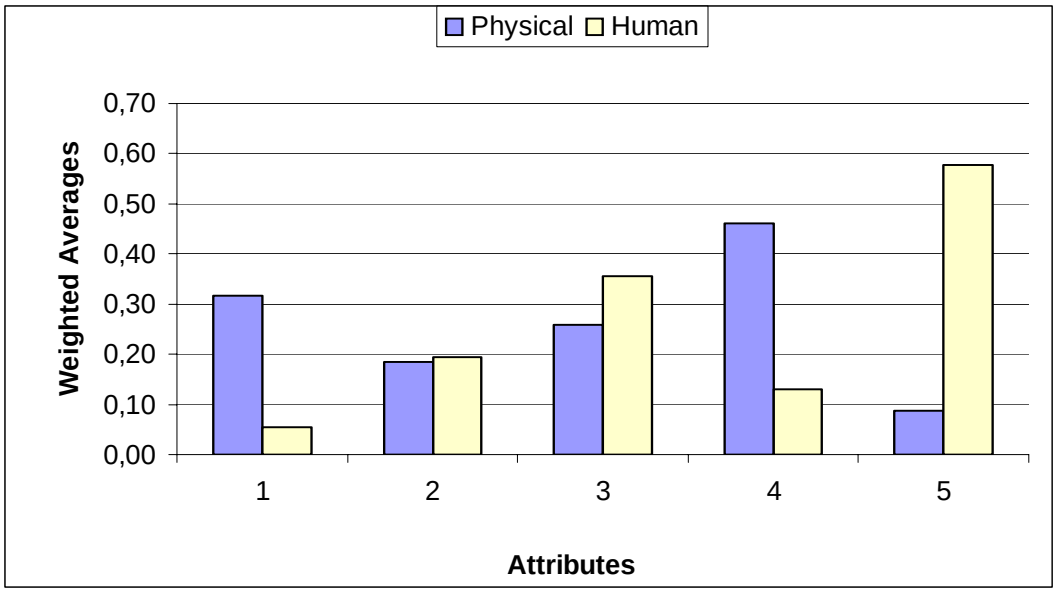


Figure F 22: Assessment Histogram of Tisan Tample, Mersin..

APPENDIX G

WEIGHTED AVERAGES HISTOGRAMS AND MEMBERSHIP DEGREE GRAPHS

Alara Coast Middle Section, Mersin



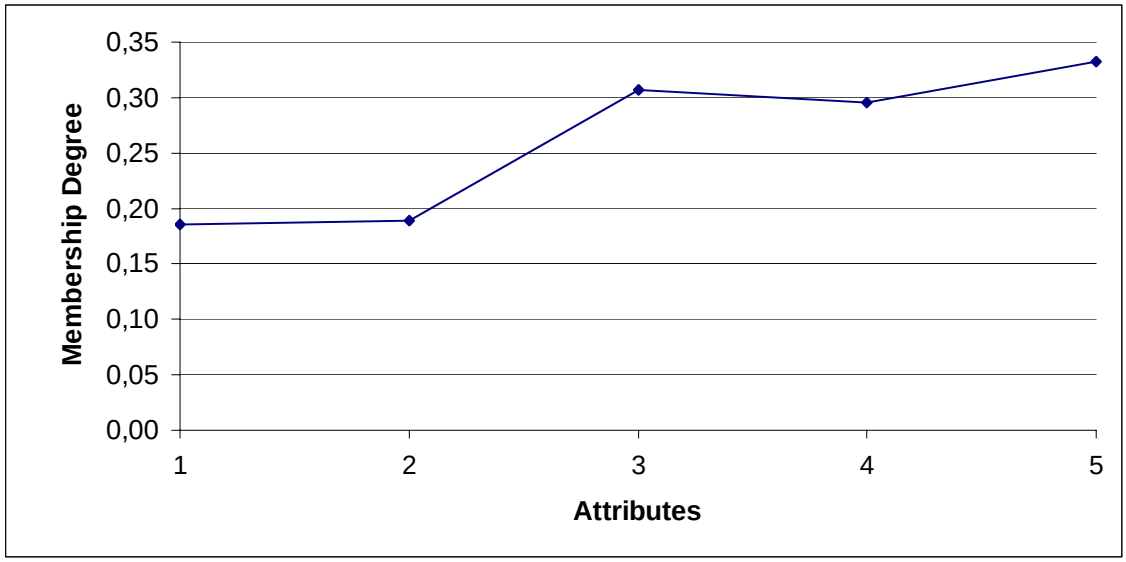
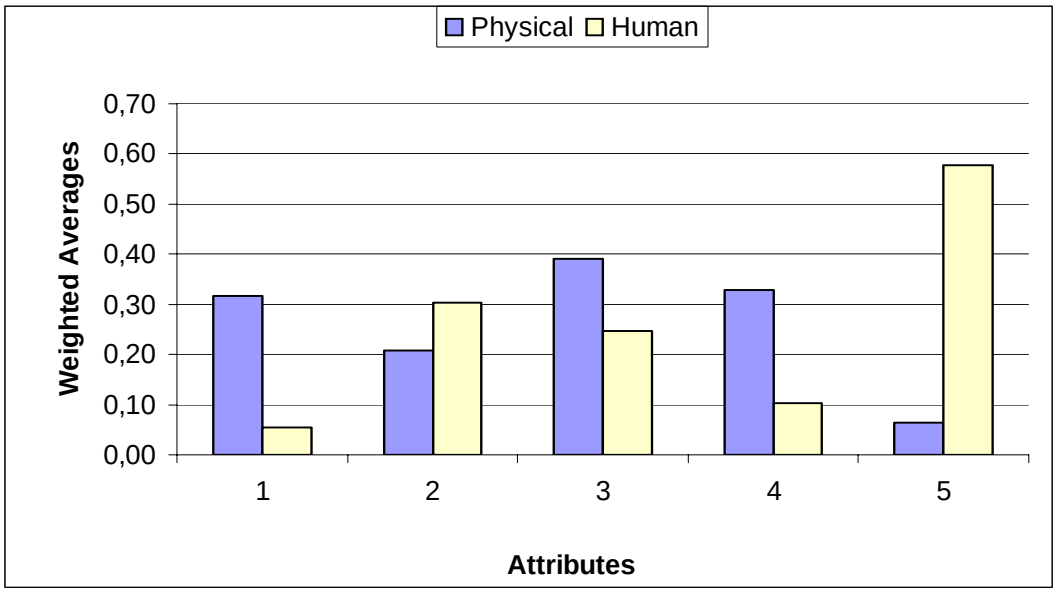


Figure G 1 - 2: Weighted averages hıstograms and membershıp degree graphs of Alata Middle, Mersin.

Alara Coast East Section, Mersin



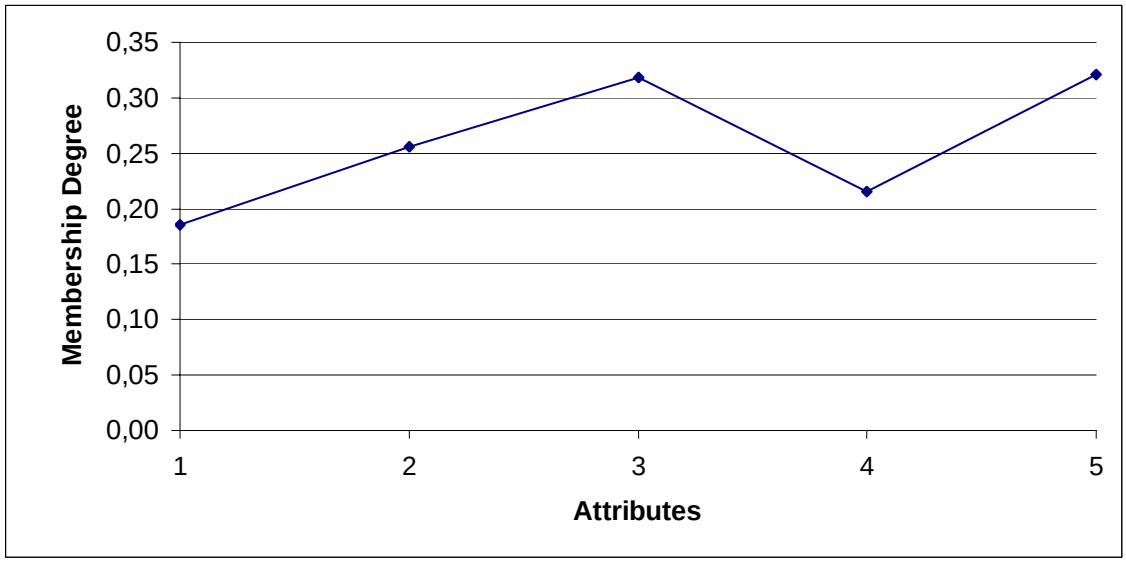
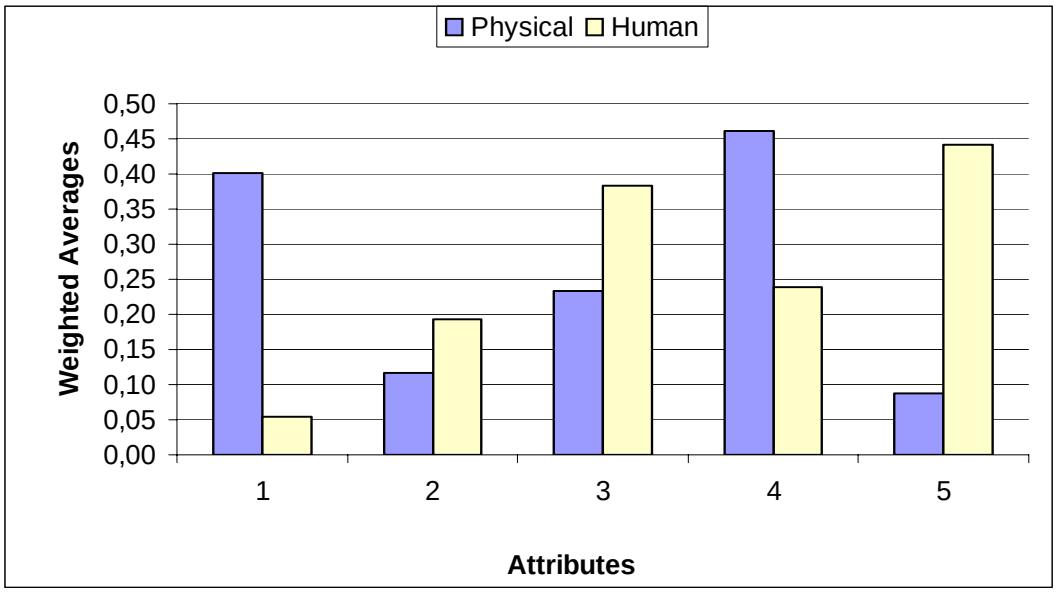


Figure G 3 - 4: Weighted averages hıstograms and membershıp degree graphs of Alata East, Mersin.

Alara West Coast, Mersin



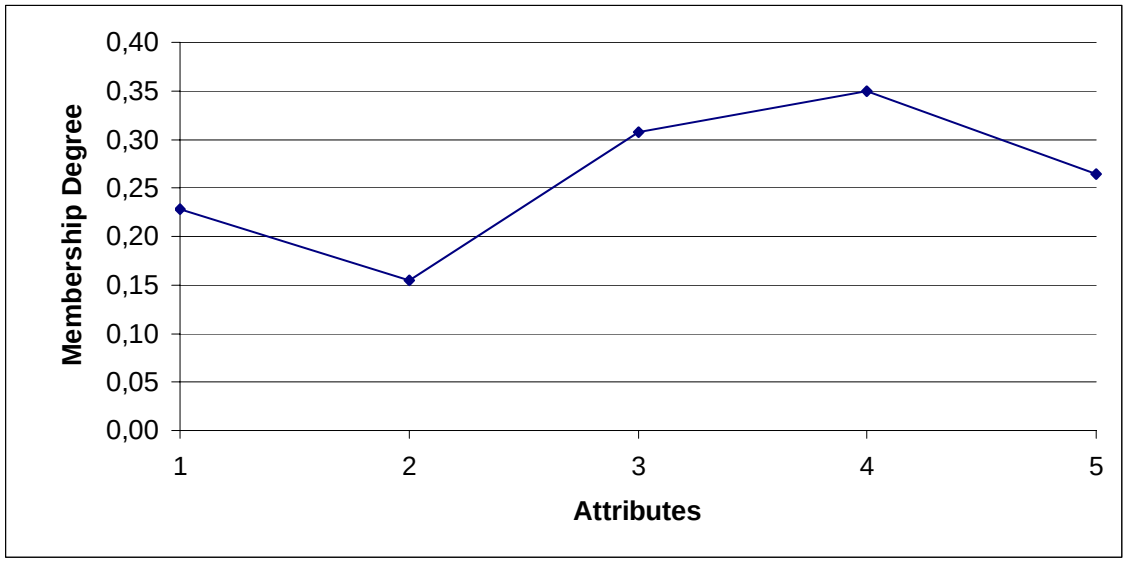
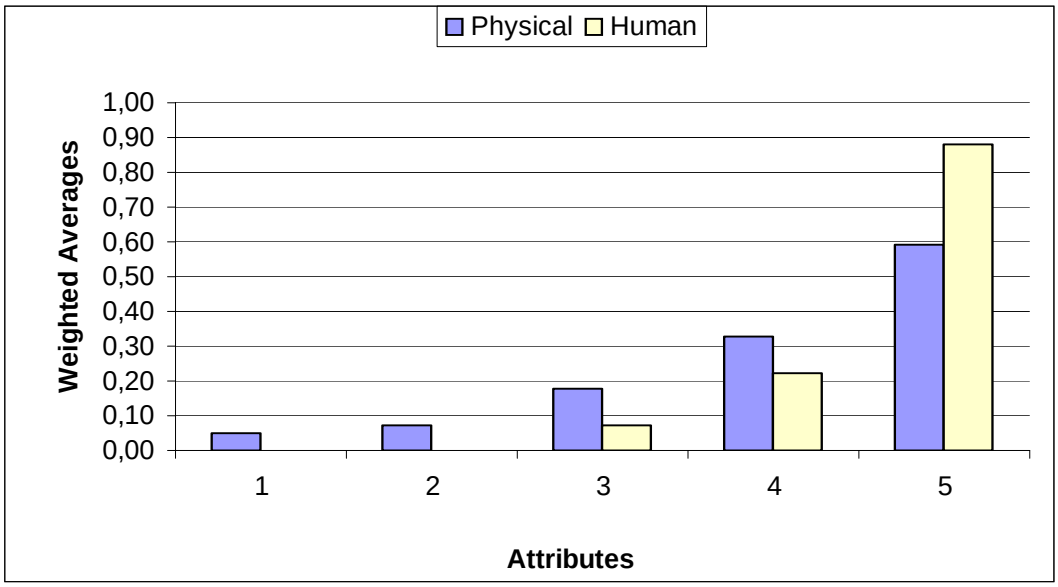


Figure G 5 - 6: Weighted averages hıstograms and membershıp degree graphs of Alata West, Mersin.

Çıralı Beach Middle Section Kemer, Antalya



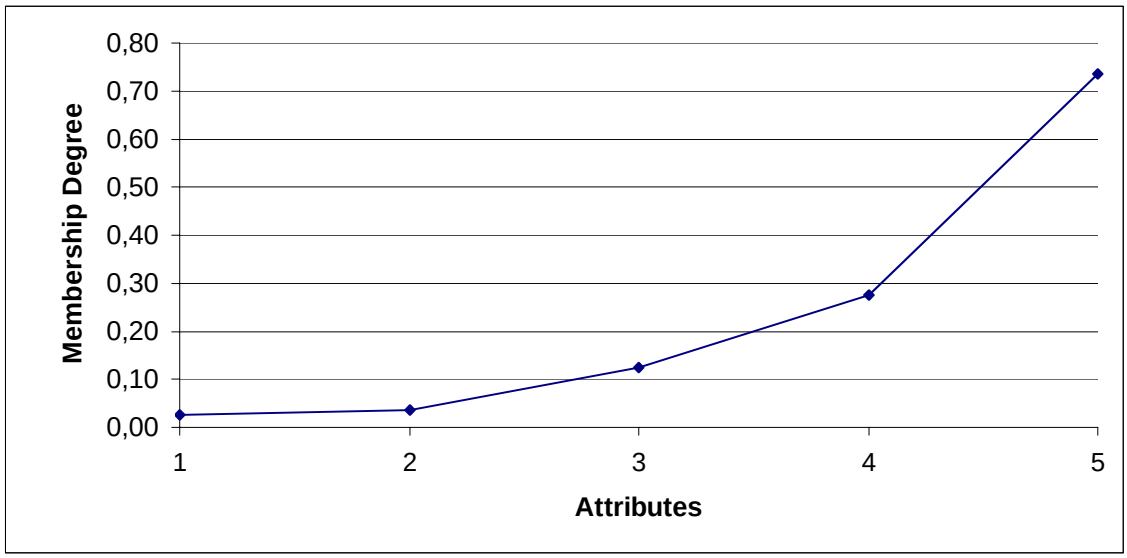
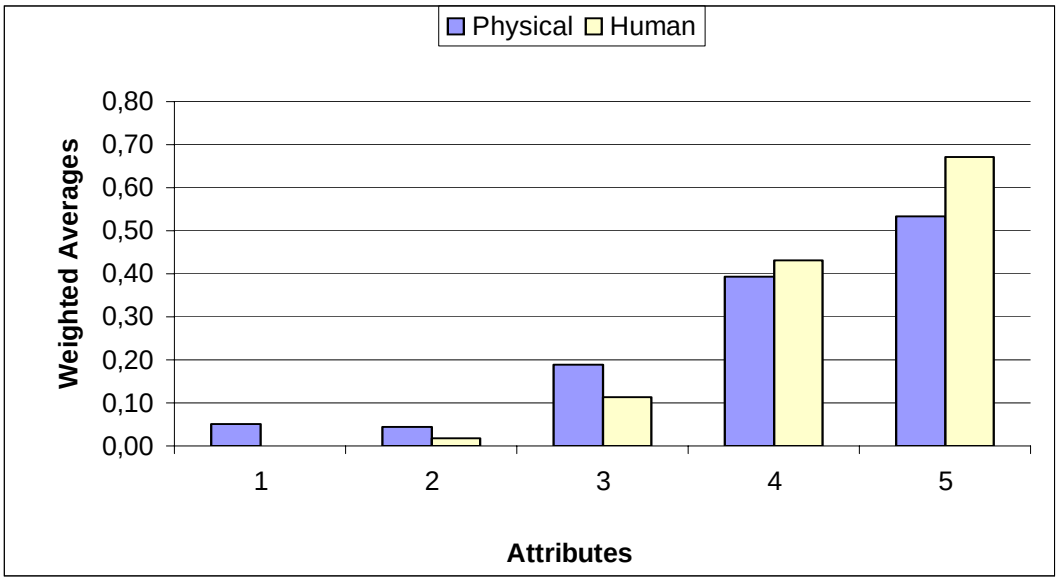


Figure G 7 - 8: Weighted averages hıstograms and membershıp degree graphs of Çıralı Middle Section Kemer..



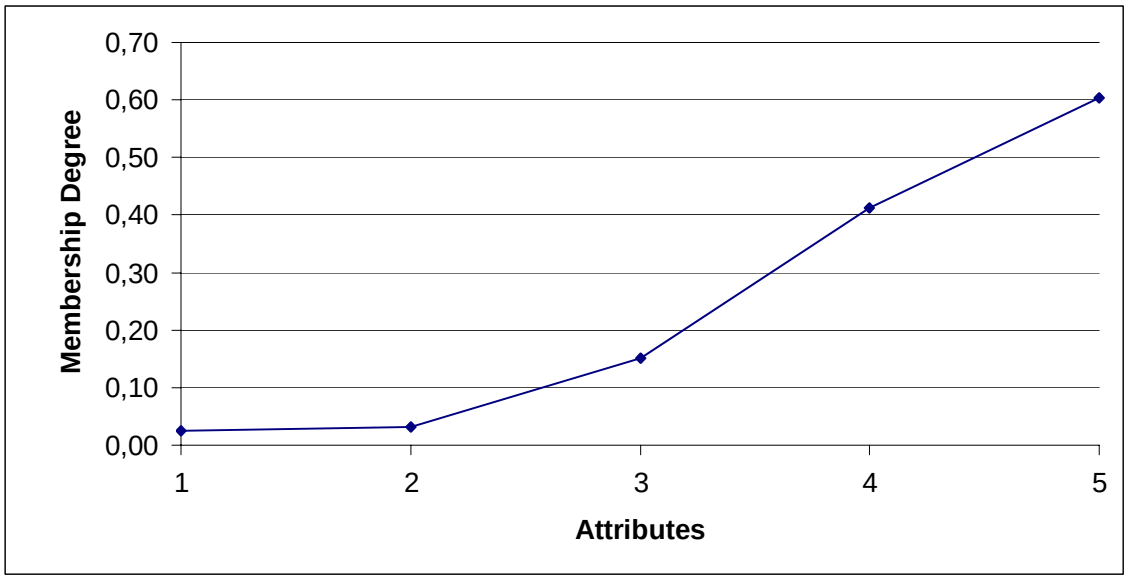
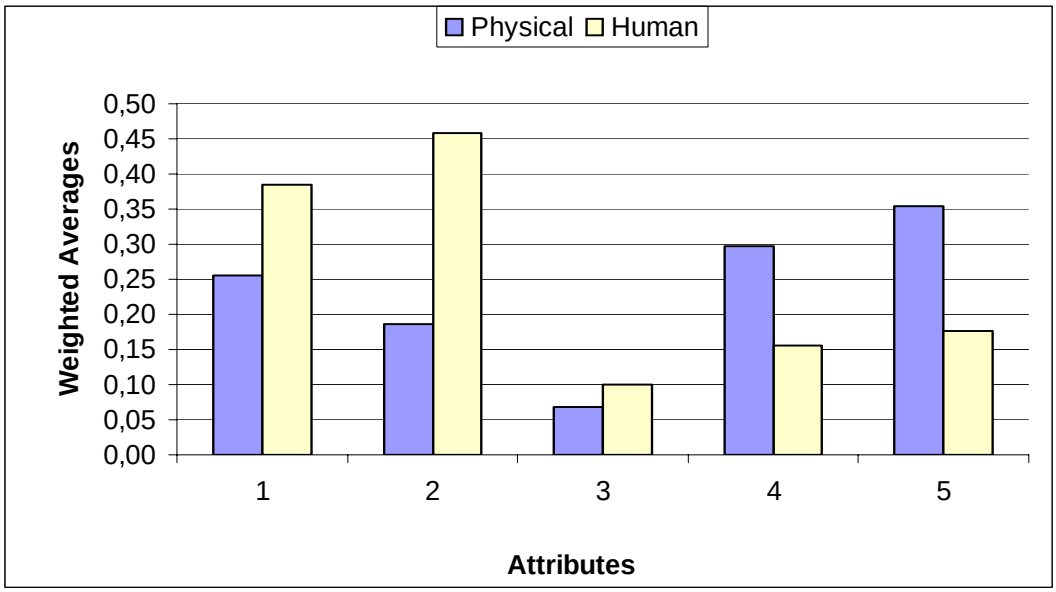


Figure G 9 - 10: Weighted averages hıstograms and membershıp degree graphs of Çıralı Karaburun Kemer.

Dedeman Hotel Region, Antalya



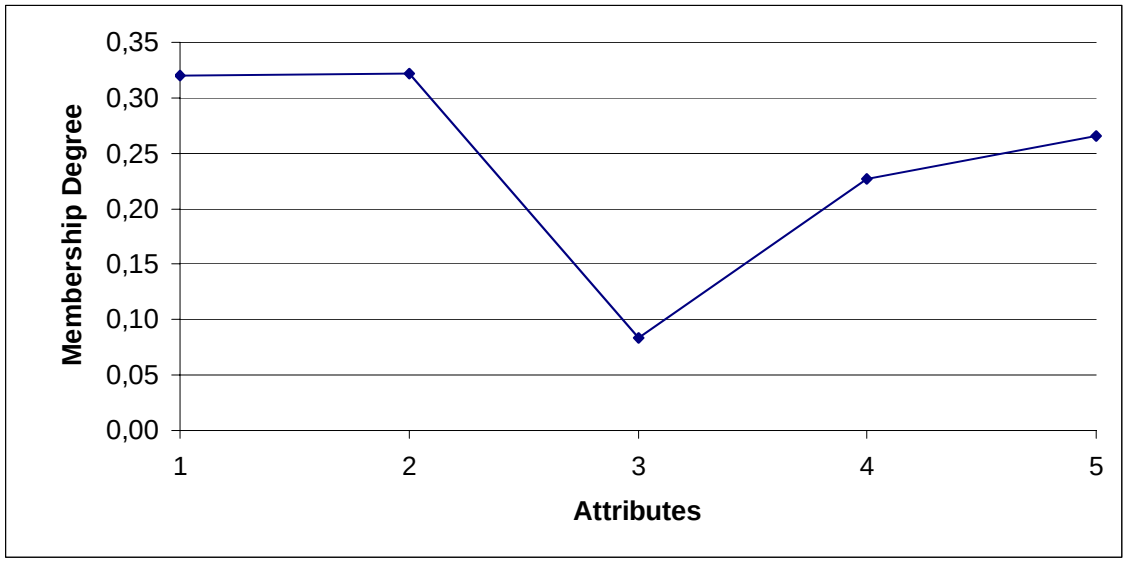
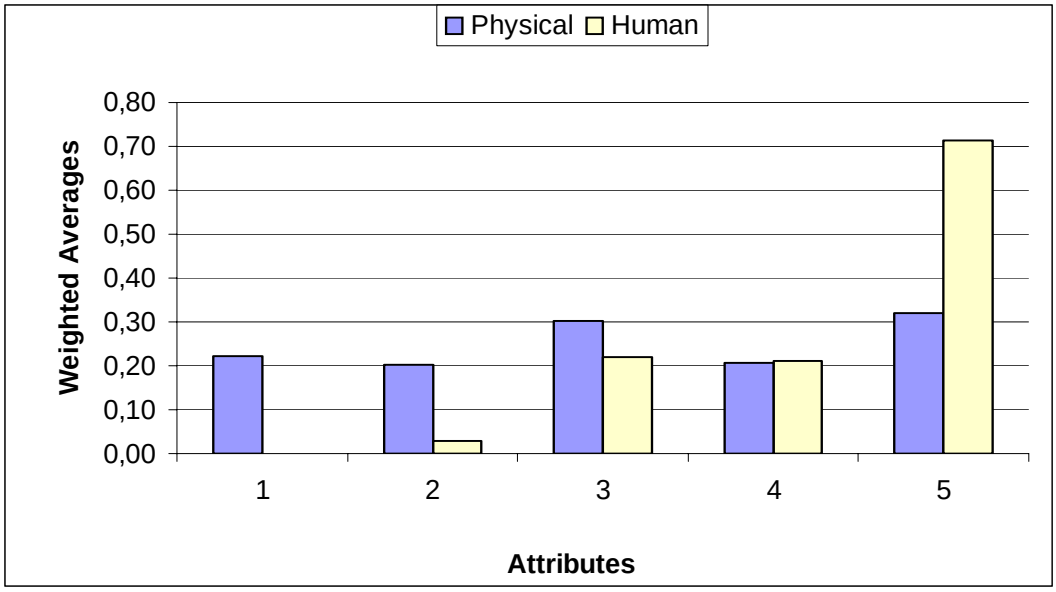


Figure G 11 - 12: Weighted averages hıstograms and membershıp degree graphs of Dedeman Hotel Antalya.

Hurma Region Göksu, Mersin



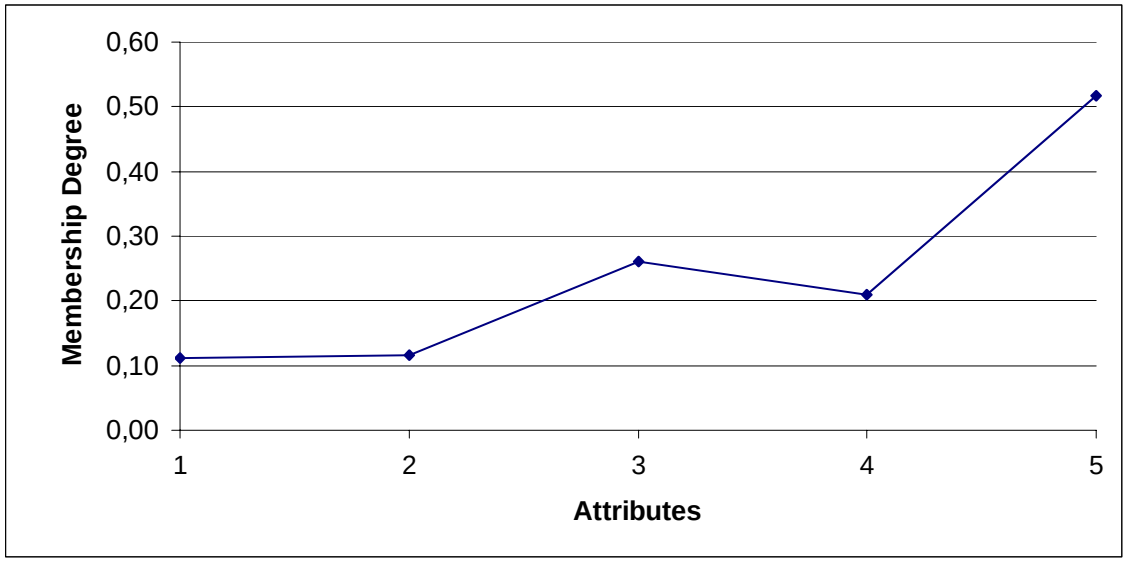
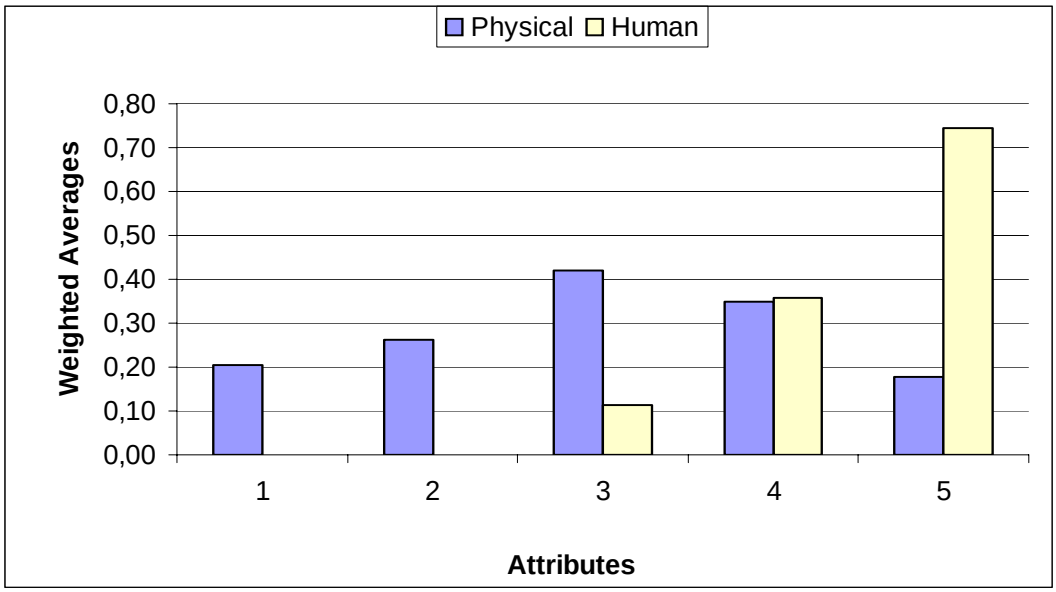


Figure G 13 - 14: Weighted averages hıstograms and membershıp degree graphs of Hurma Göksu, Mersin.



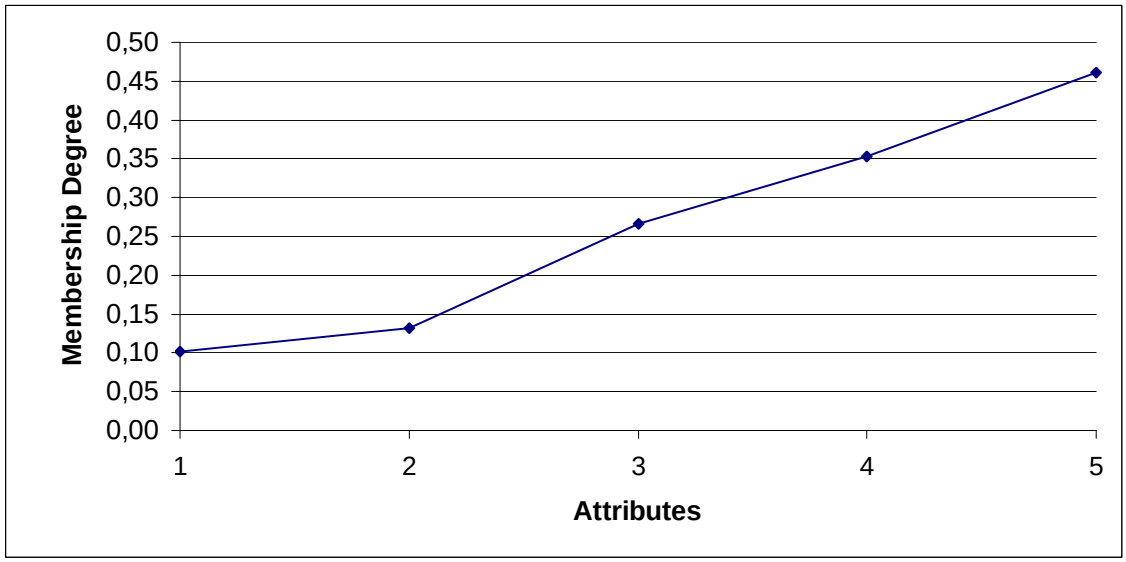
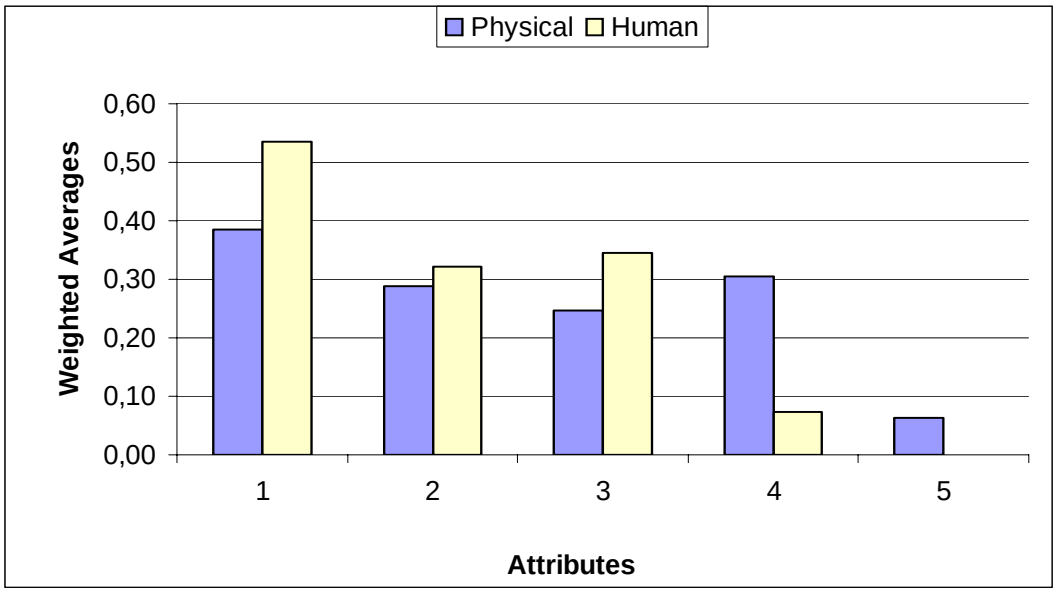


Figure G 15 - 16: Weighted averages hıstograms and membershıp degree graphs of Karaburun Akyar, Mersin.

Kızkalesi, Mersin



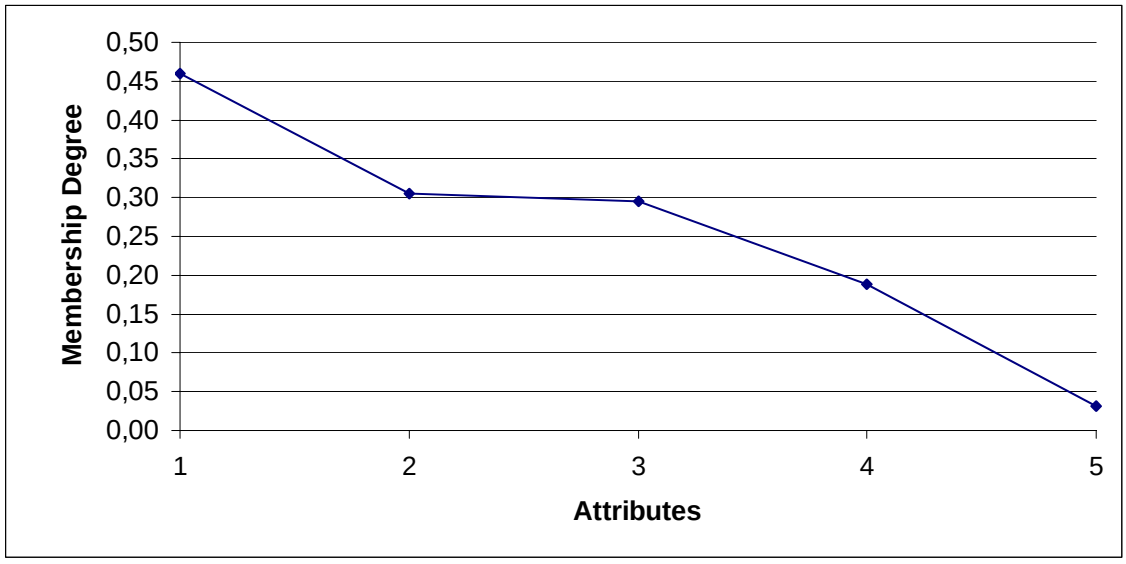
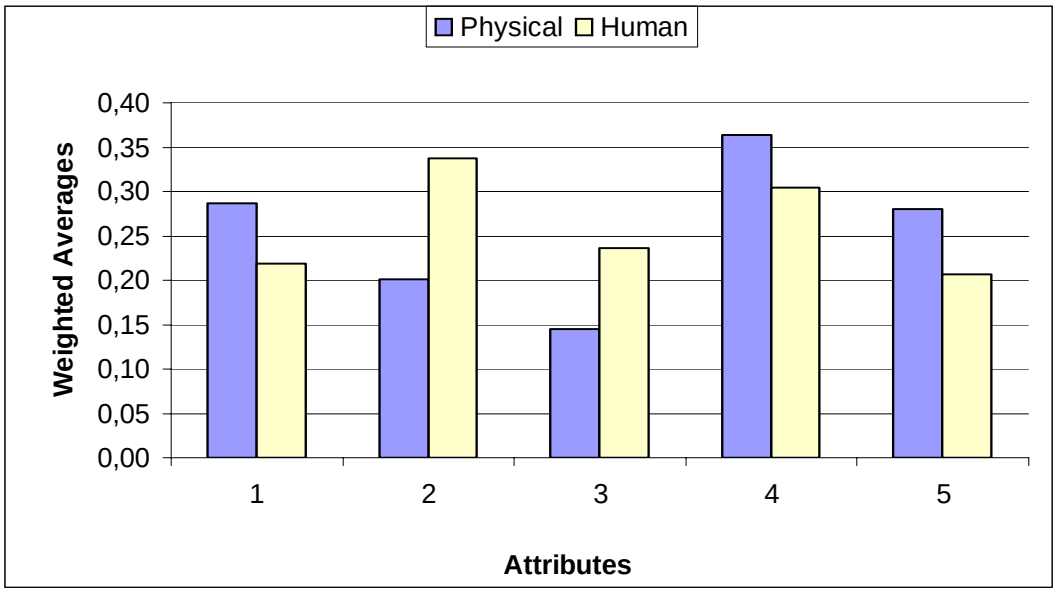


Figure G 17 - 18: Weighted averages hıstograms and membershıp degree graphs of Kızkalesi, Mersin.

Konyaaltı Beach East Section, Antalya



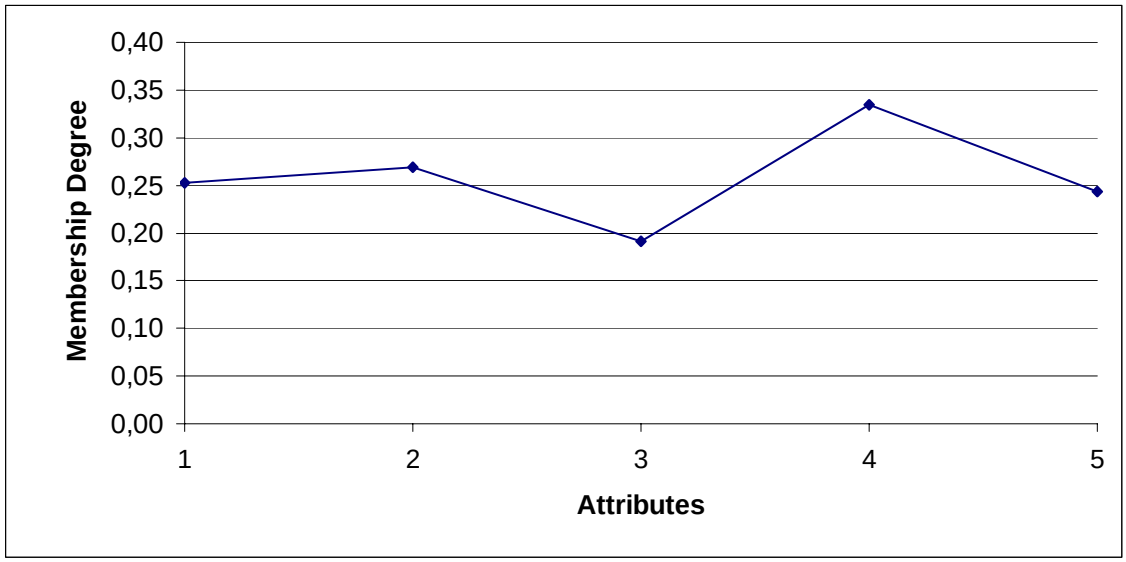
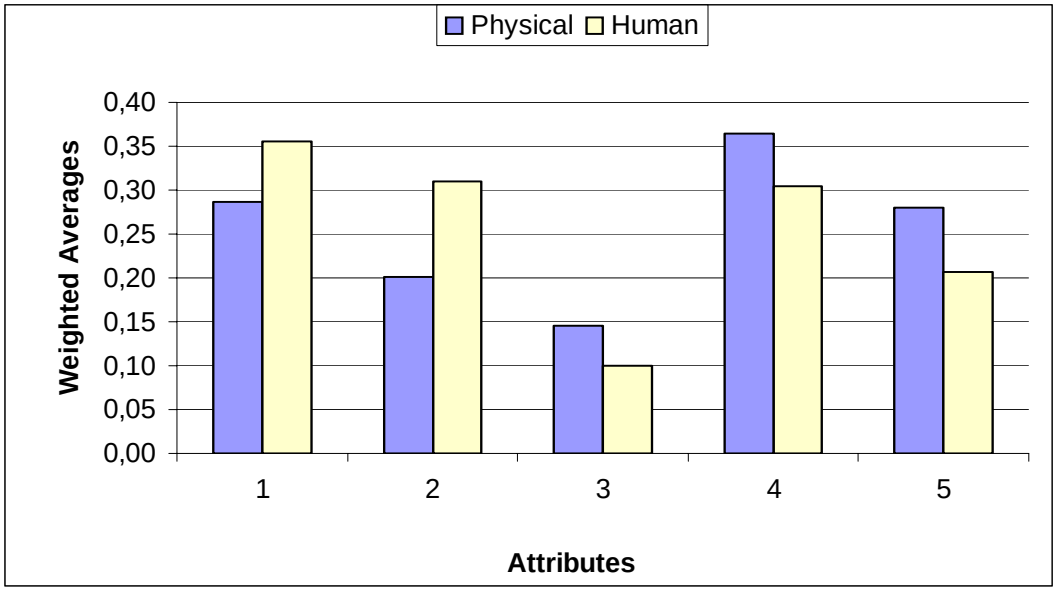


Figure G 19 - 20: Weighted averages hıstograms and membershıp degree graphs of Konyaaltı East, Antalya.

Konyaaltı Beach Middle Section, Antalya



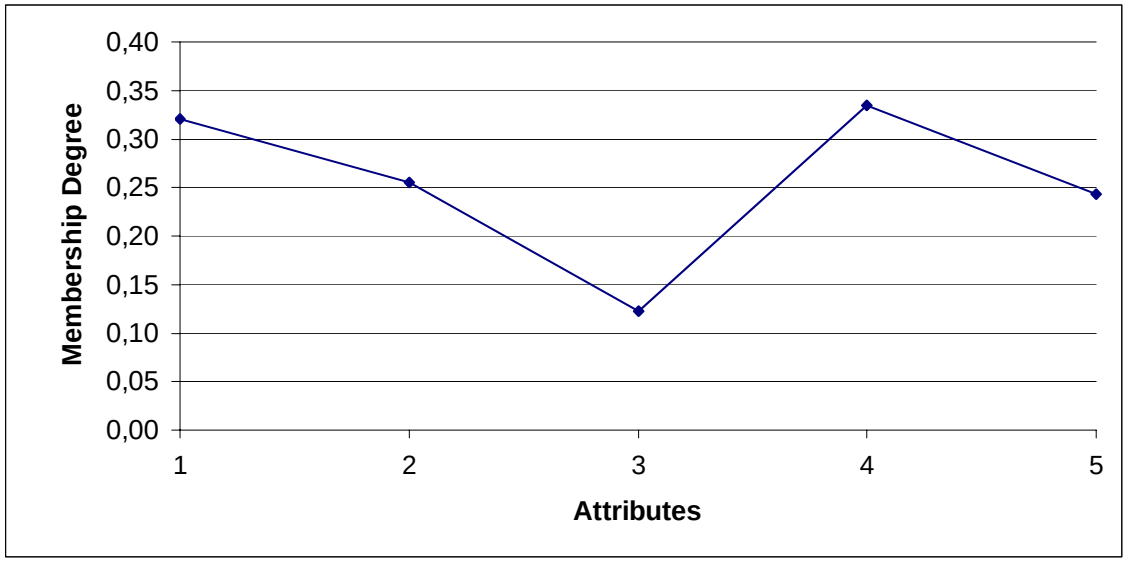
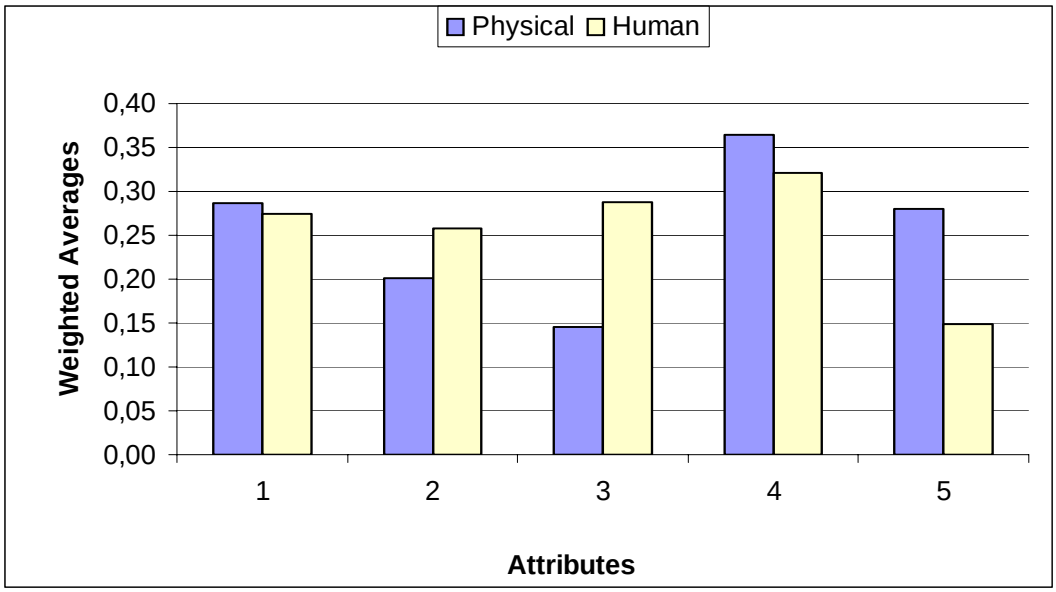


Figure G 21 - 22: Weighted averages hıstograms and membershıp degree graphs of Konyaaltı Middle, Antalya.

Konyaaltı Beach West Section, Antalya



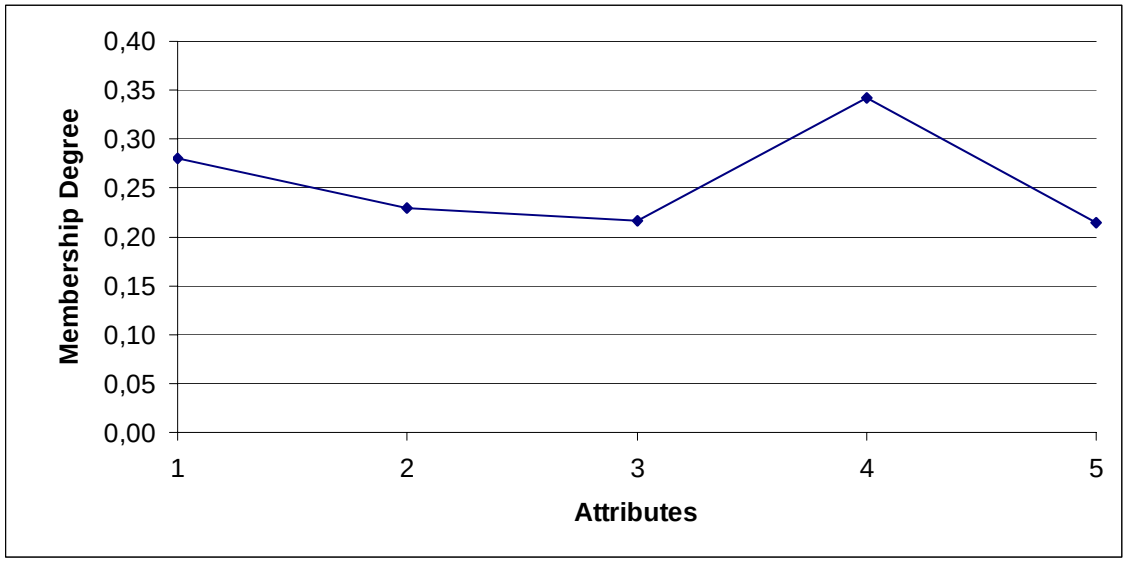
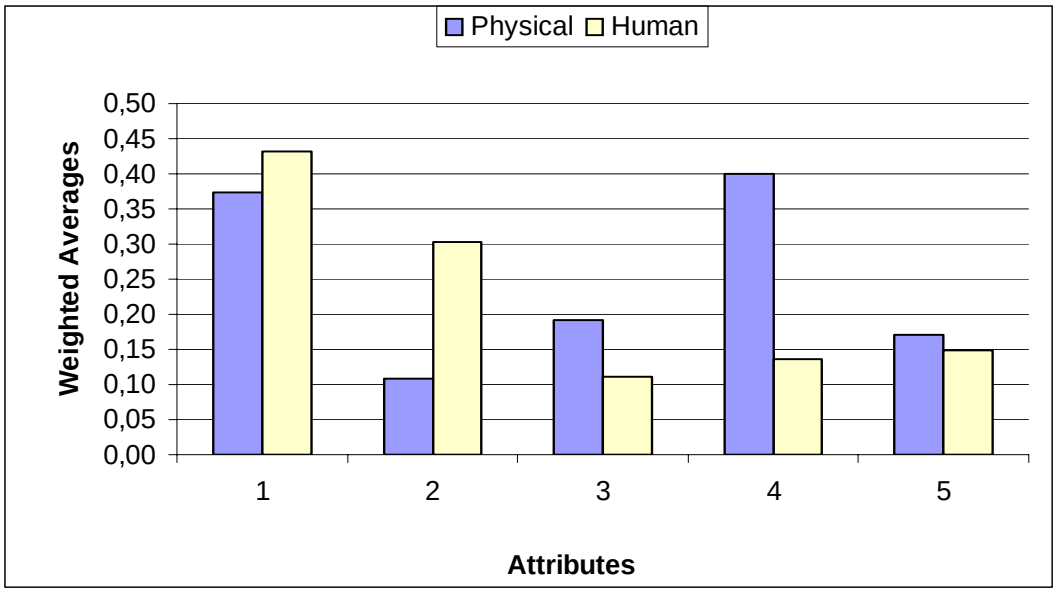


Figure G 23 - 24: Weighted averages hıstograms and membershıp degree graphs of Konyaaltı West, Antalya.



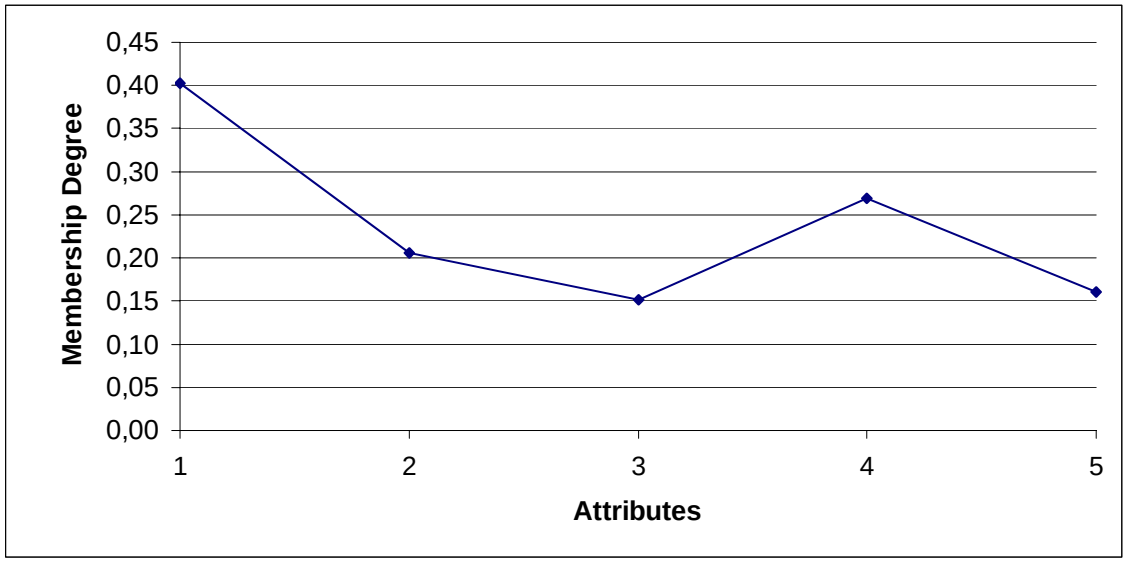
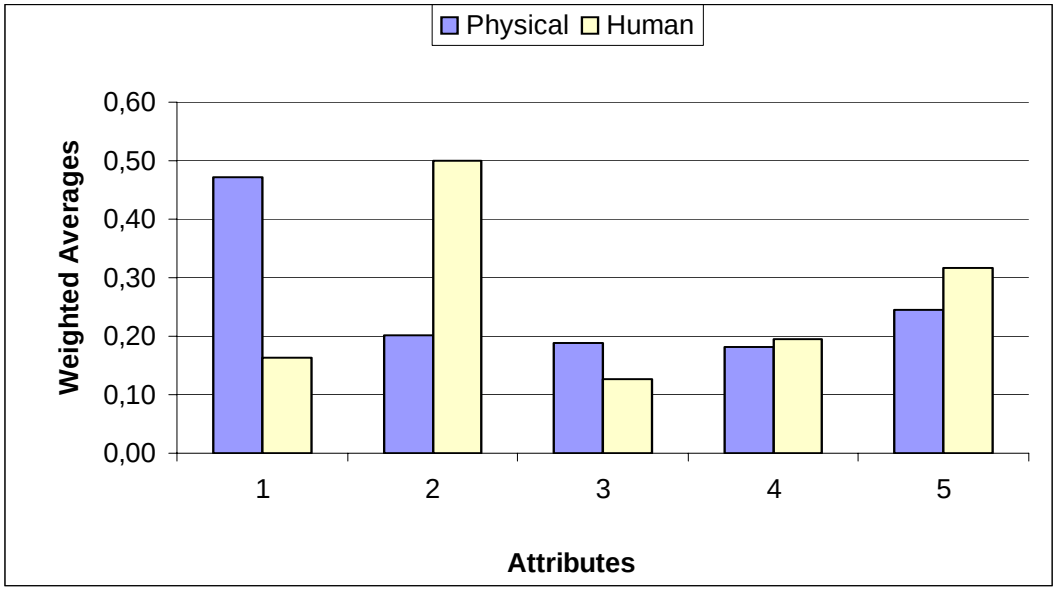


Figure G 25 - 26: Weighted averages hıstograms and membershıp degree graphs of Lara Barınak, Antalya

Lara Beach, Turkey



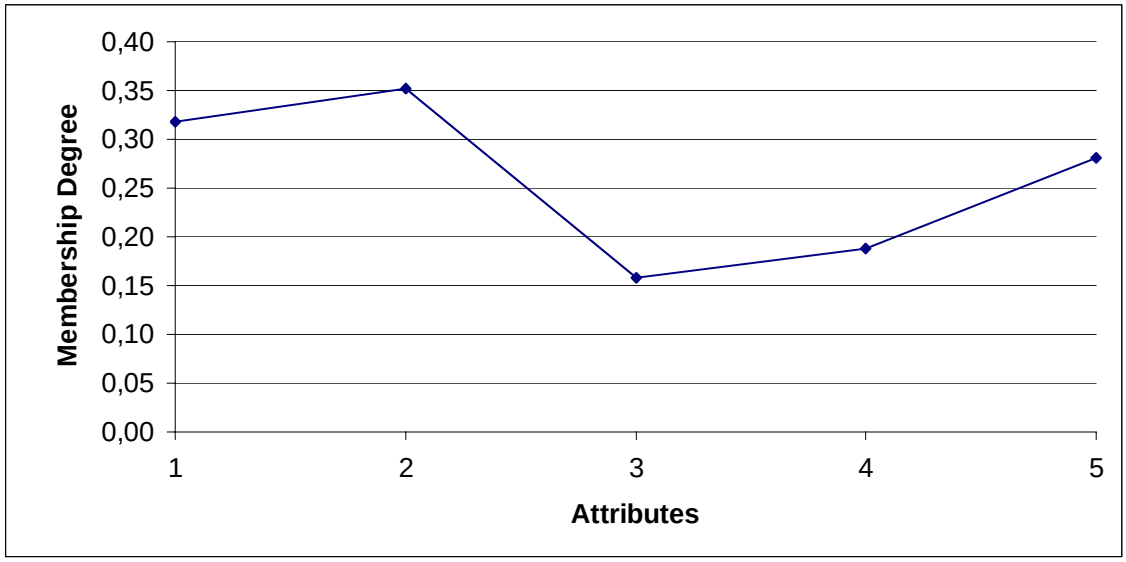
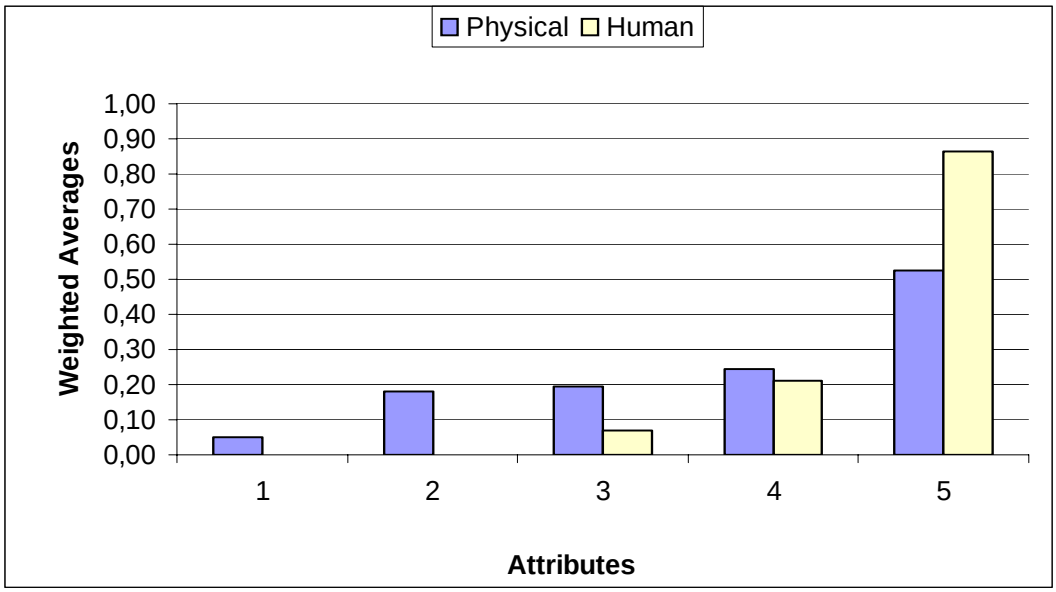


Figure G 27 - 28: Weighted averages hıstograms and membershıp degree graphs of Lara Beach, Antalya

Phasalis Small Bay, Turkey



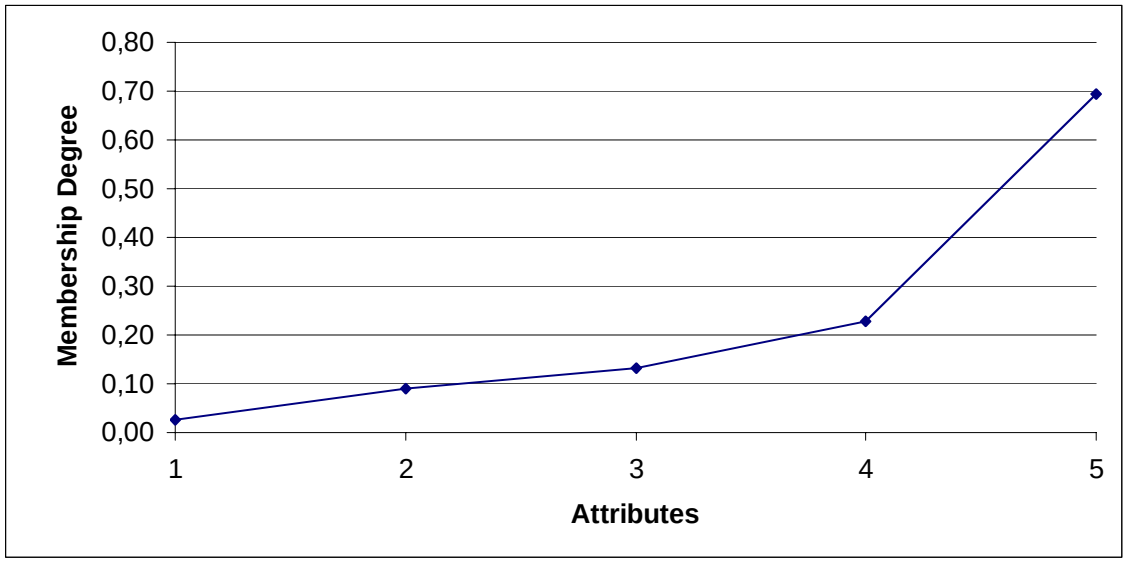
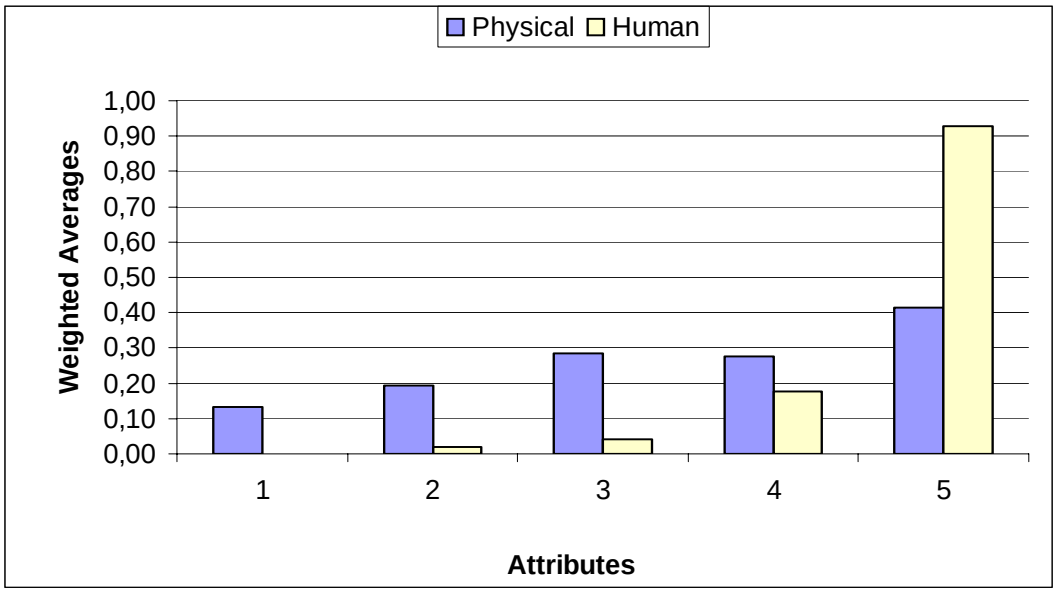


Figure G 29 - 30: Weighted averages hıstograms and membershıp degree graphs of Phaselis Small Bay

Phaselis Large Bay, Turkey



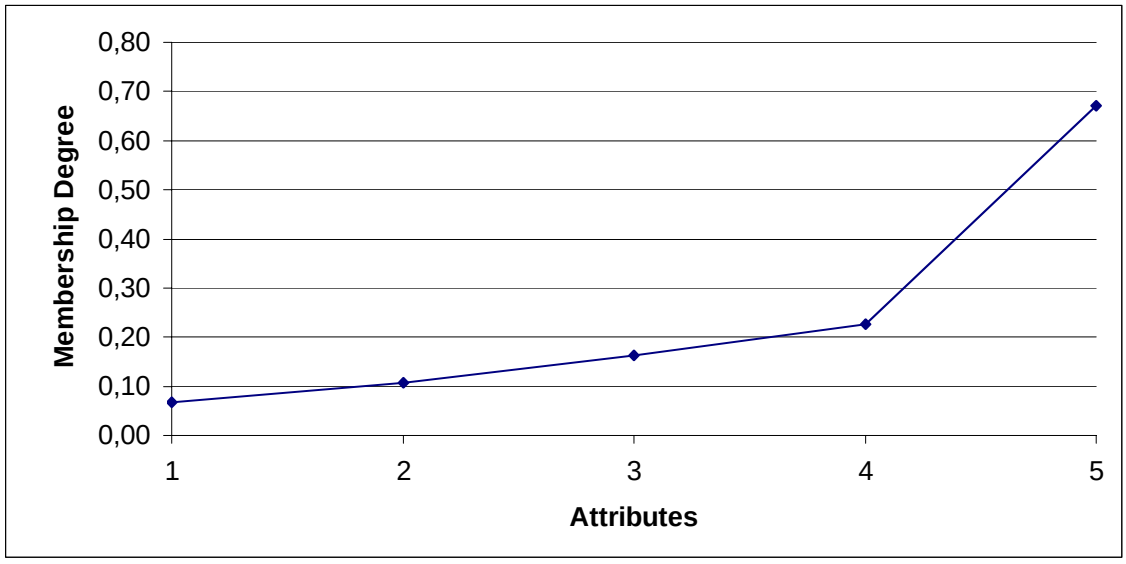
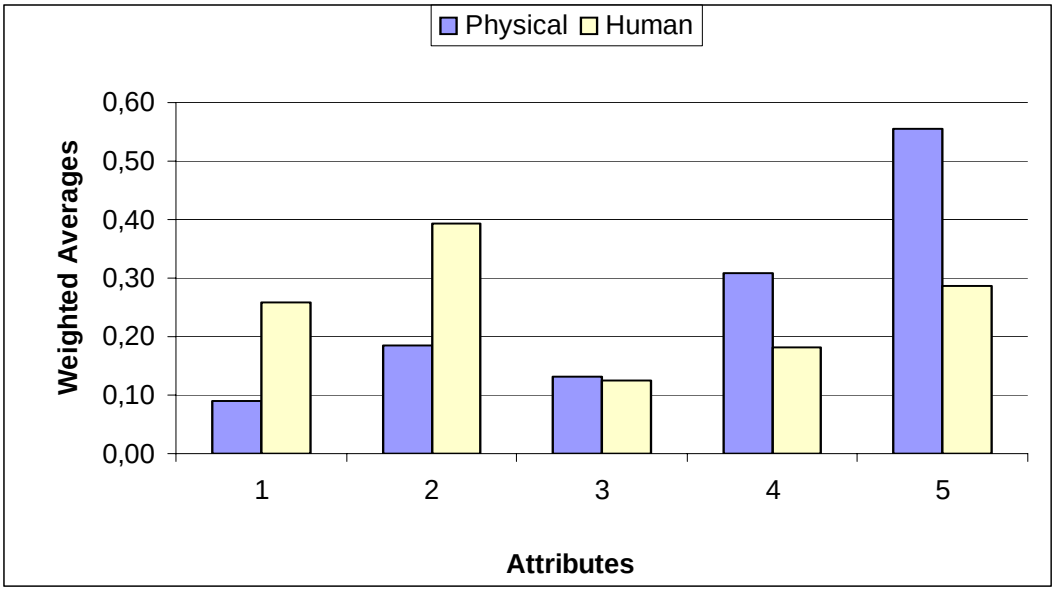


Figure G 31 - 32: Weighted averages hıstograms and membershıp degree graphs of Phaselis Large Bay

Tekirova North, Turkey



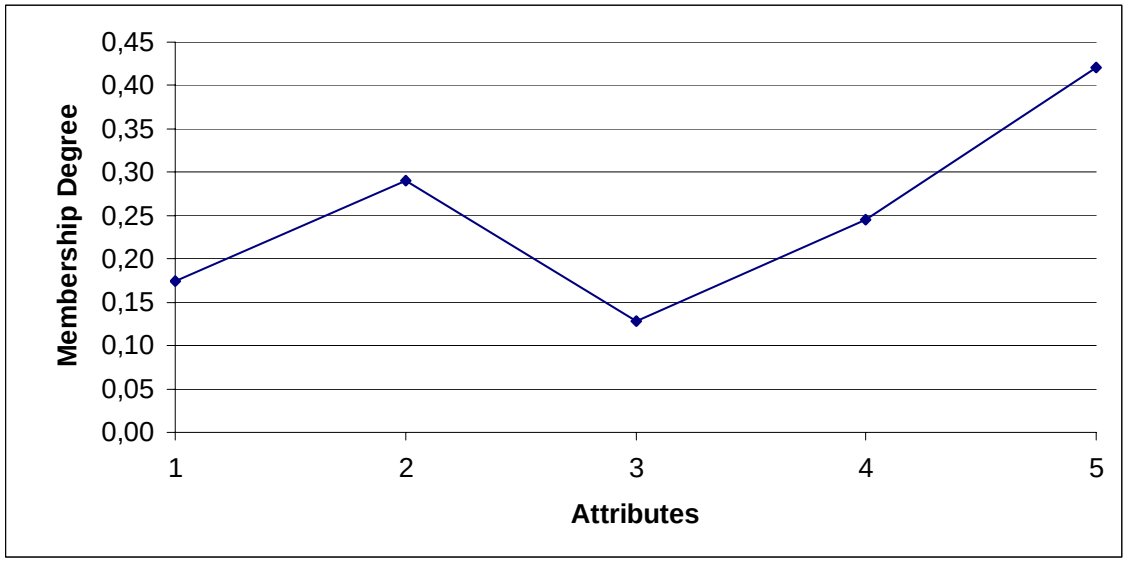
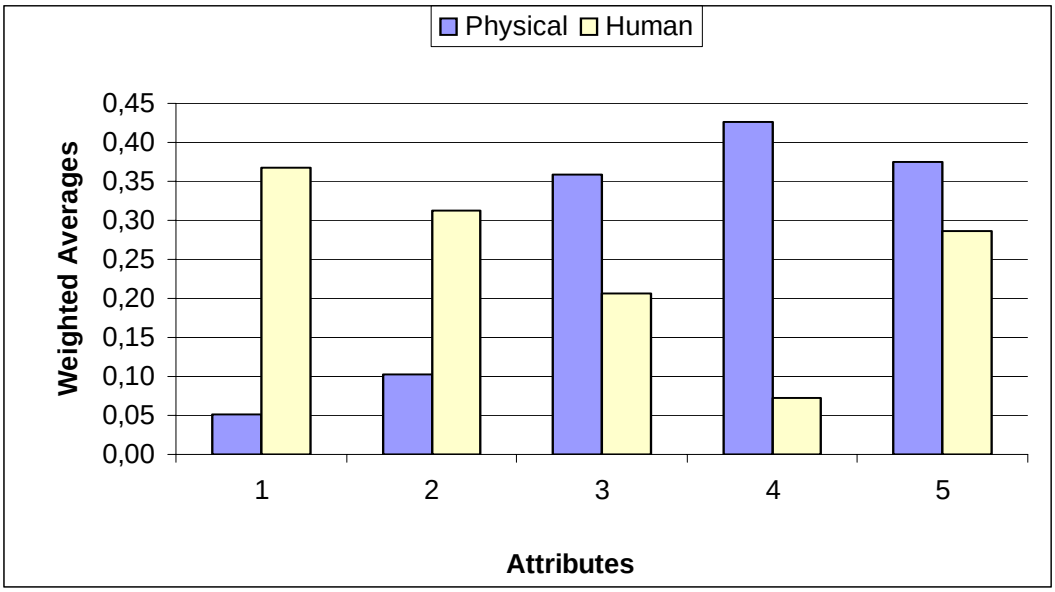


Figure G 33 - 34: Weighted averages hıstograms and membershıp degree graphs of Tekirova North

Tekirova South, Turkey



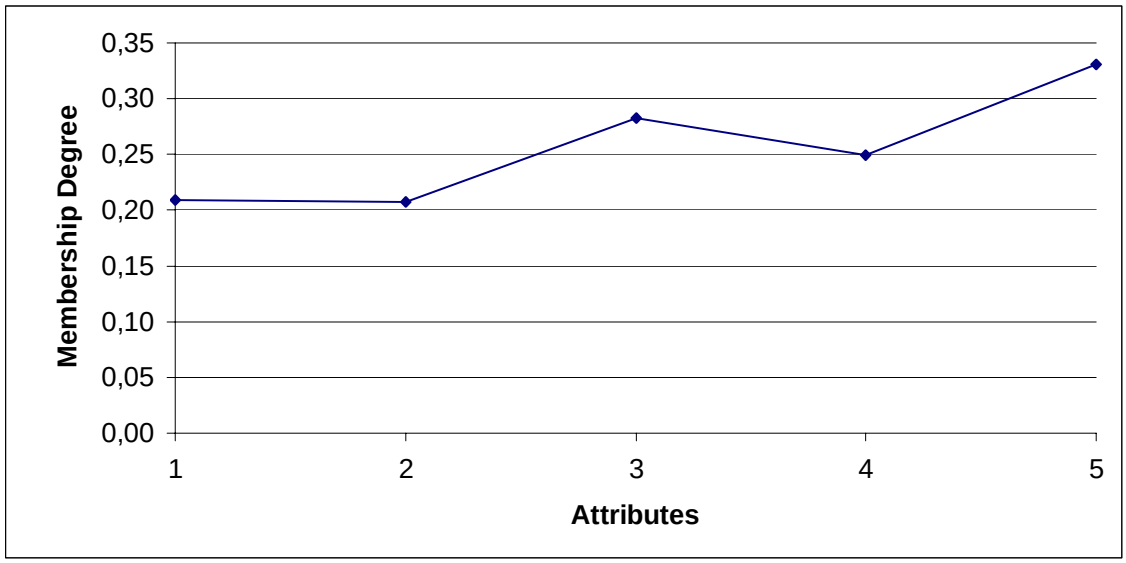
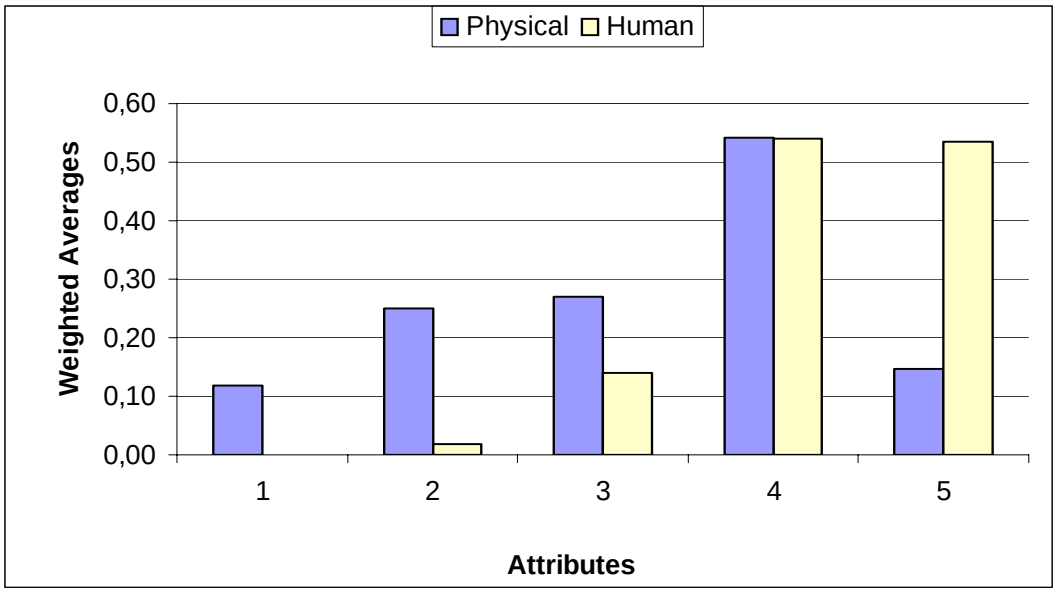


Figure G 35 - 36: Weighted averages hıstograms and membershıp degree graphs of Tekirova South.

Tisan Back Bay Mersin Turkey



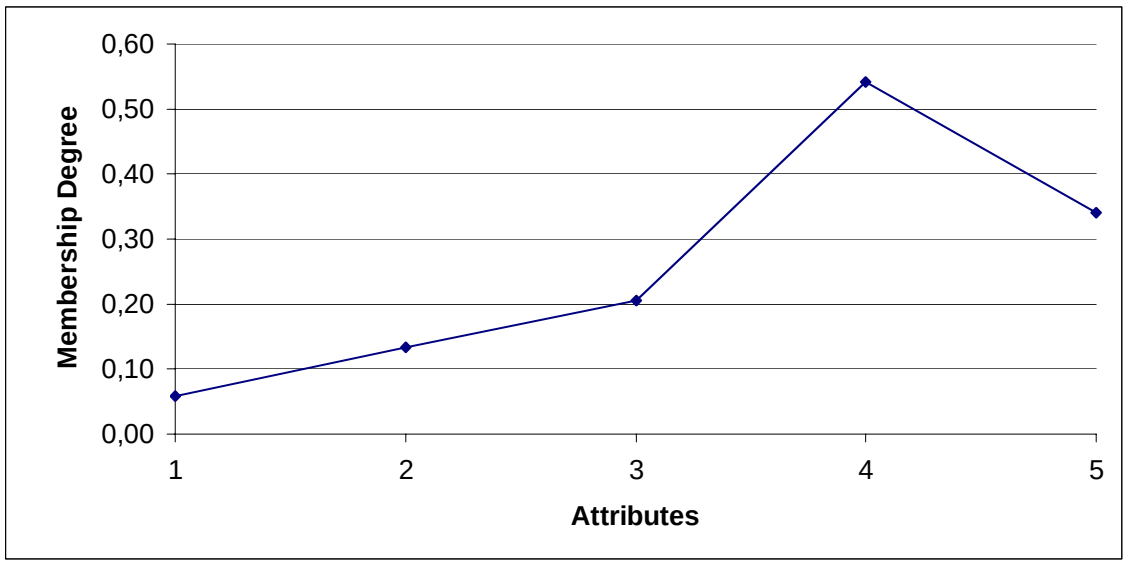
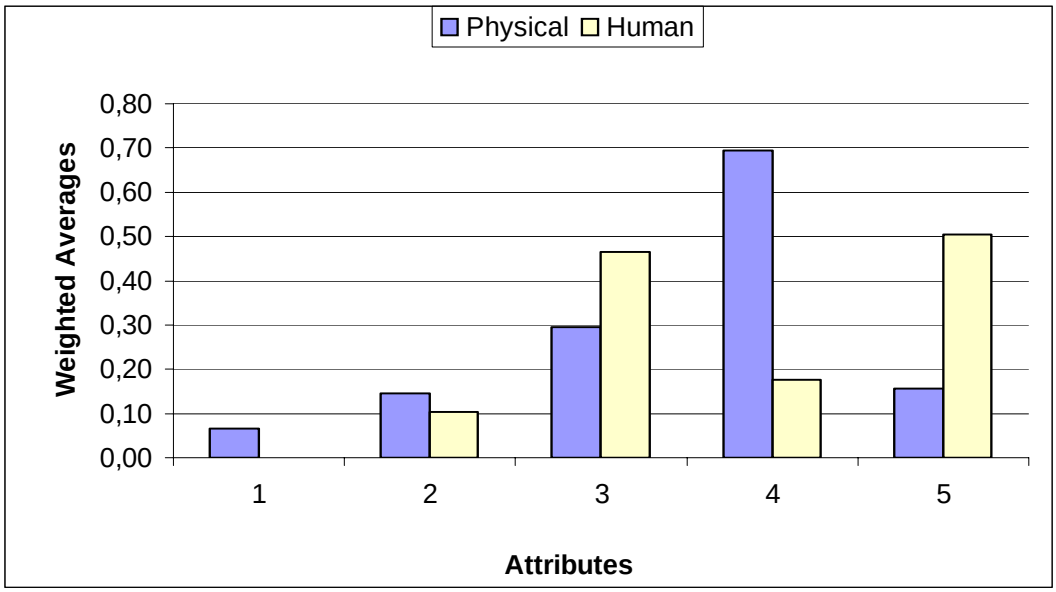


Figure G 37 - 38: Weighted averages hıstograms and membershıp degree graphs of Tisan Back Bay, Mersin.



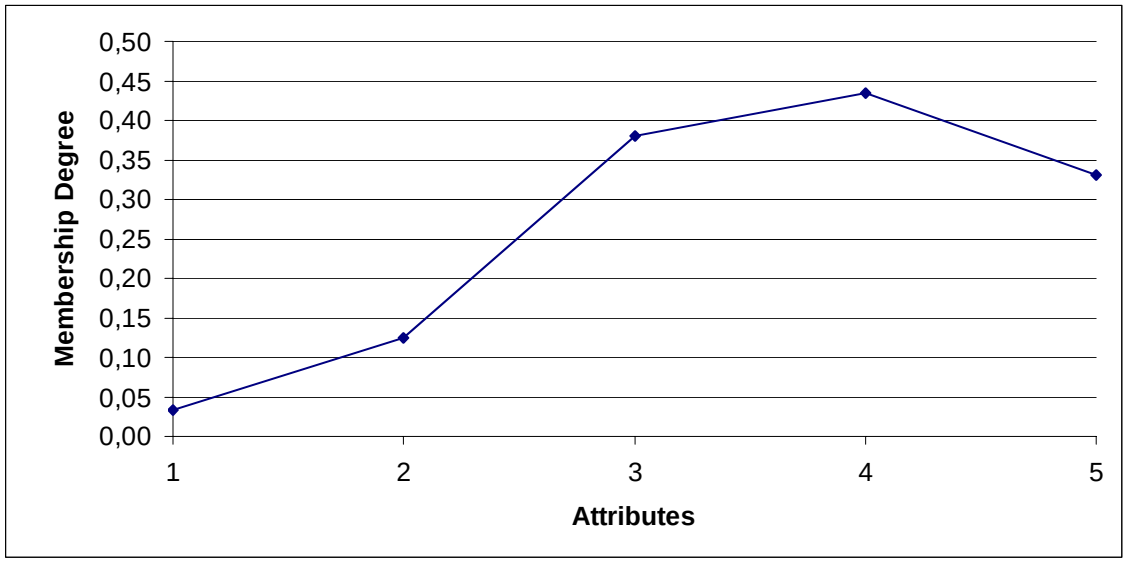
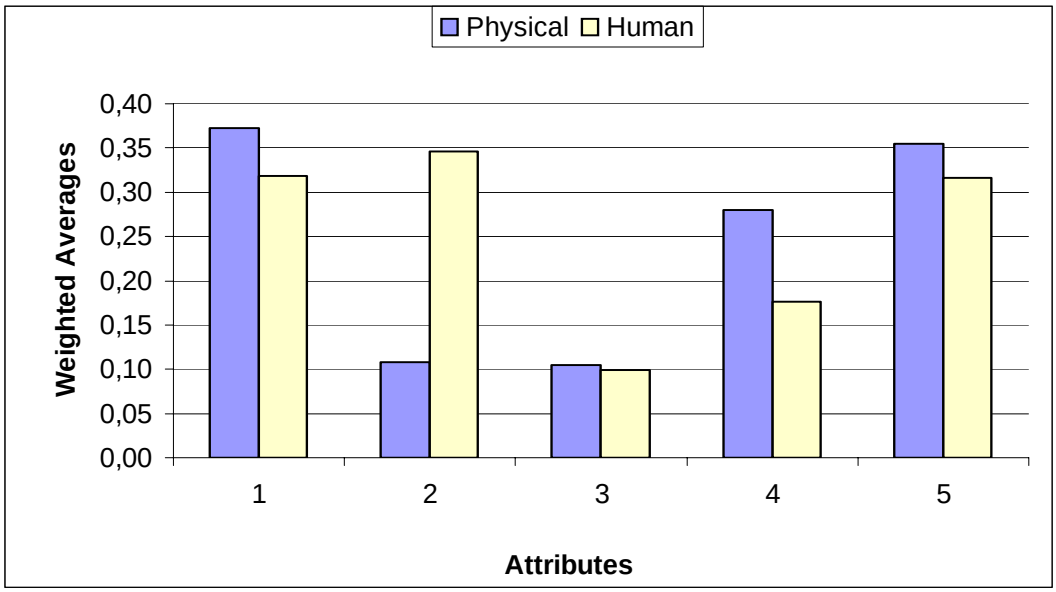


Figure G 39 - 40: Weighted averages hıstograms and membershıp degree graphs of Tisan Tample, Mersin.

Antalya Waterfalls, Turkey



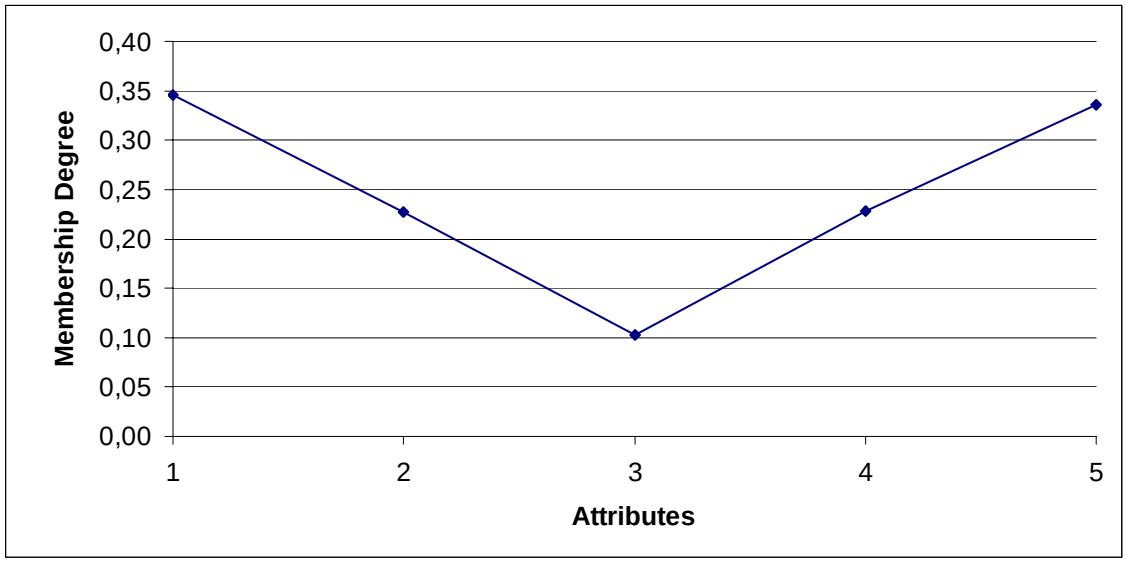
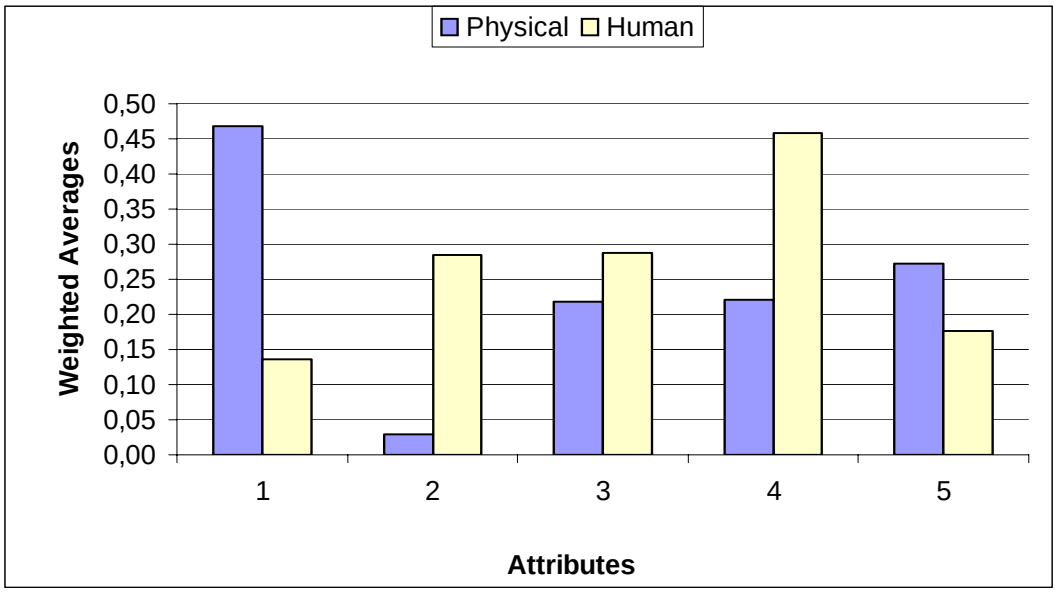


Figure G 41 - 42: Weighted averages hıstograms and membershıp degree graphs of Antalya Waterfalls.

Antalya Old Harbour, Turkey



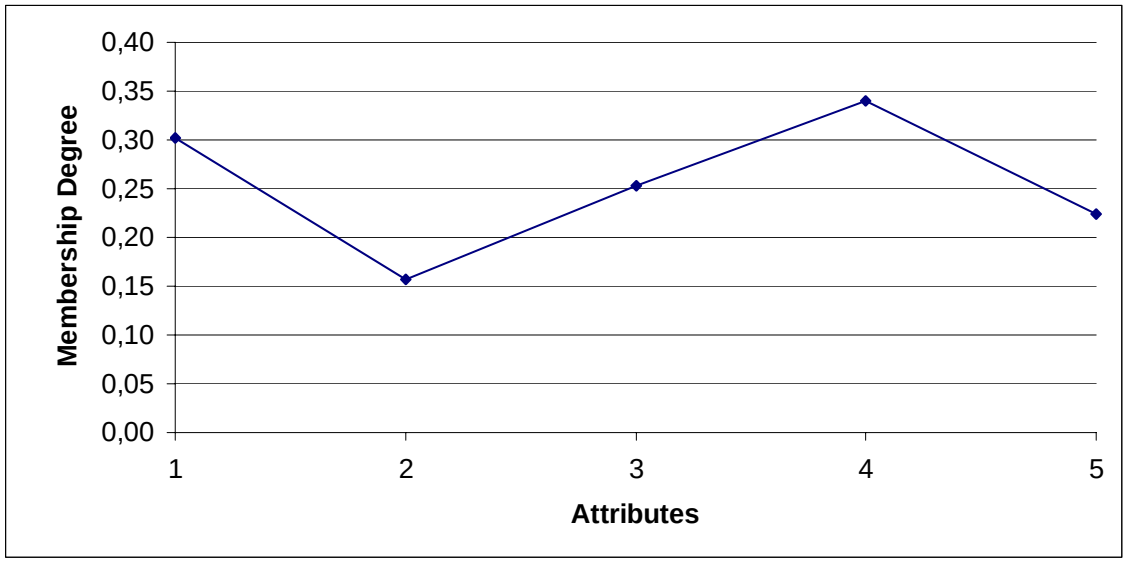


Figure G 43 - 44: Weighted averages hıstograms and membershıp degree graphs of Antalya Old Harbour.