PERIODICUM BIOLOGORUM
VOL. 110, No 2, 195–204, 2008

UDC 57:61
CODEN PDBIAD
ISSN 0031-5362

Original scientific paper

Causes and consequences of demographic development in the territory of Velebit Nature Park, 1857–2001

DANE PEJNOVIĆ[1]
DRAGICA HUSANOVIĆ-PEJNOVIĆ[2]

[1] Geography Department
Faculty of Natural Science and Mathematics
Marulićev trg 19, 10000 Zagreb, Croatia

[2] Teacher Studies Department in Gospić
Teachers College in Rijeka
Dr. Ante Starčevića 12
53000 Gospić, Croatia

Correspondence:
Dane Pejnović
Geography Department
Faculty of Natural Science and Mathematics
Marulićev trg 19, 10000 Zagreb, Croatia
E-mail: dapejno@geog.pmf.hr

Key words: population, settlements, demographic development, natural trends, migrations, depopulation, Velebit Nature Park, Croatia

Received April 28, 2008.

Abstract

Background and Purpose: *The focus of this paper is the population and level of human habitation in Velebit Nature Park. The objective is to show the causes underlying demographic development, including population figures from 1857 to 2001 and overall population trends from 1961 to 2001 (population dynamics, natural trends and migrations) and their consequences in the contemporary habitation structure (settlements based on size and age composition of their populations).*

Research methodology, periodization and spatial scheme: *The research approach was based on application of demographic models (demographic transition, general population trends and percentage evalvation of the population's age structure), methods (spatial analysis and synthesis) and techniques (tabular and cartographic analysis of relevant indicators). Periodization encompasses the intercensal periods from 1857 to 2001, wherein emphasis is placed on analysis of demographic development during the 1961–2001 period and the 1991–2001 period. The special scheme for research constitutes Velebit Nature Park as a whole, its four population zones (sub-montane settlements, coastal settlements, peripheral Lika settlements and Zrmanja area settlements), and settlements in the wider Park zone (a total of 75 settlements).*

Results and Conclusions: *From the time of its first settlement in the late seventeenth century until the beginning of the twentieth century, the population in the Park's territory grew, whereafter continual depopulation ensued. At its peak in 1910, the population in the wide territory of the Park was 52,202, which is approximately 22 persons/km^2, while in 2001 the population was only 9,219, or less than 4 persons/km^2. Main causes for this drastic depopulation were emigration (under conditions of agrarian overpopulation and lagging regional development) and destructive impact of wars (World War II and Croatia's 'Homeland War' inthe 1990s). Given the overriding population trends, the result was that by the 1960s this became an exodus area marked by explicit emigratory trends, while by the 1970s this became a dying-off trend. This fact is reflected in the modern habitation structure, characterized by predominance of small settlements with populations marked by extremely advanced age. Enervation of the social energy to make use of the Park's resources and threats to habitats by natural succession of vegetation – with the ensuing negative impact on biological diversity and landscapes – dictate the need to revitalize the population within the framework of sustainable development in the protected area.*

INTRODUCTION

Covering a surface area of 2,274 km^2, Velebit Nature Park is the largest individual protected nature area in Croatia. Within its boundaries, it encompasses the largest and most important Croatian mountain complex – Velebit. Its size is determined not so much by its height (the highest peak, Vaganski vrh, is 1,758 m high), as by its dimensions – its meridionally extended (with a bent arc in the south-east) trunk that is roughly 145 km long and its relative height (1,758 m from the seaside and an average of almost 1,200 m on the Lika). Its dimensions and direction of its expanse that it functions as a physical and geographic barrier between coastal and continental (inland) Croatia.

Given its physical location, Velebit Nature Park is part three Croatian physiognomic macro-regions: Highland Croatia and the Northern and Southern Croatian Littoral. Hence its nodal location that functions as a tie between these three specifically important regional components of Croatian national territory. In contrast to this, from spatial-functional and regional developmental standpoints, the Park's territory has exceptionally peripheral significance. It is located between the three leading hubs of life in Croatia: the capital city of Zagreb with the regional hub of Karlovac (Central Croatia), the Rijeka socio-economic region (Northern Croatian Littoral) and the developed regional hub of Zadar (Southern Croatian Littoral). Its position thus preordained it as an emigration zone during a period of polarized development in Croatia *(1)*.

Available resources for traditional economic activities and considerable strategic importance during periods of uncertainty led to its early settlement (traces of human habitation date to the Paleolithic) and continuity of human presence in the Park's territory throughout the cultural past. The modern structure of habitation largely has its roots in late seventeenth and early eighteenth centuries as a result of secondary settlement after pressures exerted by the Ottoman authorities from Central and Southern Lika and Northern Dalmatia. The pulsation of habitation and the evolution of settlements can be monitored from that time through various phases of historical and geographic development.

From the mid-nineteenth century until World War I, the population in the Park's territory considerably surpassed the area's carrying capacity, which was reflected in the fact that individual narrow parts of this territory were overburdened. This societal impact left a deep mark on the landscape and environment in the researched area, and this is best reflected in the vegetation cover where natural forest communities covering considerable surfaces were replaced by secondary vegetation, i.e. agricultural surfaces. Besides negative environmental repercussions, this spread of the cultural landscape was also accompanied by habitat diversification, which was positively reflected in increased biological diversity and the area's ambient value.

Under the influence of emigration, which commenced in the 1870s after the decommissioning of the Austro-Hungarian Military Frontier until early twentieth century (1910), the Park's wide territory was marked by continual depopulation. Emigration proceeded under the spatial and chronologically alternating impact of 'push' and 'pull' factors on the population's spatial mobility *(2)*: from agrarian overpopulation in the area's karst environment, the peripheral location during the period of Croatia's polarized development and the destructive impact of wars on one hand, to transoceanic emigration, relocation to lowland regions and developed urban centers in Croatia and employment in other European countries on the other. Lng-term intense emigration had a deep negative impact on natural trends and the population's structural features, which was cumulatively reflected in its characteristics as an exodus zone accompanied by a demographic dying-off trend.

Among relatively numerous studies dealing with the demographic development of Croatian peripheral zones, like the wider territory of Velebit Nature Park, comprehensive approach in studies by I. Nejašmić *(3)* stands out in particular. A study by I. Turčić *(4)* contains an analysis of demographic development in the counties as a function of differences in Croatian regional development until the beginning of the 1990s. Similarly, an article by D. Pejnović *(5)* considers the interdependence of depopulation and regional development of contemporary counties during the 1961-2001 period. Inauspicious changes in the population dynamics of Croatian peripheries up to the beginning of the 1990s are most completely covered in study by M. A. Friganović *(6)*. Unfavorable changes in Lika's demographic development, including a considerable portion of Velebit Nature Park, up to the beginning of the 1990s are covered in a study by D. Pejnović *(7)*. This same author conducted more detailed research into Lika's demographic development under the conditions of a periphery *(8)*, and also in to the potential for revitalizing these depopulated and war-stricken regions of Croatia *(9)*.

The objective of this study was to contribute to knowledge of the causes and consequences of demographic development in the wider territory of Velebit Nature Park. Based on empirical knowledge and results of previous research, it is possible to make the following working hypotheses:

1. from its initial settlement to the early twentieth century, demographic development in the Park was characterized by population growth as a result of natural growth under conditions of demographic transition;

2. since the 1870s, the Park's demographic development has proceeded under the heightened influence of emigration of its inhabitants;

3. emigration was caused by the cumulative impact of several 'push' factors (from the low carrying capacity of natural resources, through the destructive impact of wars to the underdevelopment of central settlements in the Park's immediate vicinity);

4. long-term and at times even intense emigration has left deep negative consequences on the age structure (aging) and natural population trends (negative birth rate);

5. contemporary demographic processes are marked by an atrophied structure of habitation.

These hypotheses were tested through the research procedure.

RESEARCH METHODOLOGY, PERIODIZATION AND SPATIAL SCHEME

In line with the designated problem area, the basis for this research approach in this study were demographic models: demographic transition model, general population trend model and the population age structure evaluation procedure. Expansion and contraction of the population within the framework of these models was studied using appropriate methods and techniques. Methods of fundamental importance include spatial analysis and synthesis, while vital techniques include tabular and cartographic analysis of the relevant indicators of demographic trends.

Demographic transition is a theory of gradual transition of population trends under the influence of socio-economic development from high birth and death rates to low birth and death rates, thus denoting a thorough transformation of the population's reproductive regime (from irrational to rational reproduction.). Three stages can be distinguished within this type of demographic transition: 1. pre-transition stage (high birth and death rates and variable although generally balanced growth), 2. transition stage with three sub-stages – a) early (high birth rate, reduction of death rate, increased population growth), b) mature (high birth rate, rapid reduction of death rate, expanded growth) and c) late (low death rate, reduced birth rate, reduced growth), and 3. post-transition stage (low and balanced birth and death rates, zero growth or natural decline of population) *(10)*.

General population trend is a synthetic indicator of demographic development in a given area over a specific period. It encompasses natural trends (growth/decline) and spatial mobility (migrations) of a population which is recorded as a whole in the number of inhabitants established by censuses. Depending on whether the migration balance is positive or negative, the area under observation is designated as having exodus (E) or immigration (I) features. In this regard, four different types of exodus zones can be distinguished: E1 – with an emigration trend (positive natural trend; census ascertains positive trend; natural trend rate higher than increase ascertained by census), E2 – with a depopulation trend (positive natural trend; census ascertains negative trend; natural trend rate higher than decrease ascertained by census), E3 – with a drastic depopulation trend (positive natural trend; census ascertains negative trend; natural trend rate lower than decrease ascertained by census), E4 – with dying-off trend (negative natural trend; census ascertains negative trend; natural trend rate (decrease) lower than decrease rate ascertained by census). Thus, four different types of immigration zones can also be distinguished: I1 – with an expanding immigration trend (positive natural trend; census ascertains positive trend; natural trend rate (increase) ascertained by census higher than natural growth rate), I2 – with a trend of regeneration by immigration (negative natural trend; census ascertains positive trend; natural trend rate (increase) ascertained by census higher than natural trend (decrease), I3 – with a weak trend of regeneration by immigration (negative natural trend; census ascertains positive trend; trend (increase) ascertained by census lower than natural trend (decrease) rate, I4 – with a very weak trend of regeneration by immigration (negative natural trend; census ascertains negative trend, trend (decrease) ascertained by census lower than natural trend (decrease) rate) *(11)*.

The age structure evaluation procedure is based on assigning points to the share of young and elderly populations and adding these values together, which provides a point indicator of the population's aging level. This standardization consists of seven aging phases or types (1 – at the aging threshold, 2 – aging, 3 – aged, 4 – advanced age, 5 – very advanced age, 6 – exceptionally advanced age, and 7 – extremely advanced age) *(12)*.

The chronological framework for research into demographic development in Velebit Nature Park encompasses the period from the first modern statistical census, 1857, to the last population census conducted in 2001. Despite considerable orientation to results of censuses, the basis for periodization in this study was not only the intercensal periods, but it also covers several tentatively homogenous developmental periods. Thus, besides population trends during the 1857-2001 period, the general population trends from 1961 to 2001 were more thoroughly researched with emphasis on the last intercensal period from 1991 to 2001 and natural trends in the 2001–2006 period.

Despite clear spatial demarcation of Velebit Nature Park, its extent does not correspond to the spatial framework encompassed by this study. Actually, the Park's boundaries, defined on a topographic map with a scale of 1:25,000 and synthesized on a map of 1:100,000, do not correspond to the boundaries of statistical settlements, they rather intersect their area. Such incongruities impose the question of proper definition of the total number of settlements in the researched area. From the broader geographic and, primarily, demographic standpoints, including the following settlements in the wide spatial extent of the Park is justified:

1. those whose area is entirely within its nominal boundaries. This includes all submontane and coastal settlements, regardless of whether they are rural or central settlements, including Karlobag and Starigrad, but not Senj;

2. peripheral settlements whose area is partially encompassed by the Park's boundaries, but with developed lots (including both residential and commercial buildings) outside of the protected area. This includes only the peripheral Lika and Zrmanja settlements of rural prove-

Figure 1. *Spatial layout of analysis of demographic development indicators in Velebit Nature Park.*

nance wherein the populations were and today still are a vital factor in use of spatial resources, landscape formation and environmental impact in the Park, while their cultural landscape is compatible with the protected area.

Thus, the Park's wide territory does not encompass nearby central settlements (Gospić, Otočac, Obrovac, Jasenice, Gračac, Perušić and Lovinac) which, as focal points of local, territorial and regional development, have functional and physiognomic features that palpably distinguish them from the rural settlements of the protected area and its immediate vicinity. This is valid even if a considerable portion of their areas fall within the Park's boundaries, as in case of the central settlement of Southern Lika, Gračac.

By applying these criteria, the spatial research framework for this study was defined in the manner that it encompassed 75 statistically defined settlements. The differing direction and intensity of developmental processes, as well as reasons for research, justify the classification of four habitation zones as small spatial/analytical units within the broad Park territory defined as follows: submontane settlements, coastal settlements, peripheral Lika settlements and peripheral Zrmanja settlements. Such a spatial scheme facilitates monitoring of demographic development on three levels of spatial analysis: at the level of the wider territory of Velebit Nature Park, at the level of separate settled zones (four smaller spatial units) and at the level of settlements (75 settlements) (Figure 1).

RESULTS

The first modern population census conducted in 1857 recorded 42,445 inhabitants in the Park's wider territory. With the exception of a brief regression in the 1870s, over the subsequent fifty years the population increased, and by 1910 it reached its peak of 52,202. Thereafter the population continually declined, i.e. the area underwent depopulation. Several periods with varying depopulation intensities can be distinguished: the first, 1910–1931, marked by slight depopulation (–2,582 or –5%); the second, 1931–1948, marked by significant depopulation (–9,904 or –20%); the third, 1948–1991 marked by drastic depopulation (–20,921 or –52.7%); and the fourth, 1991–2001, also marked by drastic depopulation (–9,573 or –50.9%). The result is that in the last census, conducted in 2001, a total of 9,219 inhabitants were recorded in the observed area, which is only 17.7% of the 1910 figure (Figure 2)

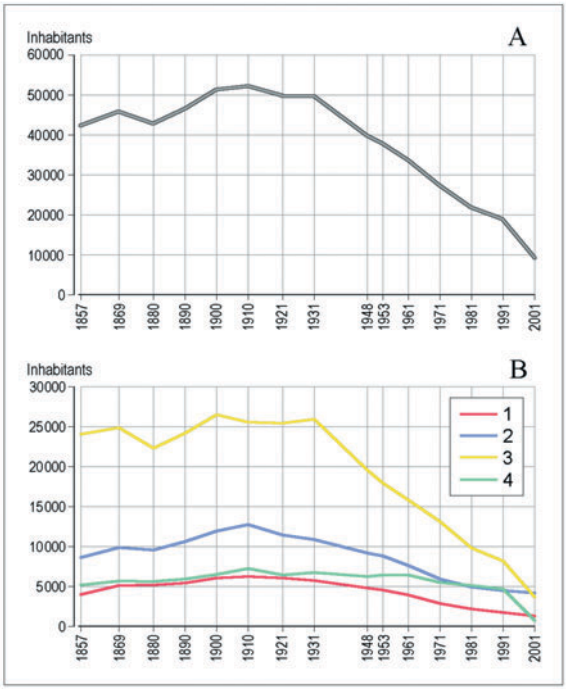

Figure 2. *Population trends in Velebit Nature Park (A) and its separate inhabited zones (B) 1857–2001. 1 – Sub-montane settlements, 2 – Coastal settlements, 3 – Lika settlements, 4 – Zrmanja settlements.*

The peripheral Lika settlements were the focus of habitation in the wider territory of Velebit Nature Park since its secondary settlement in the late seventeenth and early eighteenth centuries. This was also confirmed by the 1857 census, when 24,399 inhabitants were recorded in this zone, which was 57.5% of the entire area's population at the time. Coastal settlements participated with 20.6%, peripheral Zrmanja settlements with 12.3% and sub-montane settlements with 9.6% of the Park's total population.

The differing pulsation of habitation in the four separate settled zones was reflected in changes in the distribution of settlements in the Park's wider territory at the beginning of the 1990s. Most population in the territory under observation continued to live in the peripheral Lika settlements (43.8%), followed by peripheral Zrmanja settlements (24.4%), coastal settlements (23.3% and then submontane settlements (8.5% of the Park's inhabitants in 1991). More tangible changes occurred in the 1991–2001 intercensal period, when, under the influence of wartime events, considerable depopulation took place of the peripheral Lika (–4,663 inhabitants or –56.7%) and Zrmanja area settlements (–3,957 inhabitants or –86.4%). Moreover, in the 2001 census, only 621 inhabitants were recorded in the peripheral Zrmanja settlements, which is 13.6% of their population in 1991. This was also reflected in changes in the distribution of inhabitants throughout the Park's territory, so that the focus of habitation moved to the coastal settlements (43.3%), followed by the peripheral Lika (38.6%), sub-montane (11.4) and then peripheral Zrmanja settlements (6.7% of the Park's total population in 2001).

Such spatially differentiated population trends were correspondingly reflected in changes in population density. Over the observed period of 144 years, general relative population density in the Park's wider territory changed from 17.7 persons//km^2 in 1857, to 21.8 persons/km^2 in 1910 to less than 4 persons/km^2 in 2001. Due to its impact on the area under conditions of traditional farming, it is important to note the long duration (from the mid-nineteenth to the mid-twentieth century) of relatively high population density – over 16 persons /km^2 (Table 1).

TABLE 1

Population density trends in the wider territory of Velebit Nature Park, 1857-2001.

Spatial unit	No. of persons per km^2					
	1857	1910	1931	1948	1991	2001
Velebit Nature Park	**17.72**	**21.79**	**20.71**	**16.58**	**7.84**	**3.85**
I. Submontane settlements	10.90	16.98	15.58	12.86	4.32	2.82
II. Coastal settlements	12.46	18.15	15.55	13.11	6.22	5.66
III. Peripheral Lika settlements	24.11	25.56	25.89	19.31	8.13	3.52
IV. Peripheral Zrmanja settlements	16.98	23.59	21.70	20.06	14.93	2.03

TABLE 2

General population trends in Velebit Nature Park and its separate settled zones in 1961-2001 intercensal periods.

1961–1971 intercensal period									
Spatial unit	Population		Change in population		Natural trend		Migration balance		Type of population trend*
	1961	1971	Abs.	%	Abs.	%	Abs.	%	
Velebit Nature Park	**33,447**	**27,172**	**–6,275**	**–18.8**	**1,462**	**4.4**	**–7,737**	**–23.1**	**E3**
I. Submontane settlements	3,630	2,644	–986	–27.2	136	3.7	–1,122	–30.9	E3
II. Coastal settlements	7.650	5,874	–1,776	–519	224	9	–2,000	–528	E3
III. Peripheral Lika settlements	15,847	13,171	–2,676	–613	586	72	–3,262	–685	E3
IV. Peripheral Zrmanja settlements	6,320	5,483	–837	–13.2	516	8.2	–1,353	–21.4	E3
1971–1981 intercensal period									
Spatial unit	Population		Change in population		Natural trend		Migration balance		Type of population trend*
	1971	1981	Abs.	%	Abs.	%	Abs.	%	
Velebit Nature Park	**27,172**	**21,591**	**–5,581**	**–20.5**	**–200**	**–0.7**	**–5,381**	**–19.8**	**E4**
I. Submontane settlements	2,644	2,015	–629	–23.8	1	0.0	–630	–23.8	E3
II. Coastal settlements	5,874	4,822	–1,052	–17.9	–125	–2.1	–927	–15.8	E4
III. Peripheral Lika settlements	13,171	9,754	–3,417	–25.9	–362	–2.7	–3,055	–23.2	E4
IV. Peripheral Zrmanja settlements	5,483	5,000	–483	–8.8	286	5.2	–769	–14.0	E3
1981–1991 intercensal period									
Spatial unit	Population		Change in population		Natural trend		Migration balance		Type of population trend*
	1981	1991	Abs.	%	Abs.	%	Abs.	%	
Velebit Nature Park	**21,591**	**18,756**	**–2,835**	**–13.1**	**–1,000**	**–4.6**	**–1,835**	**–8.5**	**E4**
I. Submontane settlements	2,015	1,570	–445	–22.1	–116	–5.8	–329	–16.3	E4
II. Coastal settlements	4,822	4,383	–439	–9.1	–21	–0.4	–418	–8.7	E4
III. Peripheral Lika settlements	9,754	8,225	–1,529	–15.7	–804	–8.2	–725	–7.4	E4
IV. Peripheral Zrmanja settlements	5,000	4,578	–422	–8.4	–59	–1.2	–363	–7.3	E4
1991–2001 intercensal period									
Spatial unit	Population		Change in population		Natural trend		Migration balance		Type of population trend*
	1991	2001	Abs.	%	Abs.	%	Abs.	%	
Velebit Nature Park	**18,756**	**9,114**	**–9,642**	**–51.4**	**–807**	**–4.3**	**–8,835**	**–47.1**	**E4**
I. Submontane settlements	1,570	1,044	–526	–33.5	–137	–8.7	–389	–24.8	E4
II. Coastal settlements	4,383	3,887	–496	–11.3	–168	–3.8	–328	–7.5	E4
III. Peripheral Lika settlements	8,225	3,562	–4,663	–56.7	–431	–5.2	–4,232	–51.5	E4
IV. Peripheral Zrmanja settlements	4,578	621	–3,957	–86.4	–71	–1.6	–3,886	–84.9	E4

*** Types of general population trends**
E – Exodus zone
E1 – Emigration, **E2** – Depopulation, **E3** – Drastic depopulation, **E4** Dying off
I – Immigration zone
I1 – Expansion by immigration, **I2** – Regeneration by immigration
I3 – Weak regeneration by immigration, **I4** – Very weak regeneration by immigration

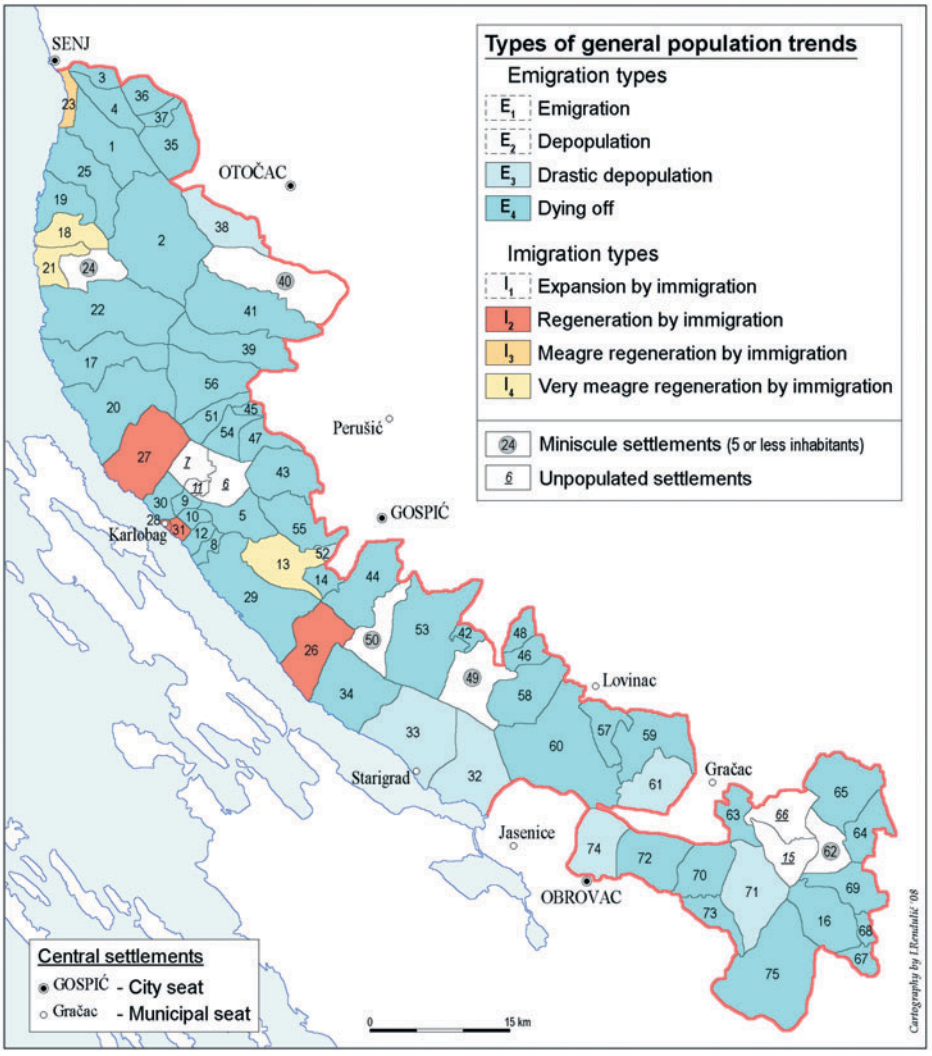

Figure 3. *General population trends in the settlements of Velebit Nature Park in the 1991–2001 intercensal period*

Traditionally, the peripheral Lika and Zrmanja settlements had the highest population density among the settled zones in the Park, while the submontane settlements had the lowest. Among the Lika settlements, particularly notable at the beginning of the twentieth century were Donje Pazarište (127 persons/km^2), Brezik (52 persons/km^2), Štikada (51 persons/km^2) and Kuterevo (47 persons/km^2), while among the peripheral Zrmanja settlements the most notable were Zrmanja (48 persons/km^2) and Zrmanja Vrelo (34 persons/km^2). Among the coastal settlements (except Karlobag), Sveti Juraj (70 persons/km^2) was ranked highest, while among the submontane settlements Konjsko (54 persons/km^2 in 1910) stood out due to its high population density.

In the modern period, population density in the Park's wider territory is less than 4 persons/km^2, ranging from 2 persons/km^2 in the peripheral Zrmanja settlements to roughly 6 persons/km^2 in coastal settlements. More detailed testimony to atrophied habitation structure is provided by the fact that five statistical settlements no longer have inhabitants (Crni Dabar, Došen Dabar, Ravni Dabar, Duboki Dol and Vučipolje), while in 15 settlements (or a fifth of the total number of settlements in the Park) there is less than 1 person/km^2 (Kom, Prizna, Starigrad, Velike Brisnice, Staništa, Vrzići, Divoselo, Drenovac Radučki, Kukljić, Lički Čitluk, Počitelj, Velika Plana, Raduč, Cerovac and Otrić).

The fundamental reason for this depopulation is emigration of population from the territory of the Park and its environs from the early 1870s onward and the demographic losses incurred by World War II and Croatian Homeland War. The intensity of emigration is demonstrated by negative migration balance (which corresponds to the intensity of emigration with negligible deviations) of 23,788 inhabitants during the 1961–2001 period, which is over 70% of the total population of this area at the beginning of the 1960s. Because it was primarily younger inhabitants who emigrated, the aforementioned depopulation factors were joined in the 1970s by negative natural trends, i.e. negative birt rate.

This was reflected in the general population trend, so that the wider territory of Velebit Nature Park during the 1960s was an exodus zone with an explicit depopulation trend, and a dying-off trend since the 1970s. During the 1981–1991 intercensal period, thus before the destructive impact of war on habitation structure, all four habitation zones had the features of an exodus zone. This trend was particularly notable in the last intercensal period, 1991–2001, when the population in this area halved (Table 2).

General population trends in the settlements of the researched area in 1991–2001 (Figure 3) thoroughly testify to the depth of the crisis features of demographic development in the wide territory of Velebit Nature Park in the recent period.

Cartographic analysis demonstrates that the dying-off trend has beset 55 settlements, or 73.3% of the total number of settlements in the Park's wide territory. Peripheral Lika settlements have the largest share of settlements experiencing a dying-off trend (87.5%), followed by the peripheral Zrmanja settlements (77.8%), while the least unfavorable features in general population trends can be found in the coastal settlements (50% are exempt from by the dying-off trend). Moreover, during the period under observation, seven coastal settlements had the features of an immigration zone, and four in the territory of the Karlobag Municipality experienced a regeneration by immigration trend (Karlobag, Cesarica, Barić Draga and Vidovac Cesarički).

Such population trends result in rapid atrophy of the habitation structure throughout Velebit Nature Park. This is reflected in the size of settlements and the population's age structure as of 2001.

Settlement structure is dominated by small settlements (largely dispersed to tentatively clustered), as a part of fossilized cultural landscape from the era of initial settlement, when traditional farming was predominant. Over 30% of settlements are in the size category of »15 or less inhabitants« (which includes settlements with no inhabitants), while only six settlements have over 500 inhabitants (Table 3).

Submontane settlements have the most unfavorable majority structure of habitation among the Park's settled zones, where there are uninhabited settlements, while those with 15 or less inhabitants account for a half of the total number of settlements. In contrast, coastal settlements include the smallest share of small settlements and the largest number and share of settlements with over 500 inhabitants. The aging indicator with the »extremely advanced age« feature shows a weakening of social energy in all four settled zones, among which peripheral Lika settlements have the highest share of old populations.

That demographic aging is a certain future for the wide territory of Velebit Nature Park is additionally demonstrated by population age structure indicators from 2001: age composition of population was marked by »extremely advanced age« and there were over one third (36%) of the elderly in the total population (Table 4).

DISCUSSION AND CONCLUSIONS

The wider territory of Velebit Nature Park was initially settled at the end of the seventeenth century, due to pressure exerted by the Ottoman authorities from the directions of Lika and Northern Dalmatia. They were settled by livestock herders who lived in small, round stone dugouts and who took up permanent residence there. Their society was organized into household cooperatives and their economy was based on extensive (primarily transhumant) livestock raising, accompanied by a degree of land cultivation. Since these activities required large pastures and forest tracts, cooperative households were widely dispersed. Their holdings covered relatively large spaces, mostly pastures dotted with cultivated fields. This led to a specific type of dispersed economy with gathered holdings which over time grew into patronymic hamlets, linked in a wider village community.

As a result of the high rate of natural growth characteristic of the early and mature sub-stages of demographic transition, during the eighteenth and nineteenth centuries the population in the Park and its surroundings gradually grew. Influenced by overall socio-economic development, particularly when starvation was overcome (by applying expanded three-field crop rotation and increased potato cultivation in the eighteenth century), a significant reduction in mortality was achieved in the latter half of the nineteenth century, primarily in peripheral Lika settlements. Data on natural growth rates in Lika testify to this: 2.7‰ in the 1874–1877 period, 15.2‰ in the 1878–1883 period and 17.3‰ in the 1906–1910 period. Thanks to these factors, and also to intensified exodus of population in the early twentieth century, the maximum population in this settled zone was already reached in 1900.

Imbalance between the number of inhabitants and the limited potential of the highland-karst natural resources was reflected in agrarian overpopulation and the development of the Park's wide area as a classic passive region. On one hand, this was reflected in increased deforestation to turn forest tracts into agricultural surfaces, and in compulsory emigration of excess population on the other. Despite sometimes very intense emigration which commenced early, the problem of agrarian overpopulation lasted until the Second World War, and even afterwards. This is backed by data on agrarian overpopulation between the two World Wars in Western Lika (in the districts of that time: Otočac, Perušić, Gospić and Gračac) with 43,770 inhabitants, in the district of Senj with 5,731 inhabitants and the district of Benkovac (which included Velebit settlements in the territory of today's municipalities of Starigrad and Obrovac) with 35,000 inhabitants *(13)*.

Such conditions of imbalance between the number of inhabitants and the area's carrying capacity (natural and economic simultaneously) made emigration a necessity. This began after the decommissioning of the Austro-Hungarian Empire's Military Frontier in the 1870s, and continued to proceed until the most recent era. The vari-

TABLE 3

Structure of settlements based on size in Velebit Nature Park and its settled zones in 2001.1.

Spatial unit	Total no. of settlements	No. of settlements with >500 inhabitants	No. of settlements with 300–500 inhabitants	No. of settlements with 100–300 inhabitants	No. of settlements with 50–100 inhabitants	No. of settlements with 15–50 inhabitants	No. of settlements with <15 inhabitants
	75	**6**	**2**	**19**	**14**	**11**	**23**
Velebit Nature Park	*100.0*	*8.0*	*2.7*	*25.3*	*18.7*	*14.7*	*30.7*
I. Sub-montane settlements	16	1	-	2	3	2	8
	100.0	*6.3*	-	*12.5*	*18.8*	*12.5*	*50.0*
II. Coastal settlements	18	3	2	5	3	2	3
	100.0	*16.7*	*11.1*	*27.8*	*16.7*	*11.1*	*16.7*
III. Peripheral Lika settlements	32	2	-	10	6	2	12
	100.0	*6.3*	-	*31.3*	*18.8*	*6.3*	*37.5*
IV. Peripheral Zrmanja settlements	9	-	-	2	2	5	-
	100.0	-	-	*22.2*	*22.2*	*55.6*	-

TABLE 4

Age composition of population and indicator of aging in Velebit Nature Park and its separate settled zones in 2001.

Spatial unit	Total	Age composition of population								Indicator of aged population	
		Young (<19 yrs.)			Middle-aged (20–59 yrs.)		Elderly (>60 yrs.)				
		Abs.	%	Points	Abs.	%	Abs.	%	Points	Points	Type*
Velebit Nature Park	**10,511**	**1,985**	**18.9**	**9**	**4,746**	**45.2**	**3,780**	**36.0**	**0**	**9**	**7**
I. Sub-montane settlements	1,044	209	20.0	10	525	50.3	310	29.7	0	10	7
II. Coastal settlements	3,987	808	20.3	11	1,887	47.3	1,292	32.4	0	11	7
III. Peripheral Lika settlements	3,562	584	16.4	4	1,446	40.6	1,532	43.0	0	4	7
IV. Peripheral Zrmanja settlements	1,918	384	20.0	11	888	46.3	646	33.7	0	11	7

*Type 7 – Extremely advanced

ous 'push' factors (direct causes), directions of emigration and intensity of mechanical outflow of the population from individual sections of the Park were the only aspects that changed in this process *(14, 15)*. The 'push' factors which cumulatively influenced emigration over and above agrarian overpopulation under low local carrying capacity conditions also included the wider area's lagging regional development within Croatia, that is the underdevelopment of central settlementts in the Park's immediate vicinity *(16, 17, 18)*. Emigration prompted by wartime events – characteristic of the peripheral Lika and Zrmanja settlements – should be added to this.

The impact of emigration on demographic development in the wide territory of Velebit Nature Park has been synthetically reflected in general population trends, which by the beginning of the 1970s were characterized by a dying-off trend. This has resulted in the devastation of the inherited habitation structure, marked by a network of small settlements and extremely advanced age among the remaining population. Among the Park's four separate settled zones, the peripheral Lika and Zrmanja settlements stand out in terms of unfavorable processes in the contemporary period.

The working hypothesis from the introductory section of this study was thus entirely confirmed. Moreover, it would be justifiable to anticipate that negative demographic processes in the near future will result in complete disappearance of population in most of the researched area.

The observed depopulation in the Park and its surroundings is being accompanied by reforestation, i.e. the succession of plant communities toward an ecological climax. In perspective, this will inevitably be reflected in impoverishment of habitats, with the corresponding impact on biological diversity and degradation of the area's

highly valuable landscape. On the other hand, a lack of social energy is being increasingly felt, particularly the absence of a skilled work force to service activities that take advantage of local natural resources. This includes tourism, which is specifically valuable to the protected area. The size, position and overall significance of Velebit Nature Park dictate the need to take measure with the aim of revitalizing human habitation in its wider area. The key instrument for achieving this end is to take advantage of its rich and diverse natural resources in compliance with the principles of sustainable growth.

REFERENCES

1. KOČI-PAVLAKOVIĆ V 1996 »Regionalni ekonomski razvoj graničnih krajeva: teorijske osnove i modeli«. *U:* Zbornik radova I. hrvatskoga geografskog kongresa. Hrvatsko geografsko društvo, Zagreb, str. 351–358
2. WITHERICK M, ROSS S, SMALL J 2001 A Modern Dictionary of Geography. Arnold, London, p 293
3. NEJAŠMIĆ I 1991 Depopulacija u Hrvatskoj: korijeni, stanje, izgledi. Biblioteka Posebna izdanja/Globus, Zagreb, str. 344
4. TURČIĆ I 2001 »Makroekonomski razvoj županija u Republici Hrvatskoj kroz tri desetljeća (1961/1962. do 1990/1991.)«, part 2, Dugoročne tendencije kretanja stanovništva županija u Republici Hrvatskoj 1961. do 1991. Ekonomski institut – Zagreb, Državni zavod za statistiku, Zagreb, str. 185
5. PEJNOVIĆ D 2004a »Depopulacija županija i disparitet u regionalnom razvoju Hrvatske«, *Društvena istraživanja*, no. 4–5 (72–73). Depopulacija Hrvatske, Institut društvenih znanosti Ivo Pilar, Zagreb, str. 701–726
6. FRIGANOVIĆ M A 1992 »Promjene u dinamici stanovništva Hrvatske 1981.–1991. kao funkcija urbanizacije«. *Geografski glasnik (Zagreb) 54:* 63–74
7. PEJNOVIĆ D 1991 »Opće kretanje stanovništva kao odraz i pokazatelj socijalno-geografske diferencijacije Like«. *Radovi (Zagreb) 26:* 65–77
8. PEJNOVIĆ D 2004b »Lika: Demographic Development under Peripheral Conditions«. *Hrvatski geografski glasnik (Zagreb):* 23–46
9. PEJNOVIĆ D 1996 »Geografski aspekt revitalizacije depopulacijskih i ratom pogođenih područja Hrvatske na primjeru Like«. Zbornik I. hrvatskog geografskog kongresa, Zagreb, str. 255–273
10. WERTHEIMER-BALETIĆ A 1999 Stanovništvo i razvoj. Mate, Zagreb, str. 658
11. FRIGANOVIĆ M 1987 Demogeografija: stanovništvo svijeta. Školska knjiga, Zagreb, p 271
12. KLEMENČIĆ M 1990 »Postupak vrednovanja dobnog sastava stanovništva«. *Radovi (vol. 25) (Zagreb) 25:* 73–80
13. BIĆANIĆ R 1940 »Agrarna prenapučenost«. Gospodarska struktura Banovine Hrvatske, 3. Gospodarska sloga, Zagreb, str. 29
14. PEJNOVIĆ D 2007 »Demografski razvoj i perspektiva naselja Krasno«, *U*: Krasno; Monografija u povodu 200. obljetnice župe sv. Antuna Padovanskoga i 170 godine školstva u Krasnu. Župa sv. Antuna Padovanskog i Adamić, Krasno – Rijeka, 37–61
15. RAJKOVIĆ M, JURKOVIĆ J 2006 »Primorski Bunjevci Krivopućani na području Virovitice (studija slučaja unutarnje migracije)«. *Studia ethnologica Croatica (Zagreb), (Vol. 18):* 231–280
16. BALETIĆ Z 1985 Razvoj privredno nedovoljno razvijenih krajeva SR Hrvatske. *U:* Baletić Z *(ur.)* Ekonomski institut Zagreb, Republički fond za razvoj privredno nedovoljno razvijenih krajeva SRH, Zagreb, str. 228
17. MARENDIĆ B, TURČIĆ I, MATES N 1982 »Mjerenje i analiza razvijenosti općina SR Hrvatske«, *U:* Baletić Z, Marendić B *(ur.)* Nedovoljno razvijena područja SR Hrvatske. Ekonomski institut Zagreb, Republički fond za razvoj privredno nedovoljno razvijenih krajeva SRH, Republički zavod za društveno planiranje SRH, Zagreb, str. 23–43
18. SIĆ M 2003 »Regional Disparities in Croatia«. *Geografski glasnik (Zagreb) 65:* 5–28