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The Use of GIS on Bioclimatic Zoning for Tourism Settlement (Case study: Polroud basin, Guilan province)

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ABSTRACT

Climate constitutes an important part of environmental context in which recreation and tourism take space. Detecting and studying hidden attractions, potentials and limitations of geographical and climatic characteristics, in different seasons, in order to be considered in tourism planning, especially for nature tourists, is of utmost importance. The case study in this research is the Guilan province of northern Iran. The main purpose of the current study is the implementation of time and space analysis in finding suitable climatic regions for tourisms by Geographical Information System (GIS) technology. In this study Makhdoom method was used for the investigation of suitable climatic condition for tourists. Due to zoning was implemented Kariging Interpolation method in Geographical Information System software and also has been used from Boolean logic for weighting and overlay analysis. Results show that, considering the time factor, there are suitable conditions during days, from May to November and during night, from Jun to September in site of the study. Considering the space factor, during days, middle parts of the region to southern parts and during nights northern parts have better climatic condition than other.

Keywords: Tourism, Bioclimatic, GIS, Kariging Interpolation, northern Iran.

INTRODUCTION

The effectiveness of climate not only is cause to emergence of tourism, but also it cause to demand of tourism services. Climate is the most important factor on developing tourism industry. Tourists' attitude is very different and contradictory. On the first estimation, it depends on the type of desired climate which is necessary to accomplishing the related activities to open space.

Today, the effect of climate on ecotourism developing has been the center of attention for many experts and scientific centers. Government and programmers in developments the programming tried to make tourism centers known and presentation of require services for tourists and removing or decreasing the existence limitation acquire necessary income in the way of

economic for this section [1]. Generally, human has the best ecological condition in climate 20 to 25c.

The purpose of body comfort degree under any local climate is an index which was suitable for human in the way of temperature and in that climate, his metabolism balance is normal [2]. In a study as "climate and the selection of destination for German tourist" which was conducted by [3] has been considered some climate variables such as the temperature, rainfall, the number of freezing days and the number of sunny days that take attention in the selection of bound for traveling. Bioclimate weather classification is based on thermal, physical and aesthetic facets and includes seven digits represent actual biothermal weather characteristics [4].

In a research which was conducted by [5], it revealed to consideration and tourism climate in Iran by using of tourist climate index (TCI). Results show that the best time of tourism for northern of Iran is spring and early in the autumn (including site of the study in this research).

In a survey study which done in Lordegan province, climate and natural tourist were investigated due to identification the desired and suitable condition of climate for tourism. According to this investigation, May, Jun, July and August, September and October have excursion priority in the way of climatic parameters, ordinary [6].

In a research as investigation on thermal comfort in open space for using ecotourism in Babolsar province of indicated that suitable condition of bioclimatic has existed in the way of time from May until at the end of November in studied region [7].

In a study has considered the condition of climate environment during the day and night at kiakalayeh wetland in Langaroud province by using of Evanz [8].

Results showed that the months of March, April, May, August, September, October and November have climatic desired condition. [8] has conducted a research on recognition of human bioclimatic comfort at Masouleh basin by using of climatic elements such as temperature, humidity, the time of sunny and wind and Guini, Elgi Climo, gram bert – lankester, bikromakhdoom methods for determination of space and time limitation of bioclimatic comfort. Results indicated that the condition of comfort is ready in region from May to October and Bikromakhdoom methods have better efficiency towards other methods.

In a study in Piranshahr province has been identified the period of comfort by using of PET and PMV index at two months of Jun and September [9].

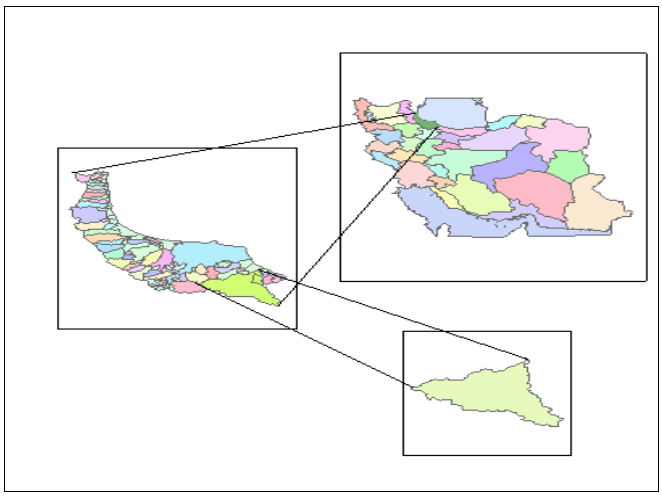
Zoning with preparing objectives emphasized on identification of potential and actual aptitudes of region for the recognition of sustained and unsustainable grounds for development.

MATERIALS AND METHODS

Site of the study:

Polroud watershed basin with 1562km^3 of extent (largeness) is located in east of Guilan province (fig.1), This basin which was located between 63, 49 to 33, 50 of eastern longitude and northern latitude 36, 33 to 37, 36 and exist 3820m the differences between minimum and maximum of its height.

The medium altitude of this basin is 1796.60 m and its height tide is 1900 – 2000m. The medium slope of basin is 20 to 32 percentages. The altitude was related to 0 - 2000m and area of 5129km^2.



(Fig.1 Site of the study)

Methodology

At the present study were used from temperature (minimum and maximum mean) and also topography map for identification of studied site. In this study for the required climatic information has been used from 10 meteorologist station and climatology which was located in the site and also area nearly research site (for covering thorough the region in order to zoning).

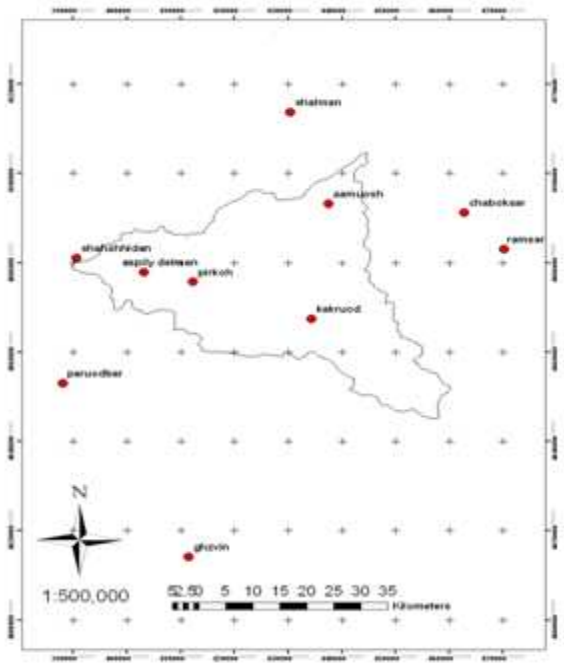
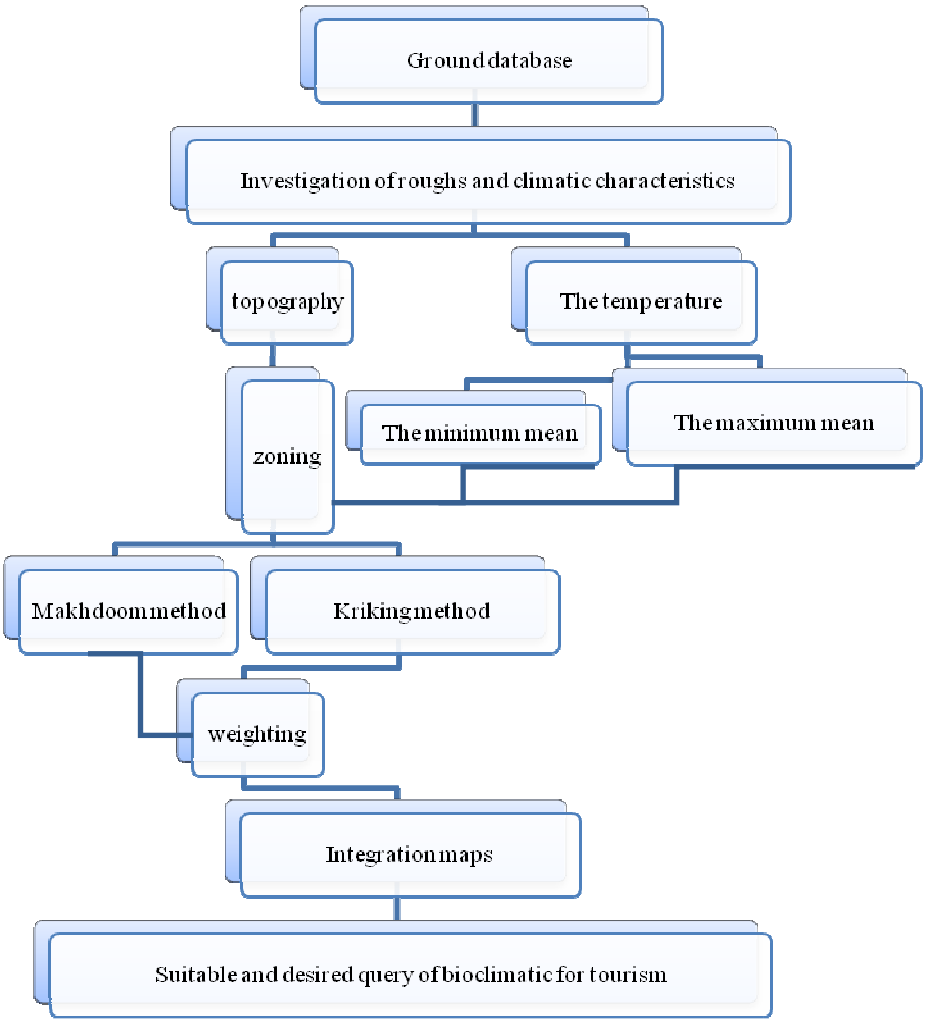


Fig2. The studied stations map

In this study in order to identification of suitable and desired condition for tourism has been from climatic method and also geographic information system for zoning.



Based on Makhdoom method has been divided excursion in the way of desired development average. In this method, climate has considered as the first and major base in model. In each two ecological models, extended and concentrated excursion of one and two category, desired and suitable climatically condition considered as: in category one seasons such as summer and spring with 21 – 25 degrees centigrade and in category 2, the temperature condition of 21-30 degrees centigrade [10].

First of all, data station has compound for each stations due to investigation and bioclimatic comfort zoning, by using of Arc GIS 9.3 and then has been used from spatial analyst in the method of interpolation, kriging model in order to bioclimatic zoning in studied basin.

At first, to combination of maps has been used from Boolean logic to investigation of climatic suitable and unsuitable condition in studied basin for tourism (in this model created an inter map in exchange for each factor that 1 revealed to suitability and 0 indicated to unsuitability of its pixel query).

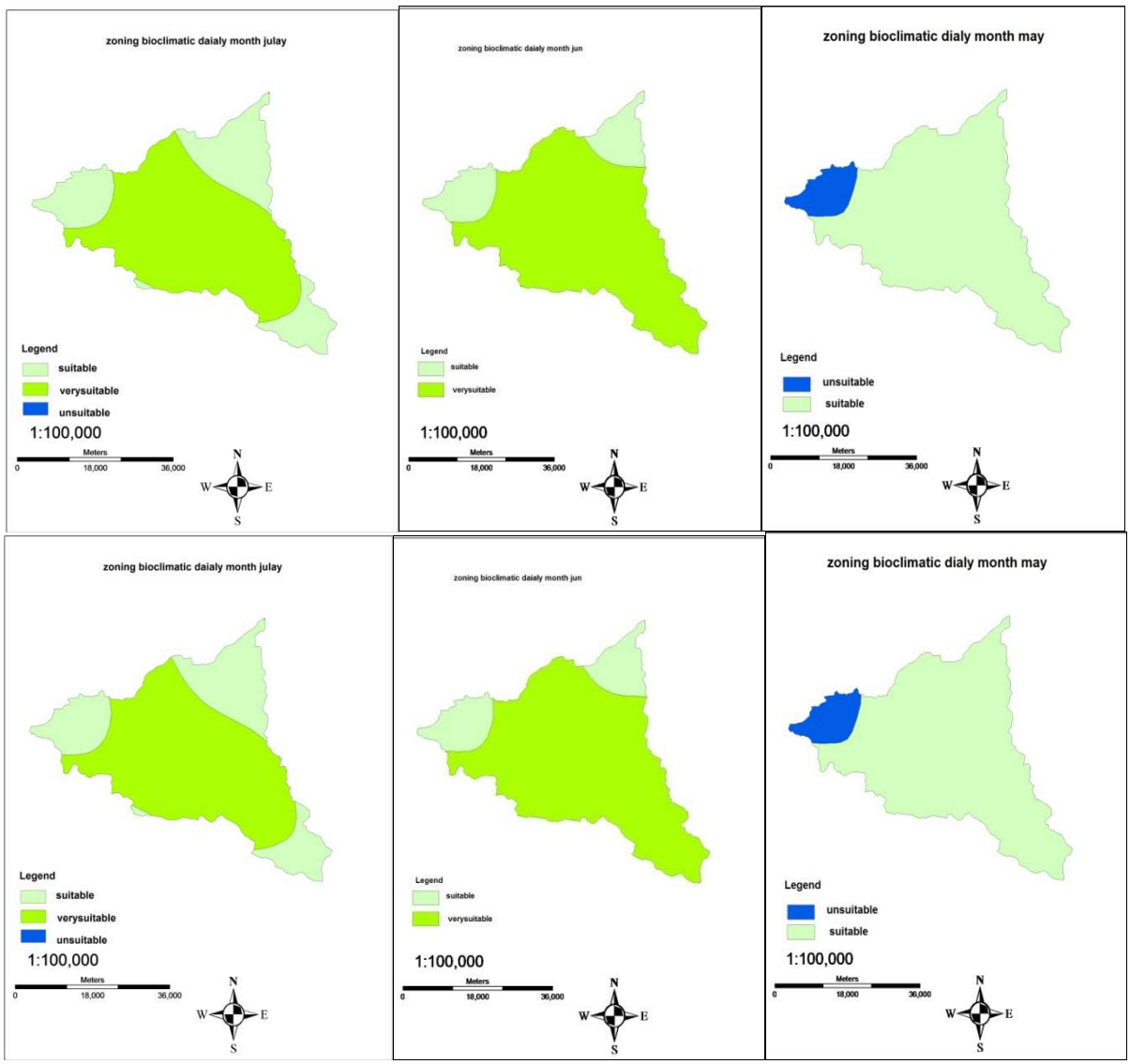
Then by overlay the layers identified the best region in the way of very suitable and suitable bioclimatic condition during the day and night, separately.

At first identified the month of region which have the temperature condition of 17 – 30 degrees centigrade for more conscious investigation on suitable and desired bioclimatic condition for

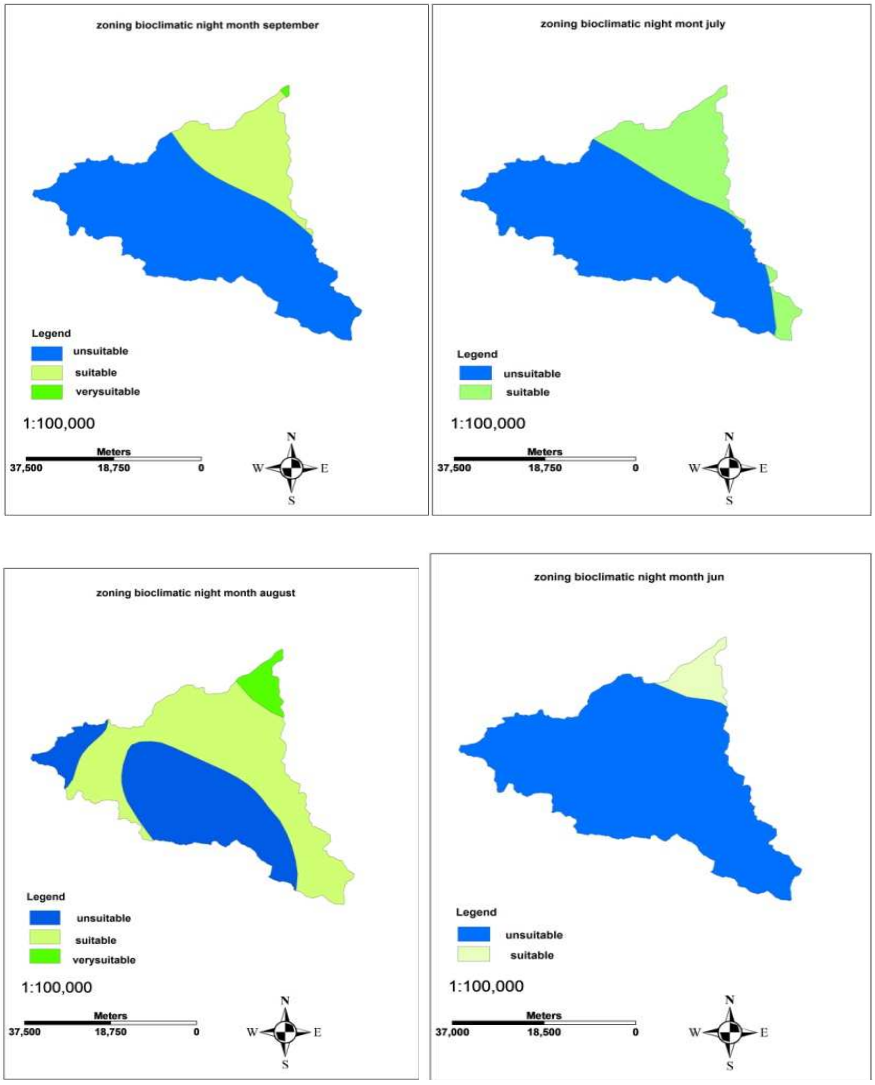
tourism. Then by using of weighting method has divided to 3 conditions of very suitable, suitable and unsuitable, area which had the condition of 21 - 25 degrees centigrade in very suitable situation, area which had 17 – 21 and 25 – 30 degrees centigrade of temperature situation, suitable code and other layers unsuitable code, figure 3 and 4 indicated the suitable and desired condition of studied region during the day and night.

RESULTS AND DISCUSSION

Regarding to the obtained maps, it revealed that during the day in May month, the other regions have desired condition exception in eastern area, in Jun month, the whole area, in Jul month middle, northern and southern zones, in August central and southern zones, in September the northern and south-west and in Oct and Nov month almost the whole area and northern area have very suitable and suitable conditioning (fig. 3 shows human bioclimatic zonings for Polrood basin during the day).



With taking into consideration of figure 4, it revealed that during the night of Jun exception of small area in north of basin, in Jul the north area and eastern north of basin have very suitable and suitable conditioning towards central area of basin and in August the subordinated elevations of basin and northern area to central area and also in south-west of basin and in September northern area of basin (fig. 4 shows the zoning bioclimatic of Polrood basin during the night).



Regarding to figure 5, the best zones in the way of very suitable bioclimatic conditioning are during the days of 4 month (Jun, Jul, August and September) and during the night of 2 months of year (August and September) that identified in the guidance of figure, in color order.

Planning the suitable climatic potentials for tourism and integrated management of tourism required to using science methods in order to identification of environment in dimensions of bioclimatic space and season comfort. The first and primary investigation of query of this potential is more functional by using of geographic information system (GIS). By taking into consideration of existence climatic models, each model indicated different result with different environmental condition, therefore should be selected a model which show at the best compatibility with condition of environment. In this study, has been used from Makhdoom model, regarding to the conducted studies by [11] in near area of studies site indicated that Biker and Makhdoom method has more suitable compatibility. In analysis of region, it can be

investigated the comfort conditioning in the form of monthly, daily and even in the form of by the hour during the day or night.

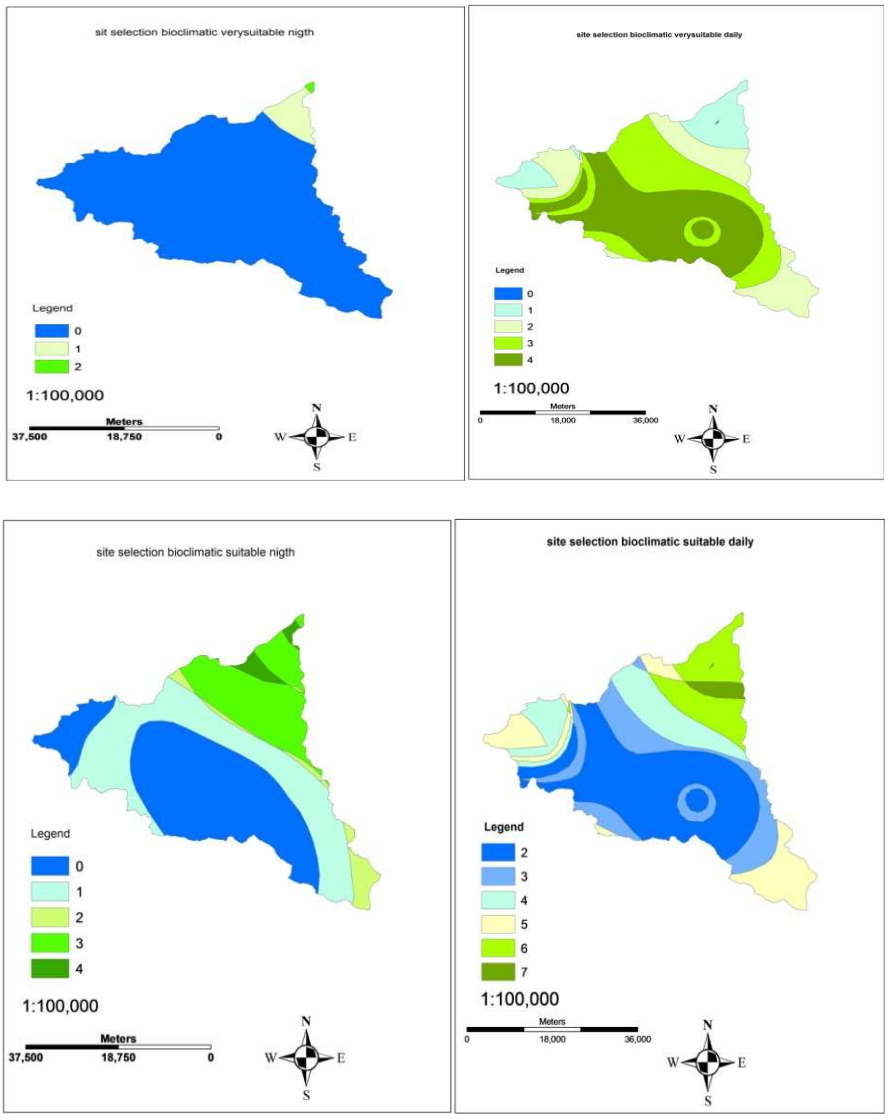


Figure 6 indicated the best spaces in the way of suitable bioclimatic conditioning during the day and night. Regarding to figure, subordinate elevations of basin including the most suitable conditioning during the days of 7 month and during the night of 4 month.

In this study by using of kriging algorithm, zoning and weighting Boolean method has been identified the spaces and season of comfort for tourism in the case of monthly and separately during the day and night. In figure 3 and 4 has showed the suitable month and spaces.

In order to designing the sample area of tourism, at first step should investigated on the condition of climatic desired comfort which based on the result of this study, the middle and southern regions during the day and northern area during the night from Jun to Nov have suitable and desired comfort situation. In addition to the recognition of best time, identification of best spaces is important and necessary for designing tourism. Figure 5 and 6 indicated the more comfort condition and suitability during the year. According to these figure and with taking into consideration of topography map and obtained descriptive information of the high area in that month in daily situation have more comfort conditioning and subordinated area of basin have

more comfort situation during the night and suitable bioclimatic during the day. Conducted studies by [8] during two years of 2010 and 2006 in two regions of kiakalaye wetland and Masouleh basin have conformity with the result of this study by Evanz, Biker and Makhdoom methods.

CONCLUSION

Results showed that in plain area at warm days of year during the day with unsuitable (warm) and during the night with desired comfort condition. This is in the event that in superior area (elevations) of studied regions suitable comfort conditioning during the day unfavorable conditioning during the night.

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