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Original Article

A Bibliometric Analysis of Scientific Research in Türkiye on National Parks Between 2002 and 2021

Mehmet Şirin Yelsiz[1], Cengiz Yücedağ[2], Nuray Çiçek[3], Sezgin Ayan[4]

[1]Division of Spatial Planning and Design, University of Burdur Mehmet Akif Ersoy, Graduate School of Natural and Applied Sciences, Burdur, Türkiye
[2]Department of Landscape Architecture, University of Burdur Mehmet Akif Ersoy, Faculty of Engineering and Architecture, Burdur, Türkiye
[3]Department of Landscape Architecture, University of Çankırı Karatekin, Faculty of Forestry, Çankırı, Türkiye
[4]Department of Forest Engineering, University of Kastamonu, Faculty of Forestry, Kastamonu, Türkiye

ABSTRACT

In Türkiye, national parks play a prominent role among protected areas. Besides meeting people's recreational needs, these protected areas are home to natural and cultural resources. As a result, numerous research has been conducted to find out more about assets and recreational uses of these areas. In this study, the bibliometric analysis method was used to examine research published in Türkiye on national park between 2002 and 2021 within the scope of Clarivate Analytics' Web of Science (WoS). For this purpose, 156 publications, selected from the WoS database, were analyzed. The year 2017 had the most publications. In addition to Türkiye, significant countries in the spatial distribution analysis of national parks included the United States and Italy. About 338 authors in all were included in the author analysis for the publications from national parks. The current study found that 117 different institutions had publications about the national park. The highest number of publications and citations originated from Karadeniz Teknik and Kastamonu Universities, respectively. In this study, the WoS database was used as search engine because it is the most frequently preferred and recognized database, containing all records of high-quality research publications and continuing to be regarded as one of the primary sources of bibliographic information. However, some publications in other databases, such as Scopus and Google Scholar, cannot be overlooked in further research.

Keywords: Bibliometric analysis, country, institute, protected area, Web of Science

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Corresponding Author:
Sezgin Ayan
e-mail:
sezginayan@gmail.com

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Introduction

The protected area is defined as a land and/or sea area that is specially designated for the protection and maintenance of biological diversity and natural and related cultural resources, and managed by legal or other effective measures (IUCN, 2013). Protected areas include not only the protection of nature but also food and water safety, reducing and managing climate risks and disasters, and the protection of cultural, spiritual, and health values (Hockings et al., 2020).

National parks, holding a privileged position among protected areas, are large natural areas or areas close to nature. They provide opportunities for spiritual, scientific, educational, entertainment, and visitor experiences. They are allocated to complete local species and ecosystems, protect large-scale ecological processes, and are environmentally and culturally compatible (Ko & Eo, 2018; Worboys, 2015). They are large areas with minimal human intervention where natural ecological processes can be maintained (Worboys, 2015). Examining trends in national park studies is critical for efficiently managing these areas and developing policies for future generations (Ko & Eo, 2018).

Bibliometry, initially used by Pritchard (1969), is the examination of information usage processes by analyzing the characteristics and distribution of the documents using statistical methods. Bibliometric analysis includes a range of analyses, including common citation analysis and bibliographic matching analysis, applied to different bibliometric data such as broadcasting years, number of publications and writers, research categories, number of references, institutions, and countries. Bibliometric techniques can utilize both quantitative and qualitative data (Romanelli et al., 2021). Bibliometric studies focus on individual researchers, research institutes, countries, journals, and certain issues (Mokhtari et al., 2020). Ultimately, using bibliometric methods enables researchers to examine an unlimited number of publications.

A significant and growing body of research on the evaluation and analysis of relational structure is social network analysis (Butts, 2008). Individuals or groups are viewed as "points" in social network analysis, and their relationships with one another are viewed as "lines." It deals with the patterns created by the points and lines, and it entails examining these patterns numerically or graphically to evaluate the impact they have on the people and organizations that make up the "networks" created by the lines that intersect and link them. Therefore, in order to simulate systems of social relations, it takes the metaphorical idea of interaction as producing a network of links and offers this idea a more formal expression. The fundamental tenet of social network analysis is to approach a social system as a network (Scott, 2012). As of right now, enterprise knowledge management, citation networks, mobile social networks, coauthor networks, and individual happiness have all made extensive use of social network research (Li et al., 2021).

Literature defines co-authorship as a collaboration among two or more scientists in research. Social interactions in multidisciplinary scientific areas are instrumental in disseminating knowledge (Rogers, 2003). Co-authorship in forestry reveals network indicators within each period, which diffuse knowledge in scientific endeavors. Bibliometric methods, including co-occurrence, co-word analysis, maps of collaborators, and co-authorship, have been applied to create a social network structure of scientific collaboration among universities. For instance, Romanelli and Boschi (2019) used Science Citation Index Expanded within the online WoS database to measure the legacy of Elinor Ostrom on typical forest research using bibliometric and network analysis methods. They used the co-occurrence of words to map cognitive development in network formation and VOSviewer (Van Eck & Waltman, 2010) to undertake the task. Derviş (2019) used Bibliometrix, an open-source software based on R, to map the graphene network in Türkiye. Dervis and Ayan (2021) used network analysis and bibliometrics to perform the first analysis of forest research production in Türkiye. Accordingly, current trends in Turkish forest study included biomass, remote sensing, and climate change.

In this study, a bibliometric analysis was performed for scientific studies conducted in Türkiye on national parks, as published within the scope of Clarivate Analytics' Web of Science (WoS).

Material and Methods

In this study, data obtained from the WoS database were used. The terms "National Park" and "National Parks," as well as "Türkiye," were searched throughout the entire text in the WoS database from 2002 to 2021. A total of 176 publications were located during the search process, but only 156 out of 176 publications were examined. Out of these, 20 of which had no direct connection to the national parks. Within the scope of bibliometric analyses, citation analysis, bibliographic connection, common citation analysis, joint association analysis (common words), joint writer, and bibliometric mapping analyses were used.

The VOSviewer program is widely used in the processing of data and converting them into images. A unique feature of this program is that it produces distance-based visualizations using a special technique called VOS Mapping Technique (Van Eck & Waltman, 2010). For instance, it can be utilized to map authors or journals based on common citation data or to create keyword maps based on common formation data. Its imaging capabilities are useful for maps containing a considerable number of elements (e.g., at least 100 elements) (Van Eck & Waltman, 2010).

For the bibliometric analysis of the publications in this study, the following methods obtained from the VOSviewer Mapping Technique were used:

1. "coauthor-country," "citation-country," and "Bibliographic Connection-country" analysis methods for the temporal and spatial tendency analysis of publications,
2. "author-coauthor," "author-citation," and "author-bibliographic link" analysis methods for the effectiveness of the authors,
3. "document-citation" and "document-bibliographic" analysis methods for basic publications,
4. "literature-citation" and "literature-bibliographic" connection methods for literature,
5. "combining keywords" method for the most used keywords and
6. "institution-coauthor," "institution-citation," and "institution-bibliometric" connection methods for the most effective institutions.

Results

Temporal Analysis

The temporal distribution of publications on national parks between 2002 and 2021 revealed fluctuations in the number of publications. The number of publications in national parks reached the highest with 18 publications in 2017 and 17 publications in 2010. The lowest number of publications was observed in 2002, 2003, and 2004. The gradual growth in the number of publications after the peak in 2017 also showed that there was not much interest in the issue of national parks (Figure 1).

Spatial Analysis

The collaboration network between countries was analyzed to obtain the spatial distribution of publications on national park from 2002 to 2021. Accordingly, in the spatial distribution analysis on the national park, Türkiye and the countries of the authors in collaboration with the Turkish researchers were at the forefront. There were authors from 17 different countries who collaborated with Turkish authors on research regarding the national parks. Türkiye had the strongest collaboration with the United States, Lithuania, and Sweden. Türkiye and the USA, with their high total link strength, were the countries with the most common points (i.e., similar studies) on national parks. Although Türkiye

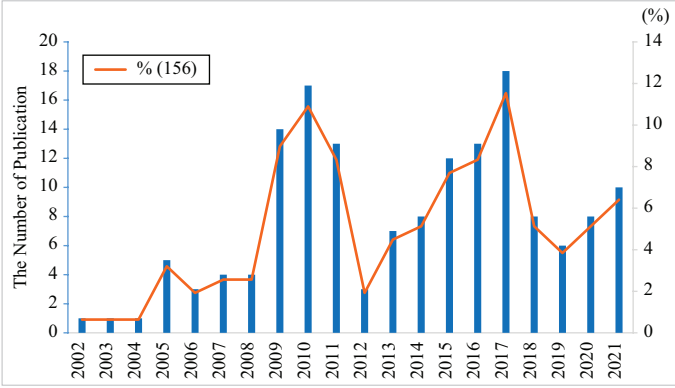


Figure 1.
Trend in the Number of Publications Between 2002 and 2021.

Table 1.
Spatial Analysis Results

Countries	Total Link Strength	Number of Publications	Citation	Average Citation	Number of Links
Türkiye	399.80	147	1013	6.89	10
United States	208.21	5	54	10.8	4
Lithuania	89	1	10	10	2
Sweden	89	1	10	10	2
Belgium	64	1	17	17	4
France	64	1	17	17	4
Switzerland	64	1	17	17	4
Portugal	46	1	4	4	1
Japan	36	1	8	8	2
Kenya	36	1	8	8	2
Malaysia	19	1	8	8	1
Pakistan	19	1	8	8	1
Romania	17	1	2	2	1
Bosnia and Herzegovina	1	1	0	0	0
Italy	1	2	14	7	0
Algeria	0	1	9	9	0
Greece	0	1	3	3	0
Latvia	0	1	1	1	0

had a total of 1013 citations, it dropped behind other countries in terms of the average number of citations. Belgium, France, and Switzerland, each with only one co-authored publication with Türkiye, had the highest average citations (17). In contrast, Bosnia and Herzegovina, which had one co-authored publication, did not receive any citations. The United States, Belgium, France, and Switzerland had a higher number of links in their publications (Table 1).

Author Analysis

A total of 338 authors published at least one publication on the topic of national parks. Among these authors, 48 had at least two publications. According to co-authorship network analysis, Goktug, T. H. (6), Belkayali, N. (5), Karahalil, U. (4), and Sevik, H. (4) were the most productive authors on national parks. Although Sevik H. (4) and Cetin M. (3) have relatively fewer publications, they play an important role in the field of national parks with the highest citation numbers (over 140). These two authors also have the highest average citations. Goktug, T. H., and Karahalil, U., with their total link strengths of 165, are the authors who share the most common points (i.e., similar studies) with other authors in the national park. Camur-Elipek, B., Kirgiz, T., Guher, H., and Oterler, B. had a higher number of links in their publications (Table 2). While the rankings of highly cited authors reflect the authors' influence in a particular field, the rankings for prolific authors' number of publications reflect their degree of activity to some extent (Song et al., 2016).

Publication Analysis

Between 2002 and 2021, Erdogan and Tosun (2009), Cetin and Sevik (2016a), and Sarikurkcu et al. (2011) had 86, 78, and 58 citations on national parks, respectively. The publications Cetin and Sevik (2016b) and Sayan and Atik (2011), which ranked seventh and eight in the most cited publications, had the highest total link strengths (Table 3).

Journal Analysis

There were 85 journals in total with at least one publication on national parks, out of which 14 had at least three publications. Considering total link strength, number of publications, citations, and average citation, the most influential journal was *International Journal of Sustainable Development and World Ecology*. *Fresenius Environmental Bulletin* and *Kastamonu University Journal of Forestry Faculty* were the journals with the highest number of publications. Despite their large number of publications, they received few citations on average. The top-cited journals were *Environmental Monitoring and Assessment* with 99 citations and *International Journal of Sustainable Development and World Ecology* with 101 citations. With an average of 24.75 citations, the *Environmental Monitoring and Assessment* has the greatest average number of citations. With 50 link strength, *Kastamonu University Journal of Forestry Faculty* is the source with the most points in common (similarities) with other journals (Table 4).

Institution Analysis

A total of 117 different academic institutions published articles regarding national parks, with 35 institutionspublishing only two articles and 22 institutions publishing three or more. With 16 publications, Karadeniz Technical University had the most published articles, followed by Çanakkale Onsekiz Mart University with 12, Ankara University, Artvin Çoruh University, and Kastamonu University with 10 each. In addition, Kastamonu University was the most cited institution with 169 citations, and Karadeniz Technical University with 107 citations. The university with the highest average number of citations (19) is Atatürk University, which ranks sixth on the list of the most often cited authors but is not in the top 10 in terms of publications. However, despite being among the top 10 universities in terms of the number of publications, Artvin Çoruh University and Adnan Menderes University fell short in terms of the number of citations. With its 329.43

Table 2.
Author Analysis Results

Authors	Total Link Strength	Number of Publications	Citation	Average Citation	Number of Links
Goktug, T. H.	156.62	6	6	1	2
Karahalil, U.	156.5	4	23	5.75	2
Sevik, H.	142.48	4	147	36.75	2
Kadiogullari, A. I.	127	2	12	6	2
Gok, A.	107.67	2	7	3.5	–
Sen, I.	107.67	2	7	3.5	–
Akar, B.	105.56	3	18	6	–
Sahin, B.	105.56	3	18	6	–
Sayan, S.	98.27	3	45	15	2
Camur-elipek, B.	98	3	25	8.33	3
Kirgiz, T.	98	3	25	8.33	3
Cetin, M.	97.48	3	140	46.67	2
Akata, I.	93.33	3	62	20.67	–
Sarikurkcu, C.	88.33	2	61	30.5	–
Belkayali, N.	70	5	50	10	2
Atik, M.	67.6	2	32	16	2
Uysal, I.	62.38	2	26	13	–
Cengiz, T.	58	2	38	19	–
Akbulak, C.	52	2	26	13	–
Guher, H.	2	2	25	12.5	3
Kurdoglu, O.	2	2	33	16.5	–
Oterler, B.	2	2	16	8	3

Table 3.
Publication Analysis Results

Publications	Citation	Total Link Strength	Year
Erdogan and Tosun (2009)	86	2	2009
Cetin and Sevik (2016a)	78	13	2016
Sarikurkcu et al. (2011)	58	0	2011
Sevik et al. (2015)	35	1	2015
Tokatli (2017)	34	0	2017
Acar et al. (2006)	33	4	2006
Cetin and Sevik (2016b)	27	17	2016
Sayan and Atik (2011)	24	18	2011
Sayan et al. (2013)	24	7	2013
Halici and Aksoy (2009)	23	5	2009
Akbulak and Cengiz (2014)	21	8	2014
Uysal (2010)	14	9	2010
Tufan et al. (2005)	14	5.33	2005
Sayan and Karaguzel (2010)	13	13	2010
Ozturk et al. (2011)	12	11	2011
Düzgüneş and Demirel (2013)	11	6	2013

link strength, Karadeniz Technical University, which ranked first in terms of the number of citations, was also the institution that had the most common points (similarities) with other institutions. The universities with the most inter-institutional cooperation are Ankara University with eight links and Karadeniz Technical University with four links (Table 5).

When examining the cooperation network of institutions with more than three publications on national parks, it was observed that although a global cooperation was expected, institutions that were spatially close to each other were more likely to cooperate, contrary to the expectation of global cooperation. For example, Karadeniz Teknik, Artvin Çoruh, and Gümüşhane Universities in the Black Sea Region, Çanakkale Onsekiz Mart, Ege, and Pamukkale Universities in the Aegean Region and its surroundings, Ankara, Gazi, Erciyes, and Selçuk Universities in the Central Anatolia Region, and Istanbul Teknik, Bartın, and Düzce Universities in Istanbul and its surroundings appeared to be more regionally connected with each other (Figure 2).

Keywords Analysis

Bibliometric analysis is a practical method for evaluating qualitatively and quantitatively changes over time in particular study topics. As keywords greatly generalize and condense the content of publications, researchers frequently utilize the statistical analysis of keywords to study trending subjects in a given field (Liu et al., 2019).

Table 4.
Quantitative Data of Citation and *Bibliometric Linking Techniques for Source Journal Analysis*

Source Journals	Total Link Strength	Number of Publications	Citation	Average Citation
Kastamonu University Journal of Forestry Faculty	50.33	10	15	1.5
Turkish Journal of Botany	39.78	3	40	13.33
Fresenius Environmental Bulletin	37.8	12	26	2.17
International Journal of Sustainable Development and World Ecology	37.33	6	101	16.83
Eco.mont—Journal on Protected Mountain Areas Research and Management	28	6	11	1.83
Ekoloji	28	4	36	9
Environmental Management	28	3	50	16.67
Turkish Journal of Fisheries and Aquatic Sciences	21.5	3	32	10.67
African Journal of Biotechnology	21	3	30	10
Journal of Environmental Biology	21	4	42	10.5
International Journal of Ecosystems and Ecology Science	19	4	1	0.25
Environmental Monitoring and Assessment	14.5	4	99	24.75
African Journal of Agricultural Research	9	3	19	6.33
Turkish Journal of Zoology	0	5	37	7.4

Table 5.
Quantitative Data of Bibliometric, Citation, and Co-author Connections Among Institutions

Institute	Total Link Strength	Number of Publications	Citation	Average Citation	Number of Links
Karadeniz Teknik Univ.	329.43	16	107	6.69	4
Ankara University	222.8	10	92	9.2	8
Çanakkale Onsekiz Mart University	180.65	12	86	7.17	3
Gümüşhane University	168.1	5	20	4	2
Erciyes University	109	3	34	11.33	3
Bartin University	102	5	13	2.6	3
Artvin Çoruh University	101.33	10	30	3	1
Süleyman Demirel University	99	9	31	3.44	1
Selçuk University	96.79	4	25	6.25	2
Ataturk University	93	4	76	19	2
Ege University	83.15	6	41	6.83	2
Adnan Menderes University	68.17	8	19	2.38	1
Kastamonu University	42.33	10	169	16.9	2
Akdeniz University	54.43	7	83	11.86	0
Trakya University	1	5	59	11.8	0
Istanbul Teknik University	75	3	13	4.33	3
Gazi University	25	3	4	1.33	3

Between 2002 and 2021, 156 publications referred to national parks using 493 different keywords, 419 of which were used just once, and 74 more than twice. The frequency and distribution of 32 keywords used at least three times were determined as the basis for the national park research. Since this study was limited to the keywords "Türkiye,""national park," and "national parks," the usage frequencies of these words were naturally found to be higher. With a usage frequency of 40, Türkiye is the most popular keyword, followed by National park at 24. Protected area and Biodiversity are additional crucial keywords because a national park was one of the protected areas, and it was strongly related to biodiversity, which is one of the essential factors in identifying protected places. In addition, these keywords had numerous citations, links, and co-operations with other keywords. The keyword "Türkiye," with a link strength of 31, has the highest common point with other keywords (Figure 3).

Web of Science Categories

The national park had 50 different WoS categories in all, 25 of which had at least two publications. With 41 publications on the national park, the WoS category "Environmental Sciences" ranked first (Figure 4).

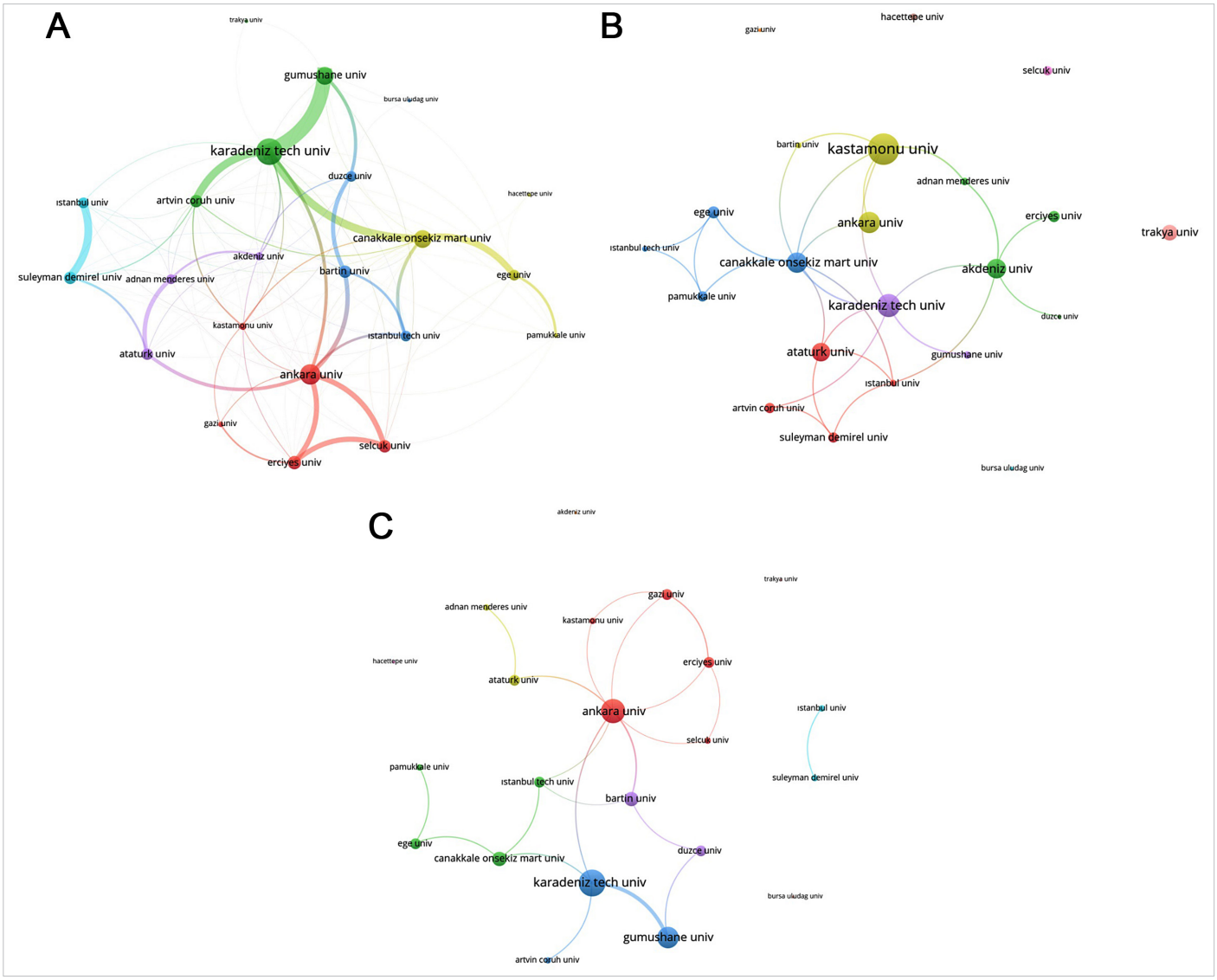


Figure 2.
Map of Bibliometric (A), Citation (B), and Co-author (C) Connections Among Institutions (The Larger the Circle Size, the More Bibliometrics, Citations, or Co-authorships the University has. Same Colored Lines Indicate Which Universities have more Connections to Each Other in Terms of Bibliometrics, Citations, or Co-authors).

Discussion

The year 2017 had the most publications. Between 2006 and 2010, 2012 and 2017, and 2019 and 2021, the number of publications increased, whereas between 2010 and 2012 and 2017 and 2019, it decreased. In addition to Türkiye, the United States and Italy in the spatial distribution analysis of national parks were notable countries. Other countries were only allowed to contribute one publication each to the co-authored works.

The author analysis for the national park publications included 338 authors in total. Goktug, Tendu Hilal was the author with the highest number of publications on national park. Sevik, H. and Cetin, M. were the most cited authors concerning the national park. Of the 156 publications, 114 had at least one or more citations, while 42 publications had no citations. The publications of Erdogan and Tosun (2009), Cetin and Sevik (2016a), and Sarikurkcu et al. (2011) had the highest number of citations in Türkiye. The present study revealed that there were publications from 117 different institutions on the national park. The highest number of publications and citations were provided from Karadeniz Teknik and Kastamonu Universities, respectively.

Conclusion and Recommendations

In the past 60 years, the significance of the national park issue, which originated in Türkiye in 1958, has increased. To recommend effective conservation strategies and policies for national parks, the patterns of studies on national parks are required to be elaborately analyzed. In this sense, the results of the current study, examining the publications on national parks in Türkiye by means of bibliometric analysis, will be helpful for the efficient management and sustainability of national parks.

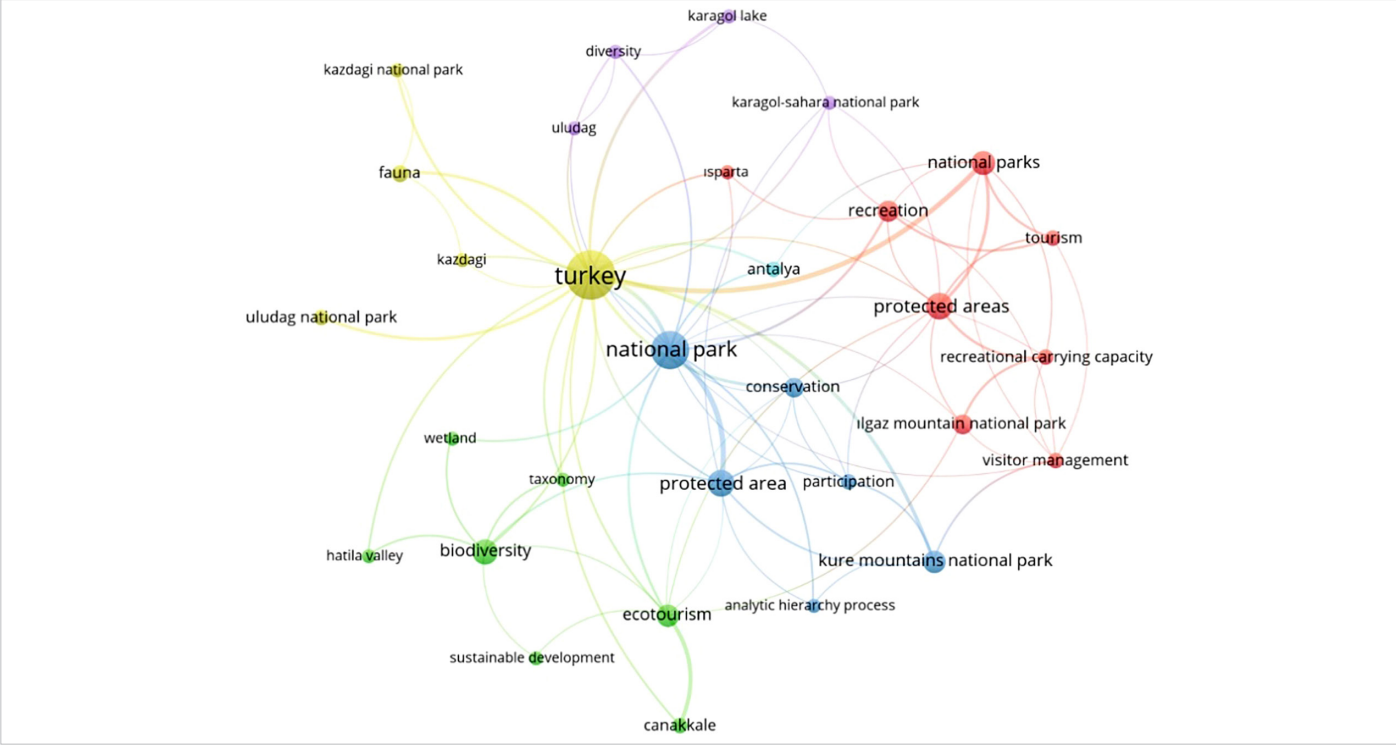


Figure 3.
Map of Co-occurrence for Keyword Analysis (The Larger the Circle Size, the More Frequently the Keyword Is Used. The Same Colored Lines Show Keywords Used More Together).

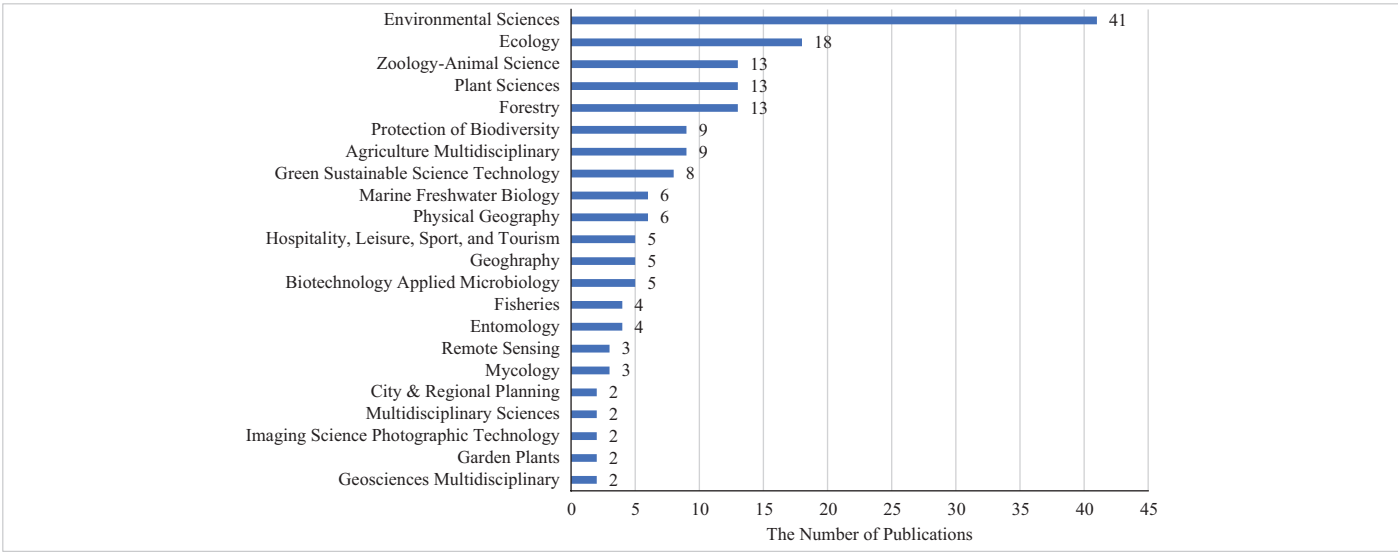


Figure 4.
WoS Categories based on the Number of Publications.

This study certainly contains several limitations as well. In this study, the WoS database was used as the search engine because it is the most frequently preferred and recognized database, containing all records of high-quality research publications and continuing to be regarded as one of the primary sources of bibliographic information. However, some publications in other databases such as Scopus and Google Scholar cannot be overlooked in further research. This, in turn, may have led to the exclusion of some publications about the national park and, as a result, to the deficiencies of the relevant articles. The TRDizin (https://trdizin.gov.tr/) and DergiPark (https://dergipark.org.tr/tr/) databases, rather than the international databases, may have included some of the publications in Türkiye on national parks, so these databases should not be overlooked when conducting further studies.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – C.Y.; Supervision – C.Y.; Data Collection – M.Ş.Y., C.Y.; Data Analysis and/or Interpretation – M.Ş.Y., C.Y.; Literature Review – M.Ş.Y., C.Y., N.Ç., S.A.; Writing Draft – M.Ş.Y., C.Y.; Critical Review – C.Y., N.Ç., S.A.

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