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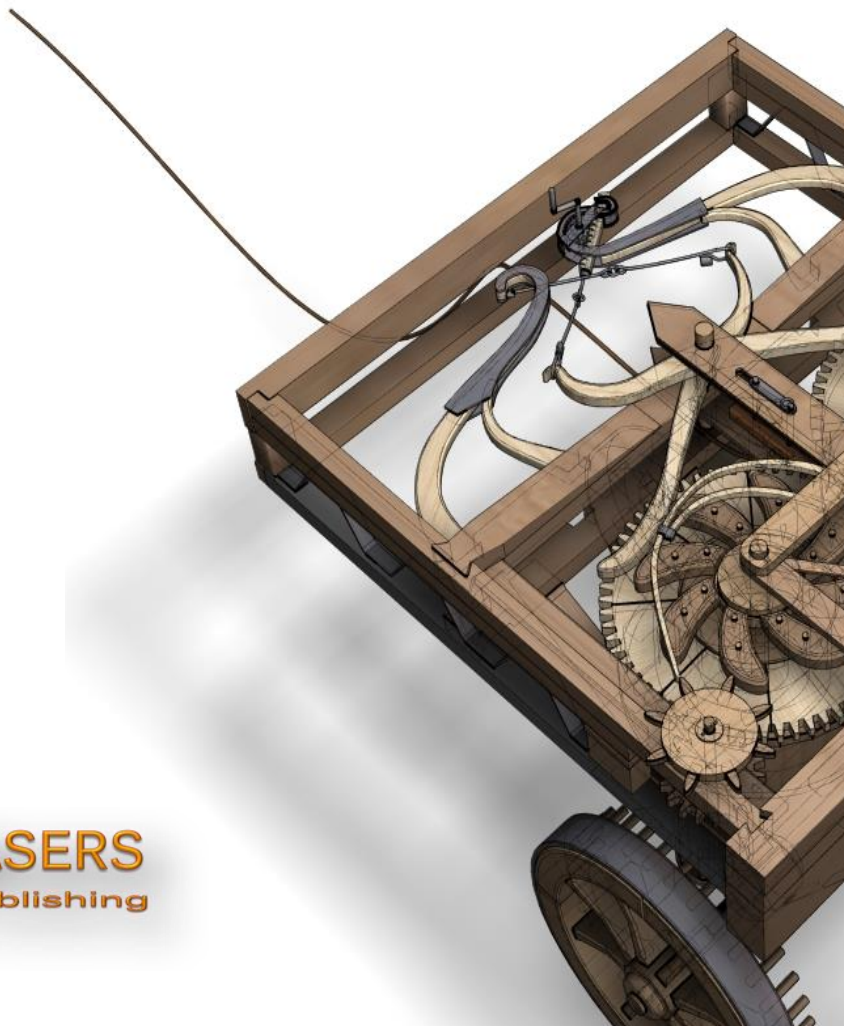

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Winter Issue 2024
Journal of Environmental Management and Tourism

Journal of Environmental Management and Tourism is an open access, peer-reviewed interdisciplinary research journal, aimed to publish articles and original research papers that contribute to the development of both experimental and theoretical nature in the field of Environmental Management and Tourism Sciences. The Journal publishes original research and seeks to cover a wide range of topics regarding environmental management and engineering, environmental management and health, environmental chemistry, environmental protection technologies (water, air, soil), pollution reduction at source and waste minimization, energy and environment, modelling, simulation and optimization for environmental protection; environmental biotechnology, environmental education and sustainable development, environmental strategies and policies.

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Alternative Forms of Tourism: User Generate Content Promote Birdwatching Tourism in Kefalonia Island, Greece

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Abstract: Kefalonia, an island in the western part of Greece, renowned for its unique geomorphology, lush vegetation, and Mediterranean climate, is an ideal habitat for diverse bird species, making it a prime destination for birdwatching tourism and intercultural communication. This paper harnesses the power of user-generated content (tourists) by systematically collating and analyzing 1,776 ornithological observations recorded online from 1981 to 2018 (human computers and new media). Organized initially using records and further processed with Geographic Information System (GIS) software, the data revealed the presence of 254 bird species across 54 families, with Scolopacidae being the most prevalent. The most frequently sighted species included *Lanius senator* and *Buteo buteo*. Notably, Livadi Marsh in Lixouri on the Paliki peninsula emerged as the hotspot with the highest number of observations. This research highlights the rich biodiversity and the critical habitats within Kefalonia Island. The richness of the data collected offers a unique opportunity to understand the dynamics of bird populations over time, examining trends in both common and rare species. The integration of these observations into conservation planning is crucial for targeting efforts that protect vulnerable species and their habitats. This approach not only aids in the preservation of biodiversity but also enriches the global birdwatching community by providing data that supports sustainable birdwatching practices that are sensitive to the ecological needs of observed species.

Keywords: vulnerable species; birds' habitat; user-generated content; intercultural communication; digital marketing; birdwatching.

JEL Classification: P28; Q57; Z32.

Introduction

Birdwatching has evolved from its origins in the early 18th century, transitioning from the collection of birds and eggs to the observation of birds in their natural habitats. This evolution was supported by a shift towards

conservation, highlighted by the founding of organizations such as: The Royal Society for the Protection of Birds in the United Kingdom (RSPB) and The National Audubon Society in the United States, which have played pivotal roles in promoting avian preservation (Macdonald, 2002). From the 20th century onwards, birdwatching has been recognized both as a popular recreational activity and a scientific endeavour, particularly in developed nations (Cordell and Herbert 2002; Hvenegaard *et al.* 1989; Sekercioglu 2002; Wiedner and Kerlinger 1990).

The community of birdwatchers is diverse, often described as middle-aged, well-educated individuals with middle to high income levels. Despite this generalization, the demographics show considerable variety, including a significant representation of women, depending on the nature and type of birdwatching undertaken (Connell 2009; Jones *et al.* 2001; Rouche 2003; Lee and Scott 2004; Maple *et al.* 2010; Scott and Thigpen 2003). The common bond among birdwatchers is their passion for observing birds (Steven *et al.* 2018). This community is marked not only by shared interests but also by the economic impact of their activities, as they often invest significantly in travel and equipment to pursue their hobby. The motive, methodology, and level of commitment among birdwatchers vary considerably. Birdwatchers often enhance their reputation within the community through the records they keep and share, which may span a lifetime (Connell 2009; Steven *et al.* 2018). The types of birdwatchers range from casual observers to dedicated ”twitchers” who specialize in spotting rare birds, often traveling long distances and investing substantial resources (Dooley 2005). Such endeavours not only fulfil their personal birdwatching ambitions but also contribute to conservation efforts by providing valuable data on bird populations and behaviours (Davies and Miller 2010; Hvenegaard 2002; Kim *et al.* 2010; Koeppel 2006).

Birdwatchers, both Greek and international, frequently visit Kefalonia, and many share their observations on specialized websites and research papers (Vittery *et al.* 1996). These contributions not only enhance the knowledge of the island’s avifauna but also aid in the species’ protection and preservation. Despite the wealth of data generated by these enthusiasts, there has historically been little effort to systematically collect and analyze these bird observations - a gap this research aims to address. The objective of this study is to collect, process, and draw conclusions about Kefalonia’s avifauna from the observations recorded by birdwatchers. This effort will not only expand the knowledge base regarding the island’s bird species but also contribute to broader biodiversity conservation efforts.

1. Literature Review

1.1 Ecotourism. A Modern Asset in the Tourism Industry

Ecotourism is a specific type of sustainable tourism defined by the International Ecotourism Society as responsible travel to natural areas that conserves the environment and improves the welfare of local people. It combines elements of both rural and cultural tourism, adopting principles that ensure the conservation of natural and cultural heritage. This includes engaging local communities in planning, development, and operational activities to enhance their well-being. This tourism model provides comprehensive and engaging explanations to visitors about natural and cultural resources, catering primarily to individual travelers and small, organized groups. It often encompasses activities like hiking, mountaineering, and wildlife observation (Moscardo 2001). Additionally, ecotourism may include cultural activities, playing a significant role in education. It offers opportunities to learn respect for nature and local culture and, for some, a chance for self-reflection inspired by the beauty of the environment. Another important aspect of ecotourism is its benefit to local communities, which includes hiring local staff, sourcing local products, and involving community members in decision-making processes. These efforts support the sustainable development of the tourism area (Butowski 2012).

The primary goal of creating a sustainable tourism strategy for a given area is to increase the number of tourists while adhering to sustainable development principles. Achieving this goal involves several specific objectives: Coordinating all stakeholders interested in the tourism development of the area. Inventorying the area’s tourism products to better understand and market them. Documenting the benefits to local communities and the environment from shaping the tourism product. Evaluating the effectiveness of destination marketing and the responsiveness of local products by potential buyers. Developing comprehensive marketing plans, along with a clear vision and mission, during the strategic planning phase. Creating a common brand for the area that encapsulates its unique qualities and sustainable practices. Developing tools to monitor and assess the progress in implementing the strategy, ensuring adaptive management and continuous improvement (Murphy and Price 2012).

Since the 1980s, the concept of ecotourism has gained traction. This includes ”soft tourism”, ”local-scale tourism”, ”green tourism” and ”nature tourism”, which are seen as ideal for development because they potentially have fewer negative impacts on destination areas, the environment, and the population. These forms of tourism do not reduce the positive economic impacts and are supported by the preservation of social, environmental, and

historical elements of tourist destinations (Measells and Grado 2007; Smith and Eadington 1992). Ecotourism supports gentle sustainable development and is sensitive to local social and economic needs. It is based on small groups, families, or singles, and activities can be conducted all year round to foster capacity building. Ecotourism considers the long-term interests and quality of tourism for all stakeholders, valuing the natural environment and local resources. In contrast to mass tourism, which has many disadvantages but can yield high revenues during peak periods, ecotourism incorporates nature conservation, which positively impacts tourist perceptions and enhances the social, economic, and cultural sustainability of local communities (Dodds and Kuehnel 2010). Implementing green service quality in accommodation management is also critical as it improves the mental health and well-being of travelers and employees (Winter *et al.* 2019). Furthermore, ecotourism is seen as an ideal model during a pandemic, with increased popularity expected in the post-COVID-19 era. It serves as a means to reduce overtourism in popular destinations (Arora and Sharma 2021). Greece has developed new tourism strategies such as birdwatching tourism, aimed at shifting from low-budget mass tourism to high-quality alternative forms of tourism. This shift is driven by the increasing demand for comprehensive and quality-oriented tourism, aiming to extend the tourist season to support year-round tourism activities (Vayanni *et al.* 2005). Such strategies are essential for maintaining Greece's success as an international tourist destination (Christou 2012).

1.2. The Use of Internet Sites to Promote the Icon of a Place

Tourism, traditionally seen as an intangible service sector, has transformed with the advent of the internet, making it somewhat tangible as potential buyers can now view images and videos of products and services before purchase. This digital exposure not only enhances the trust in the purchase of tourism products but also improves the perceived quality of websites. It has been observed that effective multimedia usage significantly increases user engagement and satisfaction, influencing the decision-making processes of potential tourists by providing them with a clearer expectation of the services offered.

The concept of a destination image is crucial for promoting tourism locales and involves both emotional and cognitive elements that develop over time from various sources. This image significantly influences tourists' choices; emotional images relate to the feelings people hold for a destination, while cognitive images involve beliefs and knowledge about it (Phillips *et al.* 2017). Negative perceptions of either can deter tourists, highlighting the importance of maintaining a balanced and positive presentation to encourage visits. Effective management of these images can significantly enhance a destination's competitiveness and attractiveness, making it a critical focus for tourism marketers. It has been emphasized that both emotional and cognitive images are critical in assessing a destination's appeal. Emotional images capture the enthusiasm and liveliness of a destination, while cognitive images include elements such as cultural attractions, landscapes, and infrastructure (Becken *et al.* 2017). These components collectively define the destination image and must be communicated effectively to attract and retain tourists. Enhancing these images involves sophisticated marketing strategies that highlight unique cultural and natural assets, thereby fostering a deeper connection with potential visitors. Furthermore, satisfaction levels are found to significantly affect tourists' intentions to revisit a destination (Kim *et al.* 2015). Positive destination images, cultivated through strategic marketing, lead to success while a negative image leads to failure or limitation (Chaulagain *et al.* 2019; Ketter 2016). The strategic development of marketing plans that focus on reinforcing positive images and addressing any negative perceptions can lead to improved tourist retention and attraction rates, ultimately impacting the economic viability of tourism destinations (Lykoudi *et al.* 2023).

Tourism websites are pivotal in creating strong and positive destination images, motivating travelers to visit these destinations. Online resources such as newspapers, TV websites, blogs, and forums substantially impact the destination image. Positive information on these platforms can persuade tourists to visit, while a lack of information can deter them (Huete-Alcocer *et al.* 2019; Leung *et al.* 2017). These digital platforms are integral in shaping the narrative around a destination, offering a medium through which vivid storytelling and engaging content can captivate and allure potential tourists (Paiva *et al.* 2023). Effective communication through these websites is crucial for marketing and influencing tourist behavior. Highlighting the attractive features of a destination can significantly alter tourists' perceptions and convince them to visit (Kim *et al.* 2017). Moreover, these platforms facilitate interactive engagements such as virtual tours and customer reviews, which can further enhance the persuasive power of destination marketing. Travel websites also serve as effective marketing communication channels, enhancing the visibility of destinations and influencing potential visitors' perceptions (Marine-Roig 2022; Rizky *et al.* 2017). These platforms are essential for deploying targeted marketing campaigns that can dynamically adapt to market trends and tourist preferences, ensuring that the marketing messages resonate well with diverse audiences. The significance of online information in shaping tourists' plans is notable, as extensive website usage for information gathering influences tourists' travel decisions (Shafiee *et al.* 2016).

Providing detailed and attractive information on travel websites is vital for promoting a destination effectively. This involves enriching the content with high-quality images, engaging narratives, and accessible booking options, which collectively enhance the usability and appeal of the website. In conclusion, the image of a tourist destination is significantly affected by online information about the tourist destination. When tourists plan to visit a place, they develop an overall image of that place through exposure to available information, affecting their decision to visit the destination (Kim *et al.* 2019). Websites are indispensable tools for creating positive destination images and play a critical role in the tourism industry's marketing strategies. They are key to enhancing the visibility and appeal of destinations, fundamentally shaping tourist perceptions and decisions. A robust and dynamic online presence, coupled with strategic content management, is critical for harnessing the full potential of internet-based tourism marketing.

1.3. Kefalonia Island, Greece as an Alternative Tourism Destination

Kefalonia Island offers a unique wealth of geological monuments and geomorphs scattered across its expanse. These include karst formations such as caves, impressive relief forms, paleontological sites, coastal geomorphs, geotectonic formations such as faults, and wetlands. All these elements together compose the geological history of Kefalonia. Additionally, the island features prehistoric-Hellenistic archaeological sites as well as Roman monuments, medieval castles, Byzantine-post-Byzantine monasteries, traditional settlements, mills, bridges, and lighthouses. The Kefalonia-Ithaca Geopark, established to protect and highlight this entire collection of Earth's" monuments" focuses on emphasizing geological heritage in conjunction with cultural heritage and the local community, following a strategy of sustainable development (Maple *et al.* 2010). In April 2022, it was designated a UNESCO Global Geopark, underscoring its significance in promoting sustainable development and the growth of geotourism and ecotourism (Kefalonia-Ithaca Geopark 2024).

Kefalonia's natural environment is unparalleled, fostering the development of Ecotourism. The protected areas of Kefalonia-Ithaca, integrated into the European" Natura 2000" network, total six and cover an area of 57,998.48 ha. Notably, the terrestrial area GR2220001 in northern Kefalonia encompasses the limestone Kalon Oros. This area's sparse vegetation is mainly composed of maquis (*Quercus coccifera, Pistacia lentiscus, Arbutus unedo,* etc.), with significant habitats such as the phryganas, dominated by *Sarcopoterium spinosum*. The most significant protected area is Aenos National Park (GR2220002), which is renowned as the smallest National Park in Greece, covering 2,862 ha. Established in 1962, it is primarily aimed at protecting the endemic Kefalonian Fir (*Abies cephalonica* Loudon), recognized as an International Biogenetic Reserve. Additional areas like GR2220004 and GR2220005 contribute to the diverse ecosystem, supporting a variety of marine and terrestrial life forms critical for biodiversity conservation. Kefalonia is also a crucial location for birdwatching, supported by the observation of 237 different species and subspecies of birds according to bibliography Vittery *et al.* 1996), and serves as a significant migratory hub due to its diverse habitats. The richness of Kefalonia's biodiversity is further exemplified by the presence of 450 species of flora, many of which are endemic and rare, 33 species of amphibians and reptiles, orchid species, and semi-wild horses living on the S.E. slopes of Mount Aenos. The local products of Kefalonia are of high quality and nutritional value, contributing to the development of gastronomic tourism. Some of these products include the handmade sweet "mandoles","Robola of Kefalonia", a white wine with Protected Designation of Origin from the Omala area, highly nutritious honey rich in vitamins and trace elements, Kefalonian cheeses, and olive oil. Local delicacies and dishes, such as the famous and delicious Kefalonian meat pie, are promoted by the Association of Hoteliers of Kefalonia-Ithaca at exhibitions and through the promotion of the local Kefalonian breakfast in the island's hotels.

Additionally, hiking tourism is rapidly developing on the island. Throughout Kefalonia, trails are placed through landscapes of unparalleled aesthetic value. In Aenos National Park, there are 5 hiking trails, while the Municipality of Argostoli and Lixouri, in cooperation with Path of Greece, have conducted a study for the opening and signaling of the trails. The Municipality of Sami already has 5 operational trails in its jurisdiction. In summary, visitors to Kefalonia could engage in a plethora of alternative tourist activities, such as sea cycling in the Koutavos Lagoon, diving in wrecks, visiting geosites, stargazing on Aenos, sea kayaking, hang gliding over Myrtos, hiking on trails, climbing, and more. Each of these activities attracts tourists not only for their leisure and recreational aspects but also for the educational insights they offer into the natural and cultural heritage of Kefalonia.

Regarding tourist infrastructure for supporting ecotourism activities, Kefalonia offers a variety of hotel facilities, which are presented in the following Table 1:

Table 1. Hotel Capacity in Kefalonia

Year	Hotels	Rooms	Beds
5* Hotels	8	629	1,357
4* Hotels	24	1,551	3,163
3* Hotels	40	1,597	3,181
2* Hotels	68	1,648	3,240
1* Hotels	9	112	244
Total	149	5,537	11,185

Source: Hellenic chambers of hotels 2021

The data presented in Table 1 showcases the distribution of hotel accommodation across various categories in Kefalonia. The island has a broad range of options, with a significant emphasis on more accessible two-star accommodation, as evidenced by the 68 hotels providing 3,240 beds. This category outstrips the three-star accommodations, which also plays a significant role in the hospitality landscape with 40 hotels. Interestingly, the luxury sector, represented by five-star hotels, although smaller in number (only 8 hotels), still offers a considerable number of beds (1,357), highlighting the island's appeal to both budget and upscale tourists. The total hotel infrastructure supports a substantial capacity of 11,185 beds, indicating Kefalonia's preparedness to host many tourists, which is crucial for sustaining the island's robust tourist industry. To understand the flow of tourism and its seasonal dynamics within the Ionian Islands, Table 2 compiles the monthly arrival figures for the year 2021 for four key islands: Kerkyra, Zakynthos, Kefalonia, and Lefkada. These statistics are pivotal for assessing the effectiveness of tourism strategies and infrastructure in accommodating and attracting visitors. The analysis helps to highlight the relative popularity of these destinations and provides insights into potential areas for development and marketing within Kefalonia's tourism sector.

Table 2. Tourist Arrivals in the Ionian Islands in 2021

Month	Kerkyra	Zakynthos	Kefalonia	Lefkada
January	0	0	0	0
February	0	0	0	0
March	108	0	0	0
April	38	0	0	0
May	14,705	7,212	582	3,337
June	79,684	49,386	6,444	14,835
July	228,935	130,515	27,066	45,168
August	268,428	151,423	43,807	52,227
September	199,120	104,051	31,295	40,991
October	109,365	29,266	7,511	17,241
November	0	0	0	0
December	0	0	0	0
Current Year	900,383	471,853	116,705	173,799

Source: INSETE 2021

According to Table 2, Kefalonia experiences a significant influx of tourists primarily in the summer months, with the highest number of arrivals recorded in August (43,807), followed by September (31,295) and July (27,066). This trend is consistent across the Ionian Islands, where summer is the peak tourist season. Despite these numbers, Kefalonia's total annual tourist arrivals amount to 116,705, which positions it last among the islands compared. In contrast, Kerkyra (Corfu) leads with an overwhelming 900,383 arrivals. The comparison highlights a substantial gap in tourist numbers, suggesting that while Kefalonia enjoys a favorable peak season, it still lags behind in attracting year-round tourism compared to its regional counterparts. The data emphasizes the need for developing new alternative forms of tourism in the island like birdwatching and possibly improving tourism strategy and existing infrastructure to increase its competitiveness and appeal throughout the year.

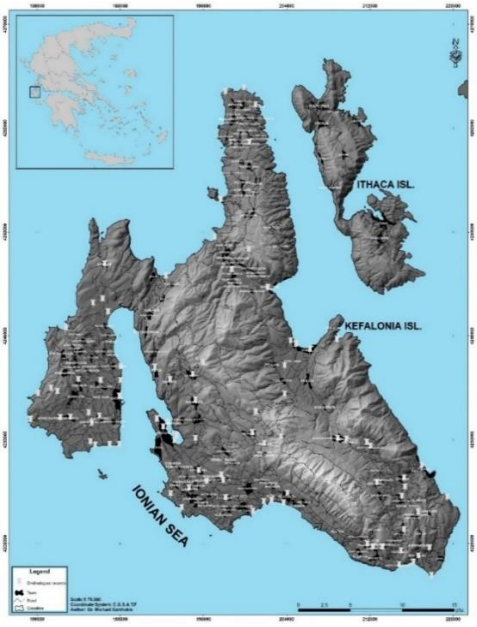
1.4. Birdwatching Tourism as an Alternative Form of Tourism in Kefalonia Island

Birdwatching tourism is increasingly recognized as a significant component of alternative tourism globally, drawing well-off tourists who travel specifically for bird observation (Cordell and Herbert 2002; Hvenegaard *et al.* 1989; Newsome and Rodger 2012; Sekercioglu 2002). Studies indicate that birdwatching can generate substantial economic benefits for local communities in both developed and developing countries, such as the United Kingdom, the USA (Kerlinger 1993; Measells and Grado 2007; Stoll *et al.* 2006), South Korea (Lee *et al.* 2010), Canada, South Africa (Biggs *et al.* 2011), and Greece (Vavanni *et al.* 2005). Protected areas networks, including the European Network of Spatial Protection Areas, wildlife shelters, Important Bird Areas (IBA), and the Ramsar wetlands, along with various non-protected areas, support tourism activities centered on bird observation.

Destinations offering unique and rare birdwatching experiences are particularly popular among enthusiasts. Kefalonia's diverse geomorphology and array of habitats make it an ideal location for birdwatching. The island's landscape has been shaped by a series of geological events, including faults, earthquakes, uplifts, and submersions, creating a variety of habitats such as wetlands, natural and artificial lakes, expansive fir forests, and rugged terrains like steep slopes, cliffs, and canyons. These features, combined with the prevalent limestone formations in Aenos National Park that provide excellent nesting sites for predatory birds, create perfect conditions for bird habitats. The vegetation of Kefalonia also plays a crucial role, with 30% of the island covered with broadleaved shrublands. This diverse environment supports a rich bird population, many of which are rare and endangered. Several of these species are priorities for conservation in the European Union and are protected under the 2009/147/EC European Directive on the conservation of wild birds.

2. Study Area

Figure 1. The study area with the spatial distribution of bird observations by birdwatchers



The study is conducted in Kefalonia (Figure 1), in the Ionian Islands region of Greece, known as "Ionio Archipelagos". This insular region stretches along the western coast of Greece, within the central Mediterranean marine area. The Ionian Islands are celebrated for their distinctive natural environment and rich biodiversity, which contribute significantly to their ecological importance. Kefalonia, the focal point of this study, stands as the largest and most mountainous of the Ionian Islands. It is strategically positioned at the entrance to the Gulf of Patras, nestled north of Zakynthos, south of Lefkada, and west of Ithaca.

The island spans an area of 781 square kilometers and is home to approximately 36,066 residents as per the 2021 census by the Hellenic Statistical Authority (ELSTAT. 2021). A significant portion of Kefalonia is dominated by Mount Aenos, which features some of the region's highest peaks including Megas Soros at 1,628 meters, Agia Dynati at 1,131 meters, Evmorfia at 1,043 meters, and Kokkini Rachi at 1,078 meters. These elevations not only define the island's rugged landscape but also support diverse ecosystems that are critical for regional biodiversity. The prominence of Mount Aenos in the island's topography is central to its appeal as a destination for birdwatching,

geotourism (Spyrou *et al.* 2022), astronomical tourism (Xanthakis *et al.* 2024), hiking and other forms of nature-based tourism.

3. Materials and Methods

The methodology for this study involved a comprehensive collection of bird observations in Kefalonia. Data were compiled from several sources including direct submissions by foreign birdwatchers, contributions from the Management Unit of Zakynthos, Aenos and Protected areas of Ionian islands (NECCA), postings from the online local Facebook group (Biodiversity of Cephalonia Island, 2024), scientific publications by English ornithologists, and birdwatching websites (Birdforum 2024, Birdtours 2024, Bubo 2024). A total of 1,776 ornithological observations were systematically gathered, involving both visitors and local citizens. Data were initially recorded and organized using Microsoft Excel to facilitate ease of processing. Each observation was detailed in a structured format with nine primary columns: Species, Prefecture, Place of Observation, Month of Observation, Year of Observation, Projective Coordinates (x, y), Name of Observer, Source, and Additional Information/Remarks. The species were listed by their Latin names to maintain consistency and scientific accuracy. Geographical data, including the location and time of each observation, were noted with precise details to enable effective mapping and analysis in a Geographic Information System (GIS). The coordinates were recorded using the Hellenic Geodetic Reference System (HGRS87) to ensure accuracy in spatial analysis using ArcGIS 10.1 software by ESRI. This approach enabled the study to highlight the spatial distribution of bird species across Kefalonia, enhancing the understanding of their habitat preferences and observation frequencies. The observations spanned several years, ranging from 1981 to 2018, providing a long-term view of avian biodiversity and birdwatching activity on the island. Below, Table 3 summarizes the distribution of these observations over the years, illustrating the fluctuation and trends in birdwatching activities.

Table 3. Number of Observations and Percentage in Total Per Year

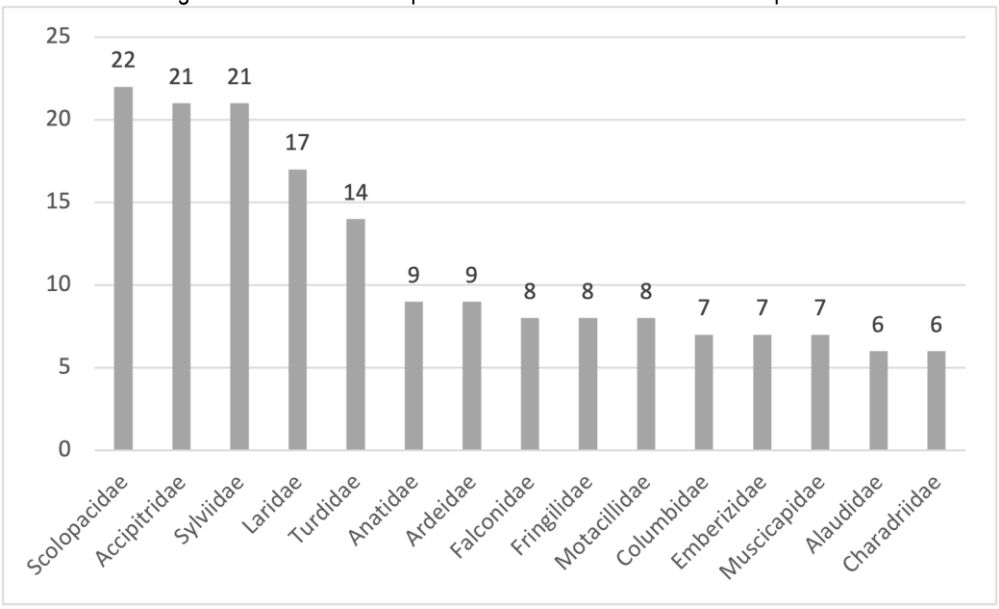
Year	Number of Observations	Total Percentage
1981	1	0.06%
1986	2	0.11%
1988	13	0.73%
1989	23	1.30%
1990	48	2.70%
1991	84	4.73%
1992	7	0.39%
1993	42	2.36%
1994	179	10.08%
1996	1	0.06%
1998	241	13.57%
2003	71	4.00%
2004	76	4.28%
2005	109	6.14%
2006	116	6.53%
2008	30	1.69%
2009	63	3.55%
2010	44	2.48%
2011	2	0.11%
2012	40	2.25%
2013	85	4.79%
2014	38	2.14%
2015	176	9.91%
2016	124	6.98%
2017	119	6.70%
2018	42	2.36%

The data presented in Table 3 highlights a significant increase in bird observations during certain years, particularly in 1998 and 2015, where the percentages of total observations reached 13.57% and 9.91%, respectively. These peaks may correspond to specific environmental or promotional events that drew higher numbers of bird watchers. The spread of observations over the years also suggests a growing interest and possibly improved awareness and reporting mechanisms in the birdwatching community over time. This increase in data collection and interest supports conservation efforts and enhances the scientific understanding of avian diversity on Kefalonia.

4. Research Results

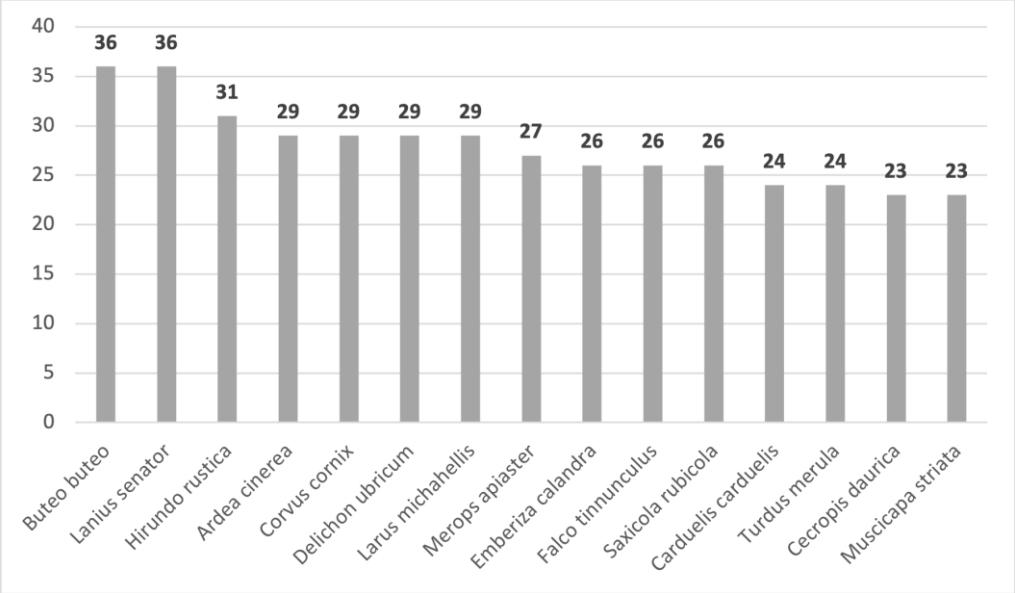
During the study, a total of 254 different bird species were recorded by foreign birdwatchers. These species are distributed across 54 diverse avian families. To provide a clearer overview, Figure 2 displays the number of species within the fifteen families that have the highest species count, facilitating a focused discussion on the most significant observations. From the data presented in Figure 1, it is evident that the family Scolopacidae, known for its shorebirds, is the most species-rich, boasting 22 distinct species. This is closely followed by the Accipitridae and Sylviidae families, each containing 21 different species. Notably, the Laridae family, which includes gulls, and the Turdidae family, known for thrushes, contain 17 and 14 species respectively. Additionally, the families Anatidae and Ardeidae, representing ducks and herons, have 9 species each. Other notable families such as Falconidae, Fringillidae, and Motacillidae each host 8 different species. Interestingly, there are several families that are represented by a single species within the region, highlighting the unique biodiversity of Kefalonia. These include Alcidae, Burhinidae, Caprimulgidae, Certhiidae, Cettidae, Cisticolidae, Coraciidae, Cuculidae, Glareolidae, Gruidae, Meropidae, Oriolidae, Pandionidae, Phoenicopteridae, Prunellidae, Stercorariidae, Sternidae, Sulidae, Threskiornithidae, Troglodytidae, and Upupidae. This variety underscores the importance of the island as a habitat for a wide range of avian life, reflecting its significant ecological value.

Figure 2. The Families Represented in Records with the Most Species



Regarding the diversity of bird species recorded, a total of 254 different species were noted, as illustrated in Figure 3.

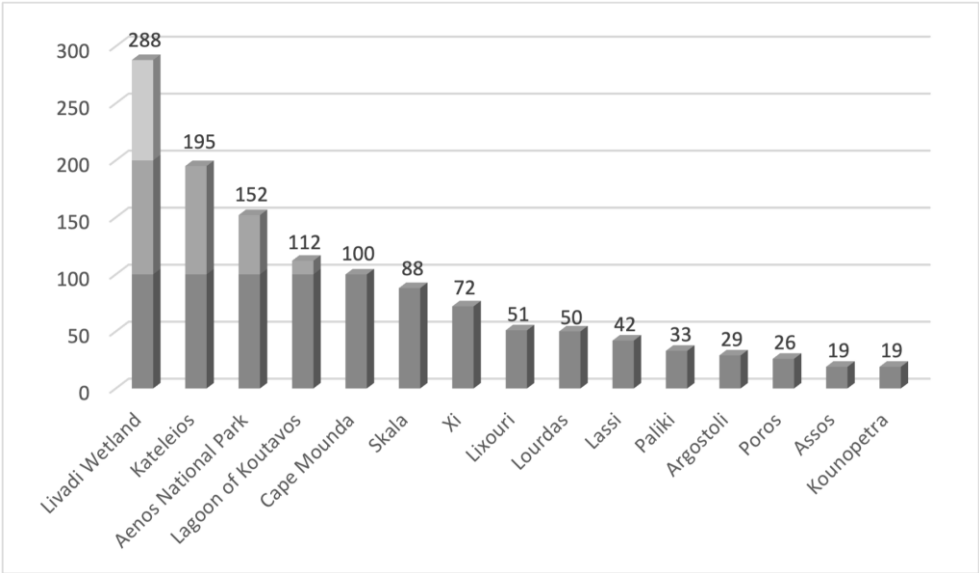
Figure 3. Species with the most Recordings



As shown in Figure 3, the Common Buzzard (*Buteo buteo*) was observed the most frequently, recorded 36 times. This was the same with the Woodchat Shrike (*Lanius senator*). The Grey Heron (*Ardea cinerea*), Hooded Crow (*Corvus cornix*), House Martin (*Delichon urbicum*), and Yellow-legged Gull (*Larus michahellis*) each were observed 29 times. The European Bee-eater (*Merops apiaster*) and several other species such as the Common Kestrel (*Falco tinnunculus*) and the Stonechat (*Saxicola rubetra*) were also frequently sighted, with 27 and 26 observations respectively. The dataset reflects the rich avifaunal diversity present in Kefalonia, showcasing both common species and those that are more unique to the region. This extensive range of species recorded underscores the island's significance as a birdwatching destination, attracting enthusiasts eager to observe both common and rare species in their natural habitats. The presence of unique species such as the Alcenidae, Burhinidae, and Caprimulgidae—each represented by only one recorded species—highlights the ecological value and diverse bird life of the island.

The geographical distribution of bird observations is a critical aspect of understanding avian biodiversity in Kefalonia. This is visually represented in Figure 4, which illustrates the frequency of observations across various locations on the island.

Figure 4. Distribution of Bird Observations by Location in Kefalonia



According to Figure 4, the highest number of bird recordings was made at the Wetland of Livadi, Paliki, with 288 observations, highlighting this area as a significant bird habitat. Following closely, Kateleios accounted for 195

observations, and Aenos National Park, a protected area known for its rich biodiversity, registered 152 observations. Notably, the lagoon of Koutavos was also a prominent site with 112 recordings, followed by Cape Mounda with 100, and Skala with 88 observations. Other notable areas that proved to be important for avifauna include Xi with 72 observations, and additional sites such as Lixouri, Lourdas, Lassi, Argostoli, Poros, and Assos also made significant contributions to the dataset. This spatial distribution of observations underscores the importance of diverse habitats in Kefalonia, supporting a wide range of bird species. It also indicates potential areas for focused conservation efforts and further research to ensure the protection and understanding of the island's avifauna.

The avifauna of Kefalonia comprises a diverse range of species, whose presence and conservation status are meticulously documented. The classification of these species according to their presence on the island provides insights into their ecological roles and the temporal aspects of their occurrences. Table 4 categorizes these species into several types of presence, offering a structured view into their life cycles and migration patterns on the island.

Table 4. Presence Status of Avifauna Species in Kefalonia

Presence status	Description
R	Resident
B	Breeder
P	Passage Migrant
W	Winter Visitor
AV	Accidental Visitor

Concurrently, the protection status of these species is critical for understanding the conservation priorities and measures needed. Table 5 delineates these statuses as per the International Union for Conservation of Nature (IUCN) and the Greek Red Data Book, reflecting both global and local conservation efforts (Baillie *et al.* 2004).

Table 5. Species Protection Status Based on IUCN

Presence status	Description
EX	Extinct
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
NT	Near Threatened
LC	Least Concern
DD	Data Deficient

Source: Baillie *et al.* 2004

Following these classifications, Table 6 provides a detailed list of the avifauna species observed in Kefalonia, annotated with their presence and protection statuses. This comprehensive enumeration aids in the targeted conservation and study of these birds, highlighting the need for continued ecological monitoring and adaptive management strategies.

Table 6. Avifauna Species Observed in Kefalonia by birdwatchers, their Presence Status, and IUCN Protection Status

A/A	Family	*Species*	Presence Status	IUCN Status
1	Accipitridae	*Accipiter brevipes*	P	LC
2	Accipitridae	*Accipiter gentilis*	P, W	LC
3	Accipitridae	*Accipiter nisus*	B, P, W	LC
4	Accipitridae	*Aquila chrysaetos*	R	LC
5	Accipitridae	*Aquila fasciata**	AV	LC
6	Accipitridae	*Aquila heliaca**	AV	VU
7	Accipitridae	*Buteo buteo*	R	LC
8	Accipitridae	*Buteo lagopus*	AV	LC
9	Accipitridae	*Buteo rufinus*	R	LC

A/A	Family	*Species*	Presence Status	IUCN Status
10	Accipitridae	*Buteo vulpinus*	AV	LC
11	Accipitridae	*Circaetus gallicus*	P, B	LC
12	Accipitridae	*Circus aeruginosus*	P, W	LC
13	Accipitridae	*Circus cyaneus*	P, W	LC
14	Accipitridae	*Circus macrourus*	P	NT
15	Accipitridae	*Circus pygargus*	P	LC
16	Accipitridae	*Clanga clanga**	AV	VU
17	Accipitridae	*Clanga pomarina*	AV	LC
18	Accipitridae	*Gyps fulvus*	AV	LC
19	Accipitridae	*Hieraaetus pennatus*	P, W	LC
20	Accipitridae	*Milvus migrans*	P, W	LC
21	Accipitridae	*Neophron percnopterus*	P	EN
22	Accipitridae	*Pernis apivorus*	P	LC
23	Acrocephalidae	*Acrocephalus arundinaceus*	B, P	LC
24	Acrocephalidae	*Acrocephalus melanopogon*	P, W	LC
25	Acrocephalidae	*Acrocephalus paludicola**	P	VU
26	Acrocephalidae	*Acrocephalus schoenobaenus*	P	LC
27	Acrocephalidae	*Acrocephalus scirpaceus*	B, P	LC
28	Acrocephalidae	*Hippolais icterina*	P	LC
29	Acrocephalidae	*Hippolais olivetorum*	P	LC
30	Acrocephalidae	*Hippolais opaca*	P	LC
31	Acrocephalidae	*Hippolais polyglotta*	AV	LC
32	Acrocephalidae	*Iduna pallida*	B, P?	LC
33	Alaudidae	*Alauda arvensis*	B, P, W	LC
34	Alaudidae	*Calandrella cinerea*	P	LC
35	Alaudidae	*Galerida cristata*	R	LC
36	Alaudidae	*Lullula arborea*	R, P	LC
37	Alaudidae	*Melanocorypha bimaculata*	AV	LC
38	Alaudidae	*Melanocorypha calandra*	B, P	LC
39	Alcedinidae	*Alcedo atthis*	P, W	LC
40	Anatidae	*Anas acuta*	P, W	LC
41	Anatidae	*Anas clypeata*	P, W	LC
42	Anatidae	*Anas crecca*	P, W	LC
43	Anatidae	*Anas penelope*	P, W	LC
44	Anatidae	*Anas platyrhynchos*	B, P, W	LC
45	Anatidae	*Aythya fuligula*	AV	LC
46	Anatidae	*Cygnus olor*	R	LC
47	Anatidae	*Spatula querquedula*	P, W	LC
48	Anatidae	*Tadorna tadorna*	AV	LC
49	Apodidae	*Apus apus*	B, P	LC
50	Apodidae	*Apus pallidus*	P	LC
51	Apodidae	*Tachymarptis melba*	B, P	LC
52	Ardeidae	*Ardea alba*	P, W	LC
53	Ardeidae	*Ardea cinerea*	B, P, W	LC
54	Ardeidae	*Ardea purpurea*	P	LC
55	Ardeidae	*Ardeola ralloides*	P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
56	Ardeidae	*Botaurus stellaris**	P, W	LC
57	Ardeidae	*Bubulcus ibis*	P, W	LC
58	Ardeidae	*Egretta garzetta*	P, W	LC
59	Ardeidae	*Ixobrychus minutus*	P	LC
60	Ardeidae	*Nycticorax nycticorax*	P, W	LC
61	Burhinidae	*Burhinus oedicnemus*	R	LC
62	Caprimulgidae	*Caprimulgus europaeus*	B, P	LC
63	Certhiidae	*Certhia brachydactyla*	R	LC
64	Cettiidae	*Cettia cetti*	R	LC
65	Charadriidae	*Charadrius alexandrinus*	P, W	LC
66	Charadriidae	*Charadrius dubius*	P, W	LC
67	Charadriidae	*Charadrius hiaticula*	P, W	LC
68	Charadriidae	*Charadrius morinellus*	W	LC
69	Charadriidae	*Pluvialis squatarola*	P, W	LC
70	Charadriidae	*Vanellus vanellus*	P, W	NT
71	Ciconiidae	*Ciconia ciconia*	P	LC
72	Ciconiidae	*Ciconia nigra*	AV	LC
73	Cisticolidae	*Cisticola juncidis*	R	LC
74	Columbidae	*Columba livia*	R	LC
75	Columbidae	*Columba oenas*	B, P, W	LC
76	Columbidae	*Columba palumbus*	R	LC
77	Columbidae	*Streptopelia decaocto*	R	LC
78	Columbidae	*Streptopelia roseogrisea*	AV	LC
79	Columbidae	*Streptopelia turtur*	B, P	VU
80	Coraciidae	*Coracias garrulus*	P	LC
81	Corvidae	*Corvus corax*	R	LC
82	Corvidae	*Corvus cornix*	R	LC
83	Corvidae	*Garrulus glandarius*	R, B	LC
84	Corvidae	*Pica pica*	AV	LC
85	Cuculidae	*Cuculus canorus*	P	LC
86	Emberizidae	*Emberiza caesia*	P	LC
87	Emberizidae	*Emberiza calandra*	P, R	LC
88	Emberizidae	*Emberiza cia*	P	LC
89	Emberizidae	*Emberiza cirlus*	R	LC
90	Emberizidae	*Emberiza hortulana*	P	LC
91	Emberizidae	*Emberiza melanocephala*	P	LC
92	Emberizidae	*Emberiza schoeniclus*	W	LC
93	Falconidae	*Falco biarmicus*	R, P	LC
94	Falconidae	*Falco cherrug*	P	EN
95	Falconidae	*Falco eleonorae*	P, B	LC
96	Falconidae	*Falco naumanni*	B, P	LC
97	Falconidae	*Falco peregrinus*	R	LC
98	Falconidae	*Falco subbuteo*	P	LC
99	Falconidae	*Falco tinnunculus*	R	LC
100	Falconidae	*Falco vespertinus*	P	NT
101	Fringillidae	*Carduelis carduelis*	B, P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
102	Fringillidae	*Chloris chloris*	B, P	LC
103	Fringillidae	*Coccothraustes coccothraustes*	P, W	LC
104	Fringillidae	*Fringilla coelebs*	R	LC
105	Fringillidae	*Linaria cannabina*	P, B	LC
106	Fringillidae	*Loxia curvirostra*	AV	LC
107	Fringillidae	*Serinus serinus*	R	LC
108	Fringillidae	*Spinus spinus*	P, W	LC
109	Glareolidae	*Glareola pratincola*	P	LC
110	Gruidae	*Grus grus*	P	LC
111	Hirundinidae	*Cecropis daurica*	B, P	LC
112	Hirundinidae	*Delichon urbicum*	B, P	LC
113	Hirundinidae	*Hirundo rustica*	B, P	LC
114	Hirundinidae	*Riparia riparia*	P	LC
115	Hydrobatidae	*Hydroprogne caspia*	AV	LC
116	Laniidae	*Lanius collurio*	P	LC
117	Laniidae	*Lanius excubitor*	AV	LC
118	Laniidae	*Lanius minor*	P	LC
119	Laniidae	*Lanius senator*	B, P	LC
120	Laridae	*Chlidonias hybrida*	P	LC
121	Laridae	*Chlidonias leucopterus*	P	LC
122	Laridae	*Chlidonias niger*	P	LC
123	Laridae	*Chroicocephalus ridibundus*	P, W	LC
124	Laridae	*Gelochelidon nilotica*	AV	LC
125	Laridae	*Hydrocoloeus minutus*	P, W	LC
126	Laridae	*Ichthyaetus melanocephalus*	AV	LC
127	Laridae	*Larus argentatus*	AV	LC
128	Laridae	*Larus audouinii*	AV	LC
129	Laridae	*Larus cachinnans*	P, W	LC
130	Laridae	*Larus fuscus*	P, W	LC
131	Laridae	*Larus genei*	AV	LC
132	Laridae	*Larus marinus*	AV	LC
133	Laridae	*Larus melanocephalus*	P, W?	LC
134	Laridae	*Larus michahellis*	R	LC
135	Laridae	*Spilopelia senegalensis*	AV	LC
136	Laridae	*Sternula albifrons*	P	LC
137	Locustellidae	*Locustella luscinioides*	P	LC
138	Locustellidae	*Locustella naevia*	P	LC
139	Meropidae	*Merops apiaster*	B, P	LC
140	Motacillidae	*Anthus campestris*	B, P	LC
141	Motacillidae	*Anthus cervinus*	P, W	LC
142	Motacillidae	*Anthus novaeseelandiae*	AV	LC
143	Motacillidae	*Anthus pratensis*	B, P, W	LC
144	Motacillidae	*Anthus spinoletta*	P, W	LC
145	Motacillidae	*Motacilla alba*	R	LC
146	Motacillidae	*Motacilla cinerea*	R	LC
147	Motacillidae	*Motacilla flava*	B, P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
148	Muscicapidae	*Cercotrichas galactotes*	P	LC
149	Muscicapidae	*Erithacus rubecula*	P, W, B	LC
150	Muscicapidae	*Ficedula albicollis*	P	LC
151	Muscicapidae	*Ficedula hypoleuca*	P	LC
152	Muscicapidae	*Ficedula parva*	P	LC
153	Muscicapidae	*Ficedula semitorquata*	P	LC
154	Muscicapidae	*Luscinia megarhynchos*	B, P	LC
155	Muscicapidae	*Muscicapa striata*	B, P	LC
156	Muscicapidae	*Oenanthe hispanica*	B, P	LC
157	Muscicapidae	*Oenanthe isabellina*	B, P	LC
158	Muscicapidae	*Oenanthe oenanthe*	B, P	LC
159	Muscicapidae	*Phoenicurus ochruros*	P, W	LC
160	Muscicapidae	*Phoenicurus phoenicurus*	P, W	LC
161	Muscicapidae	*Saxicola maurus*	AV	LC
162	Muscicapidae	*Saxicola ruberta*	B, P	LC
163	Muscicapidae	*Saxicola rubicola*	B, P	LC
164	Oriolidae	*Oriolus oriolus*	P	LC
165	Pandionidae	*Pandion haliaetus*	P	LC
166	Paridae	*Cyanistes caeruleus*	B, P, W	LC
167	Paridae	*Lophophanes cristatus*	AV	LC
168	Paridae	*Parus major*	R	LC
169	Paridae	*Periparus ater*	B, P	LC
170	Paridae	*Poecile lugubris*	P	LC
171	Passeridae	*Passer domesticus*	R	LC
172	Passeridae	*Passer hispaniolensis*	B, P, W	LC
173	Passeridae	*Passer montanus*	R	LC
174	Passeridae	*Petronia petronia*	AV	LC
175	Phalacrocoracidae	*Microcarbo pygmeus*	AV	LC
176	Phalacrocoracidae	*Phalacrocorax aristotelis*	R	LC
177	Phalacrocoracidae	*Phalacrocorax carbo*	P, W	LC
178	Phasianidae	*Alectoris chukar*	R, B	LC
179	Phasianidae	*Alectoris graeca*	R, B	NT
180	Phasianidae	*Coturnix coturnix*	P	LC
181	Phasianidae	*Phasianus colchicus*	AV	LC
182	Phoenicopteridae	*Phoenicopterus roseus*	P, W	LC
183	Phylloscopidae	*Phylloscopus bonelli*	AV	LC
184	Phylloscopidae	*Phylloscopus collybita*	P, W	LC
185	Phylloscopidae	*Phylloscopus sibilatrix*	P	LC
186	Phylloscopidae	*Phylloscopus trochillus*	P	LC
187	Picidae	*Dendrocopos leucotos*	AV	LC
188	Picidae	*Dryocopus martius*	AV	LC
189	Picidae	*Jynx torquilla*	B, P, W	LC
190	Podicipedidae	*Podiceps cristatus*	P, W	LC
191	Podicipedidae	*Podiceps nigricollis*	P, W	LC
192	Podicipedidae	*Tachybaptus ruficollis*	R	LC
193	Procellariidae	*Calonectris borealis*	AV	LC

A/A	Family	*Species*	Presence Status	IUCN Status
194	Procellariidae	*Calonectris diomedea*	B, P	LC
195	Procellariidae	*Puffinus yelkouan*	B, P	VU
196	Prunellidae	*Prunella modularis*	W	LC
197	Rallidae	*Fulica atra*	P, R	LC
198	Rallidae	*Gallinula chloropus*	B, R	LC
199	Rallidae	*Porzana parva*	P	LC
200	Rallidae	*Porzana porzana*	P	LC
201	Rallidae	*Rallus aquaticus*	B, P, W	LC
202	Recurvirostridae	*Himantopus himantopus*	P	LC
203	Recurvirostridae	*Recurvirostra avosetta*	P	LC
204	Regulidae	*Regulus ignicapillus*	R	LC
205	Regulidae	*Regulus regulus*	R	LC
206	Scolopacidae	*Actitis hypoleucos*	P, W	LC
207	Scolopacidae	*Arenaria interpres*	P, W	LC
208	Scolopacidae	*Calidris alba*	P	LC
209	Scolopacidae	*Calidris alpina*	P, W	LC
210	Scolopacidae	*Calidris canutus*	AV	NT
211	Scolopacidae	*Calidris falcinellus*	AV	LC
212	Scolopacidae	*Calidris ferruginea*	P	NT
213	Scolopacidae	*Calidris minuta*	P, W	LC
214	Scolopacidae	*Calidris pugnax*	P	LC
215	Scolopacidae	*Calidris temminckii*	P	LC
216	Scolopacidae	*Gallinago gallinago*	P, W	LC
217	Scolopacidae	*Gallinago media*	P	NT
218	Scolopacidae	*Limosa limosa*	P	NT
219	Scolopacidae	*Numenius arquata*	P, W	NT
220	Scolopacidae	*Numenius phaeopus*	P	LC
221	Scolopacidae	*Numenius tenuirostris*	P	EN
222	Scolopacidae	*Scolopax rusticola*	P, W	LC
223	Scolopacidae	*Tringa glareola*	P	LC
224	Scolopacidae	*Tringa nebularia*	P	LC
225	Scolopacidae	*Tringa ochropus*	P, W	LC
226	Scolopacidae	*Tringa stagnatilis*	P	LC
227	Scolopacidae	*Tringa totanus*	P, W	LC
228	Stercorariidae	*Stercorarius parasiticus*	AV	LC
229	Strigidae	*Asio flammeus*	AV	LC
230	Strigidae	*Asio otus*	R, P	LC
231	Strigidae	*Athene noctua*	R, B	LC
232	Strigidae	*Otus scops*	R	LC
233	Strigidae	*Strix aluco*	AV	LC
234	Sturnidae	*Pastor roseus*	AV	LC
235	Sturnidae	*Sturnus vulgaris*	P, W	LC
236	Sulidae	*Morus bassanus*	AV	LC
237	Sylviidae	*Sylvia atricapilla*	R	LC
238	Sylviidae	*Sylvia borin*	P	LC
239	Sylviidae	*Sylvia cantillans*	B, P	LC

A/A	Family	*Species*	Presence Status	IUCN Status
240	Sylviidae	*Sylvia communis*	B, P	LC
241	Sylviidae	*Sylvia conspicillata*	AV	LC
242	Sylviidae	*Sylvia crassirostris*	P	LC
243	Sylviidae	*Sylvia curruca*	P	LC
244	Sylviidae	*Sylvia hortensis*	AV	LC
245	Sylviidae	*Sylvia melanocephala*	R	LC
246	Sylviidae	*Sylvia rueppelli*	B, P	LC
247	Threskiornithidae	*Plegadis falcinellus*	P	LC
248	Troglodytidae	*Troglodytes troglodytes*	R	LC
249	Turdidae	*Monticola saxatilis*	P	LC
250	Turdidae	*Monticola solitarius*	R	LC
251	Turdidae	*Turdus merula*	R, P, W	LC
252	Turdidae	*Turdus philomelos*	P, W	LC
253	Turdidae	*Turdus viscivorus*	P, W	LC
254	Upupidae	*Upupa epops*	B, P	LC

5. Discussions

The present research synthesizes observational data collected by birdwatchers on the island of Kefalonia, Ionian islands, Greece marking a significant compilation of 1,776 bird recordings. Utilizing Microsoft Excel for data management and Geographic Information System (GIS) software for spatial analysis, this study maps the observations onto Kefalonia's topographical layout, providing a detailed view of avifauna distribution across various habitats. The extensive dataset underscores Kefalonia's ecological richness, attributed to its diverse physical geography which includes wetlands and rocky outcrops - habitats that are crucial for numerous bird species. The study confirms that Kefalonia's climate and geography make it an ideal locale for birdwatching, which is further enriched by the island's vibrant culture, traditions, and natural beauty. These factors collectively foster the growth of birdwatching tourism (Maniatis *et al.* 2020).

An analysis of the timing and frequency of excursions reveals that birdwatching activities predominantly occur during morning and afternoon hours, which could potentially bias observational data against nocturnal species such as the Eagle Owl or the Tawny Owl (Weston *et al.* 2015). Additionally, changes in agricultural practices and land use over recent years raise concerns about their impacts on local avifauna, possibly contributing to the reduced sightings of some species like the Griffon Vulture (Wretenberg *et al.* 2010). Furthermore, this research highlights several key observation sites across Kefalonia that are particularly favourable for birdwatching, including the Livadi Wetland, Aenos National Park, and the coastal areas of Kateleios and Mounda. The findings suggest that easily detectable species tend to be observed more frequently, while cryptic species are less commonly recorded, indicating a potential area for targeted research and conservation efforts.

The collected data not only enhance our understanding of Kefalonia's bird species but also hold significant potential for promoting conservation awareness and ecotourism. Recommendations for future initiatives include the development of educational materials such as guides, posters, and brochures, involvement in thematic exhibitions like the BirdFair UK, contributions to wildlife magazines, and the creation of digital content including specialized websites and smartphone applications. These resources would serve both to educate the public and to support birdwatching practices on the island. Moreover, the systematic analysis and reporting of these observations to the Hellenic Ornithological Society play a crucial role in the broader scientific community, contributing to ongoing research and conservation strategies. Such efforts are vital for monitoring population dynamics of key species, understanding their habitat needs, and ensuring the long-term preservation of Kefalonia's rich biodiversity (Karris *et al.* 2020).

In conclusion, this research not only expands our knowledge of Kefalonia's avian diversity but also underscores the importance of integrating scientific research with tourism and conservation efforts. By doing so, it enhances the protection of biodiversity and supports the development of specialized, thematic tourism that appreciates and preserves the natural environment (Martinis *et al.* 2023).

Conclusions and Further Research

This research aimed to harness the observational data collected by birdwatchers on Kefalonia to derive meaningful insights about the island's avifauna, contributing to the broader catalog of Greek bird species. Through meticulous data collection and analysis of bird observations, this study provided a detailed overview of the species present on the island, their habits, and their ecological niches. Notably, these efforts highlighted Kefalonia as a significant stopover for migratory birds in Europe and underscored its potential as a prime destination for birdwatching tourism.

The study successfully demonstrated the utility of special thematic websites for gathering birdwatcher observations. Using Microsoft Excel and ArcGIS 10.1, the data were efficiently organized and spatially mapped, confirming the feasibility of such digital tools for ecological research and tourism development. The analysis revealed that Kefalonia remains a crucial habitat for both migratory and resident bird species, including rare and endangered species like the Snake eagle (*Circaetus gallicus*), Golden eagle (*Aquila chrysaetus*), and Shag (*Phalacrocorax aristotelis*). The island's blend of natural diversity and minimal human encroachment creates a favorable environment for avian biodiversity. Lastly, the research identified a significant opportunity in the digital recording and processing of bird observations. The current lack of a centralized database means many valuable observations remain underutilized. Establishing an integrated digital platform could revolutionize how data are collected and analyzed, promoting more dynamic conservation efforts and enriching the birdwatching experience.

Future initiatives should focus on developing a comprehensive digital database for Kefalonia's avifauna, which would streamline data collection and accessibility, and integrate with global citizen science projects to enhance data richness and availability. Additionally, expanding observational studies to include more systematic night-time observations would provide a more comprehensive understanding of the island's avian biodiversity, including nocturnal species. There is also a critical need for enhanced public engagement and education. Developing interactive applications and educational programs would increase public involvement in birdwatching and conservation activities, enriching local tourism offerings and fostering a deeper community connection to the island's natural and cultural heritage (Mylonopoulos *et al.* 2022). Furthermore, conducting longitudinal studies on avian population dynamics would assess the impact of environmental changes and human activities on bird populations, providing essential data for effective conservation strategies. By addressing these areas, future efforts can build on the current study's findings to promote sustainable tourism and conservation on Kefalonia, ensuring the protection of its avian populations for generations to come.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of use of generative AI and AI-Assisted Technologies

The authors declare that they have not used generative AI and AI-assisted technologies during the preparation of this work.

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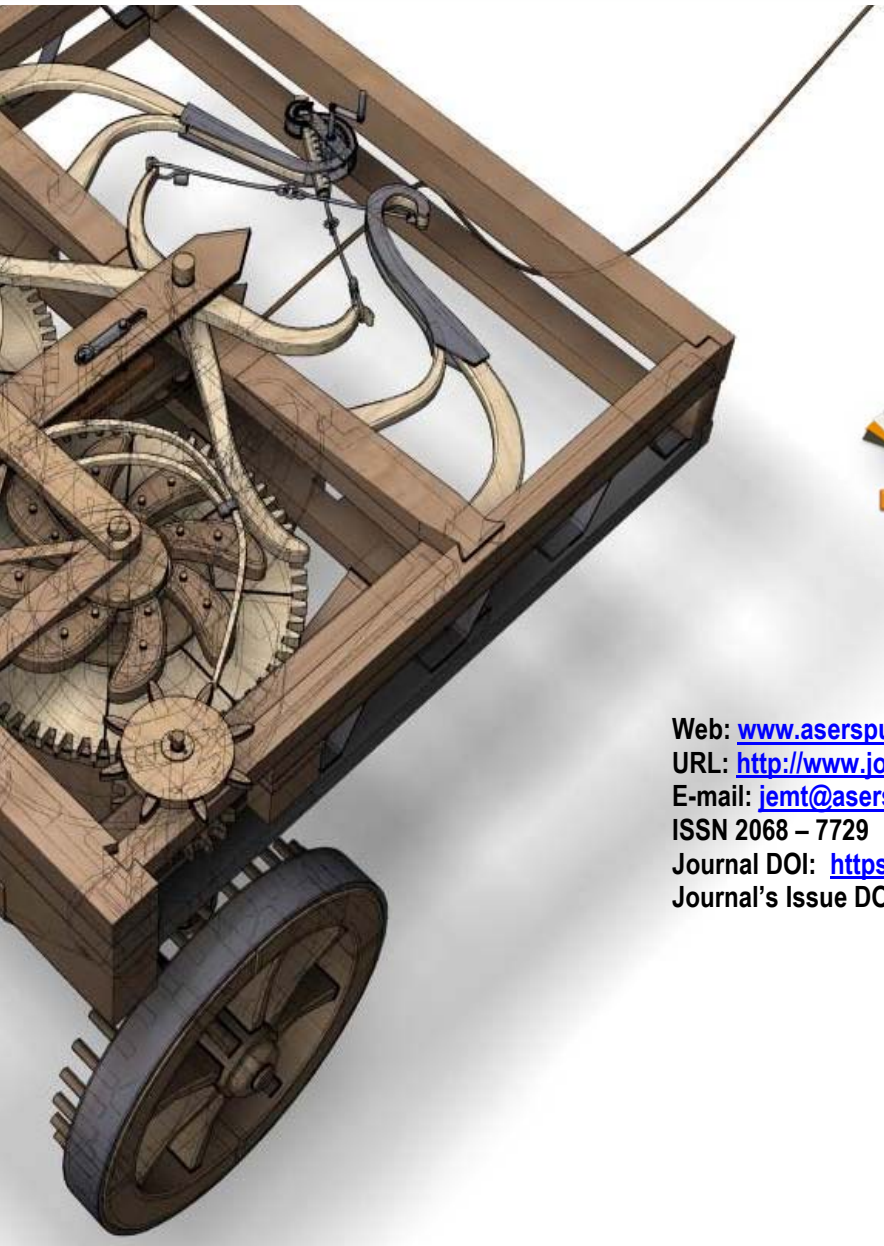

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