



Factors influencing visitors' acceptance of parking management measures in the Ebro Delta region, Spain

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ABSTRACT

This study examines visitors' acceptance of parking management measures in the Ebro Delta (Spain), a car-dependent rural and protected coastal area that experienced a sharp increase in visitation after the COVID-19 pandemic. This context has intensified traffic congestion, environmental pressures, and the need for adaptive visitor management strategies in a territorially complex and ecologically sensitive destination. Using data from a survey conducted among visitors during the peak summer season of 2022, the study analyzes the acceptance of three types of parking measures: regulated parking (zoning and spatial organization), limited parking (time restrictions, capacity control, and reservation systems), and paid parking (fee-based access). The analysis integrates sociodemographic characteristics, travel behavior, environmental attitudes, and perceptual variables, and applies ordinal logistic regression models to identify the main determinants of acceptance. Results show high levels of acceptance for regulated and limited parking, while paid parking generates more heterogeneous responses. Visitor satisfaction emerges as the strongest and most consistent predictor across all measures, highlighting its central role in shaping support for management policies. Acceptance is also influenced by factors such as country of origin, mobility patterns, education level, accommodation type, and length of stay. The findings underscore the importance of aligning traffic management strategies with visitor experience and destination characteristics. In car-dependent rural areas such as the Ebro Delta, improving satisfaction, promoting active mobility, and considering the cumulative costs of longer stays are key to increasing public support for sustainable transport policies. This study contributes to bridging the gap between visitor data and practical management, offering insights for the design of adaptive and context-sensitive mobility strategies in car-dependent rural destinations facing visitor pressures.

1. Introduction

The boom of tourism and outdoor recreation since the 1960s to witness scenic beauty, wildlife, and nature (Budowski, 1976), has fueled growing demand in rural and nature-based destinations. The mobilities growth from urban societies to these destinations has added concerns related to the domination of car travel (Juschten and Hössinger, 2020). As Dickinson and Robbins (2008), Jaarsma et al. (2009) or Waleghwa and Ioannides (2024) have shown, cars are the primary mode of transport for trips to and within rural and natural destinations. Consequently, the effects of tourism extend both to the impacts caused by the number of visitors and their behavior, and to traffic-related problems in and around the destinations (Curtale et al., 2024; Waleghwa, 2025). That latter aspect is crucial in communities that struggle with escalating

congestion resulting from the influx of cars, which is only worsened by the lack of adequate infrastructure in such areas (Jaarsma et al., 2009).

Following the COVID-19 pandemic and the lifting of mobility restrictions implemented in 2020 and 2021, recreational behavior of local travelers shifted significantly (Beery et al., 2021). Changes in outbound and inbound international mobility flows, a heightened promotion of rural and nature-based destinations, and perceptions of health safety in these destinations have shaped visitation patterns (Jones et al., 2021). Moreover, the increase in domestic tourism and the engagement in outdoor activities in rural areas of Spain has exerted pressure on car-dependent nature-based destinations in the post-pandemic context (Cañada and Izcara, 2021).

This study focuses on changes experienced in the Ebro Delta region, Spain; where visitors flocked on holidays after COVID-19 lockdowns,

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including zones designated as protected areas (Margalef Callau, 2021). It is also a rural area characterized by its dependence on private vehicles, both for visitors' arrival and for their mobility during their stay (Paulino et al., 2025a,b). Limited public transport services and the spatial separation of attractions reinforce this car-dependency, particularly during peak tourist periods. As a result, high volumes of cars concentrate in environmentally sensitive areas, generating congestion, informal parking practices, and pressure on fragile ecosystems. In this context, parking management becomes a key policy tool, not only to regulate access and control visitor flows, but also as part of broader strategies aimed at reducing car use and promoting more sustainable mobility options, including active modes. These challenges make the Ebro Delta a relevant case for examining the role of parking policies in managing transport and tourism pressures in environmentally sensitive rural areas. Limiting, if not preventing, car traffic and implementing parking-related policies have become key tools within visitor management in nature-based car-dependent destinations (Regnerus et al., 2007). Since traffic-related management measures were widely implemented at the Ebro Delta region to cope with the effects of increasing visitation, we examined how visitors perceived those strategies. The effects of traffic management policies have been explored (Beunen et al., 2006), however studies related to visitors' drives and perception on these measures are still scarce (Juschten and Hössinger, 2020). Parking is often less strictly regulated in rural and nature-based destinations than in urban contexts, which can lead to informal parking along roadsides or around formal parking areas and increase disturbance in sensitive zones (Monz et al., 2016). Parking regulation has therefore been identified as an effective strategy for organizing visitor mobility flows and managing on-site visitor levels, although it should be combined with broader transport and visitor management strategies (Regnerus et al., 2007; Weitowitz et al., 2019; Jou et al., 2024).

The analysis developed in this case study will provide detailed insights into the specificity and complexity of traffic management in the Ebro Delta region, with the chief objective of examining the relationship between the profile of visitors and their agreement with parking measures implemented in the area. Understanding visitors' perceptions and acceptance of management measures is essential because these attitudes can influence compliance and the effectiveness of traffic and visitor management strategies (Phongkhieo and Sangchoey, 2019; Kuentzel et al., 2008). To that general purpose, we aimed to answer the following questions:

Q1: How did visitors perceive parking management measures implemented in the Ebro Delta?

Q2: Which demographic and behavioral characteristics most effectively explain a visitor's acceptance or rejection of the parking management measures implemented in the area?

Q3: What are the implications of visitors' attitudes towards visitor and parking management measures for the Ebro Delta stakeholders and managers?

Visitor management strategies are fueled by the information gathered from users within the destination; thus, an insufficient understanding of visitor behavior can result in poor management decisions. Destination managers are increasingly conducting visitor surveys, but there is a gap between collecting information from visitor surveys and its effective use for management or parking strategies (Weitowitz et al., 2019). In this sense, the knowledge provided after addressing the proposed research questions will be useful to advance decision-making and transport planning both before and after the implementation of management strategies in car-dependent rural destinations facing visitor pressures.

2. Literature review

2.1. Overcrowding management in rural and nature-based destinations

Nature-based tourism is rooted in the environmental and cultural characteristics of the territory (Newsome et al., 2002). These activities usually occur in functionally rural settings, typically based on "small-scale" elements – i.e., settlements, services, enterprises; where local traditions, economy and history play an important role (Dickinson, 2006). In these territories, human activities are inherently tied to the natural environment, making nature preservation a critical function of these areas. High volumes of visitors can cause tensions within these destinations, negatively affecting local habitats and resources in unsustainable ways (Lenart-Boroń et al., 2022), disrupting residents' well-being and impacting users' experiences, (Hanley et al., 2002; Marion and Reid, 2007). In the face of these straining challenges, the introduction of visitor and traffic management actions, usually based on carrying capacity indexes, has been considered in various destinations, including rural areas. These actions aim to enhance both sustainable environmental management and the quality of visitor experiences (Yun et al., 2021).

When facing the question of "how many is too many" in a given destination, carrying capacity serves managers as an indicator of the maximum number of visits the area can accommodate based on physical, biological, and management conditions (Zelenka and Kacetyl, 2014). It works as a systematic and strategic tool within the planning process, which application requires consideration of ecological, sociological, psychological and economic dimensions (Job et al., 2021; Salerno et al., 2013). PUTRI IASLP (Putri Iaslp, 2021) underscored the importance of managers' ability to oversee and regulate visitors flows in natural destinations and to establish carrying capacity values based on their management limitations.

2.2. Tourist mobilities and traffic management in rural and nature-based destinations

Traffic volume and congestion on roadways are equally important concerns when considering both ecological integrity and visitor management (Monz et al., 2016). Excessive visitation leads to traffic congestion (Curtale et al., 2024; Jou et al., 2024), impacting the capacities of natural, social, and cultural environments, straining the qualities that make these territories attractive (Paulino et al., 2025). The pressure exerted increases physical hazards stemming from vehicle emissions, elevated noise levels, and overburdened road capacity (Beunen et al., 2006; Jaarsma et al., 2009).

In face of these concerns, effective management is required to mitigate these impacts, as well as ensure ecological preservation and a positive visitor experience. Moreover, management strategies can influence visitor use by emphasizing the control of recreational traffic flows to mitigate the negative impacts of driving and parking in natural and rural areas (Jaarsma et al., 2009; Yildirim et al., 2024).

Some studies suggest the implementation and promotion of alternative mobility solutions that correspond to the destination features (Juschten and Hössinger, 2020). Solutions such as shuttle services (Wang et al., 2024; Paulino et al., 2025), e-bike rental, (Curtale et al., 2024), public bike sharing (González et al., 2018), electric car rental (Martín et al., 2019), or simply, a conventional network of public transport with reasonable frequent connections (Tomej and Liburd, 2020), may offer potential ways to reduce the negative externalities. However, more frequently implemented solutions on these destinations are related to the regulation of human use through enforcement, zoning and access control (Eagles et al., 2002).

Research has shown that parking regulations are indeed an effective strategy for optimizing visitor mobility flows and on-site visitor levels; and in fact, characteristics such as type of parking, capacity, available facilities and implementation of fees can influence how visitors use

recreational areas (Jou et al., 2024; Weitowitz et al., 2019). Nevertheless, while parking regulations can help to redistribute the number of visitors in overcrowded areas, these measures should be part of a broader set of strategies. Such strategies should be informed by knowledge of recreational use patterns and involve different stakeholders in the decision-making process (Regnerus et al., 2007; Medina-Chavarria et al., 2024; Wang et al., 2024).

Furthermore, while the introduction of fees is a less frequent practice in traffic and visitor management, they can serve as complementary tools to both control congestion by influencing visitor behavior and generate funding for conservation efforts (Bushell and Mccool, 2007). Methods for implementing fees include entrance fees, charges for services (e.g., public transportation), and fees for amenities such as parking (Brown, 2001). However, the implementation of fees has faced criticism. It can incur additional costs for staffing, accounting, and specialized services; and may be perceived as impractical or culturally unacceptable in destinations where they have not previously been introduced (Brown, 2001). In fact, some studies suggest that fees may not be allocated to the conservation function of PAs, thus bringing no benefits to the area (Hanley et al., 2002).

2.3. Understanding visitors' perceptions of traffic management

Visitors' response to traffic management and related restrictions and measures depends on several factors, including sociodemographic and psychographic attributes and/or motivations. The combined study of those characteristics helps explain why visitors accept, value, and comply (or not) with management measures. Prior research has studied visitors' attitudes toward awareness of relationships with specific places (Frost and McCool, 1988; Haukeland et al., 2013; Yildirim et al., 2024).

In this context, Weitowitz et al. (2019) have examined the role of parking on the volume of recreational use of natural areas. They identified capacity conditions, site popularity and access to alternative transportation as key drivers of visitors' behavior; and emphasized the role of visitors' tolerance in parking measures' effectiveness. Notably, they noted that despite the introduction of paid parking, PAs remained significantly busy, suggesting that visitors are often determined to visit popular destinations regardless of fees. Similarly, Streifeneder and Omizzolo (2017) noted that fees do not discourage motorized traffic, as many visitors prefer to pay for the convenience of private vehicle travel rather than forgo it.

Other studies have focused on how demographic and attitudinal variables affect visitors' acceptance of regulations and willingness to pay. Brown (2001) has suggested that willingness to pay is influenced by visitors' income, education, occupation, perception of the services offered at the place, and destination's uniqueness. Moreover, Perera et al. (2015) found that higher education positively affected visitors' attitude toward the functions of natural protected areas, the user restrictions, the actions to reduce undesirable recreational activities, and toward the conservation-oriented policies. Song et al. (2021) found varying effects from gender, country of origin, experience, and season.

Moreover, visitors with a greater appreciation and familiarity with natural areas tend to accept conservation-oriented management strategies more readily (Gundersen et al., 2015). In contrast, Bayer et al. (2016) found that visitors with less affinity with the place were more likely to favor road tolls and parking fees. Visitors are also more likely to accept fees if they are aware that the funds generate direct benefit to the local site (Bushell and Mccool, 2007). Further studies indicate that visitor satisfaction and the perceived quality of services are inseparable from the perception of measures implemented in a destination (Ervina et al., 2020). Moreover, visitor satisfaction is the result of expectations being met on their experience, which is influenced by several variables including, among others, transportation (Qaddhat et al., 2021).

Despite existing literature, studies integrating demographic, attitudinal, and perceptual factors in outdoor recreation remain scarce (Song et al., 2021). Research on visitor acceptance of traffic management on

extraordinary situations such as the post-pandemic context is still needed. Furthermore, some authors noted a significant gap between collecting visitor data and using it effectively to improve management or address issues such as parking (Weitowitz et al., 2019). The forthcoming analysis aims to contribute to this research field.

3. Data and methods

3.1. Study area: The Delta del Ebro

Our study area was the Ebro Delta, Spain, a 320 km² territory, with a population of approximately 61,000 inhabitants spread across seven municipalities: Sant Jaume d'Enveja and Deltebre – situated entirely within the region; and L'Ampolla, La Ràpita, Amposta, L'Aldea, and Camarles – located on the peripheries (Parc Natural Del Delta De L'ebre, 2020). This region hosts diverse habitats shaped by the interaction between natural processes and human endeavors. The most sensitive ecosystems – coastline, wetlands, lakes and islands – were granted protected areas status between 1983 and 1986, under designations of natural park and nature reserves. While nature reserves focus on strict protection of natural systems, often limited to scientific research and education; natural parks emphasize a balance between natural resources use and the development of human activities (Parlament De Catalunya, 1985). In 2013, the Delta and neighboring natural areas became part of the UNESCO Biosphere Reserve of Terres de l'Ebre, aimed at the conservation of natural environments and biological biodiversity, the protection of regional cultural heritage and the sustainable development of agriculture (Reserva de la Biosfera Terres Del Ebre, 2024). However, prior research has noted that, in practice, biosphere reserves in Spain do not add an additional layer of protection but instead emphasize the development of tourism (Paül et al., 2022).

The Delta attracts visitors for its exceptional ecological richness, biodiversity and the distinctive sociocultural features such as Mediterranean gastronomy, aquaculture, and rice production. Before the pandemic, visitors mainly sought rest and leisure or popular destinations and routes, while nature-focused or active tourism were less common (Cazorla, 2015). Being the most visited protected area in the Province of Tarragona, tourism offerings include ecotourism, nature-based and wildlife tourism, and outdoor sports. However, the region is also exposed to mass tourism practices, particularly beach tourism and water sports. These contrasting dynamics make the Ebro Delta territory a valuable case for studying how rural destination are strained by unsustainable tourism mobilities and practices.

Cazorla (2015) explained that while access regulations existed for the most sensitive areas of the Ebro Delta, overcrowding management was overlooked. Palacio Buendía et al. (2019) supported this, by underscoring a deficiency in signposting across this territory. In 2020, 265,053 visitors were registered at EDNP information points, which was a lower figure than pre-pandemic years. However, visitors number raised to 324,029 in 2021 (de Catalunya, 2023), with peaks during Easter holidays and summer that exceeded records from same period on previous years. This trend continued in the following years, with recent studies noting visitor overcrowding as an emerging concern (Dorado Martínez and Farías-Torbidoni, 2025). Furthermore, national visitors accounted for more than 90% of the records, reflecting a significant rise in local tourism. Like other rural and natural areas in Europe (Dickinson, 2006), the distance between key attractions of the Delta and limited public transport connectivity (Cazorla, 2015; Paulino et al. 2025) has led most visitors to rely on private vehicles. The behavioral changes observed in 2020 and 2021 intensified these challenges, adding temporal and spatial visitor concentrations in sensitive spaces. Moreover, visitor's bad behavior, littering and ecological degradation were reported during this time (Medina-Chavarria et al., 2024). In response to these changes, municipalities introduced traffic management actions in the most affected sites, especially those within the protected areas of the Delta (Giralt, 2017). In June 2021, several measures were implemented

at Trabucador Beach in La Ràpita (Fig. 1), which later extended to other municipalities. These regulations combined three distinct management strategies: regulated, limited and paid parking.

Regulated parking was applied through zoning. At Trabucador Beach, parking areas were designated for per type of vehicle, with a maximum capacity of 700 vehicles: 650 cars, 50 camper vans, and 30 motorcycles (ACN, 2021). Moreover, adjacent spaces were delimited with poles, ropes and signs dedicated to fauna and flora preservation. At Eucalyptus Beach in Amposta and Migjorn and Serrallo Beaches in Sant Jaume d'Enveja the most fragile areas were similarly zoned to manage traffic and parking. Limited parking included restrictions on circulation and parking times. Access and parking at Trabucador Beach were only permitted from 6:00 a.m. to 11:00 p.m. (Generalitat de Catalunya, 2021), with overnight stays explicitly prohibited, as in all beaches of the Delta. During the peak summer months, an online reservation system was activated to manage entries, designed to ration carrying capacity by ensuring that daily vehicle numbers remained within sustainable thresholds (La Ràpita, 2021). This system combined spatial zoning with time-based access limits, making it a hybrid approach to visitor management.

Paid parking areas with fee-based rationing were introduced at Trabucador Beach, particularly in July and August (Generalitat de Catalunya, 2020). Here, a multi-tiered fee scheme differentiated charges by vehicle type: €5 for cars, €8 for camper vans and €3 for motorcycles, and an app-based payment system was used, with the incentive of €1 discount for early reservations (ACN, 2021). Cyclists, pedestrians and neighbors were exempt from this fee. Moreover, the first hour of stay was free. Importantly, the fee structure functioned not only as a financing tool but also as a mechanism to regulate demand, discouraging long stays and reducing traffic congestion in sensitive zones. The revenue generated was intended to cover operation-related expenses like tourist information, civic agent services, first aid service, toilets, and increased cleaning (La Ràpita, 2021); as well as support habitat regeneration efforts (Margalef Callau, 2021).

While Trabucador Beach became the most restrictive case, combining capacity limits, time restrictions, and zoning, other beaches such as Bassa de la Arena in Riumar and La Marquesa Beaches in Deltebre, primarily relied on zoning fragile areas and applying fee-based rationing systems. This said, previously unregulated areas, with unorganized and free parking, became more strictly managed through a combination of regulated, limited and paid parking strategies. Studying visitors' characteristics and perceptions about this transition will help policymakers assess the effectiveness of these measures and develop knowledge-based visitor management strategies (Gundersen et al., 2015). It is noteworthy that by summer of 2023, several measures implemented at the Ebro Delta were lifted (ACN, 2021). Despite being initially presented as an innovative traffic control tool, the barrier and

parking fee at Trabucador Beach were removed by the managing municipality due to economic and technical viability issues. This outcome could be attributed to the lack of prior monitoring and an incomplete understanding of visitor flows, experiences and satisfaction- factors that, according to Weitowitz et al. (2019), can lead to ineffective management decisions. This underscores the relevance of this study, which will inform managers and policymakers about the visitor profile and preferences, guiding future decision-making processes and their management approach.

3.2. Data collection and sampling

We collected data for our study by conducting a survey of visitors at the primary tourist sites and/or staying in accommodations in the Ebro Delta. Survey locations (Fig. 2) were selected based on the findings of Paulino and Prats (2013), who performed a content analysis of tourist guides to identify major destinations in the Delta and classify them according to their attractiveness on local, regional, and international scales. As a result, 4 attractions (Zigurat viewpoint, Deltebre, Punta del Fangar and La Tancada) concentrated 72% of surveys. Due to the lack of a sampling frame for the total visitor population, a non-probability convenience sampling method was employed. Moreover, the interviewers conducted the surveys in Spanish, Catalan, French and English. The fieldwork took place over a period of five continuous weeks during July and August 2022. Participants were chosen using a simple random sampling technique. In some cases, participants completed the survey online after their visit to the Delta. Before taking part in the study, participants were provided with information regarding the study's objective, were required to confirm that they were at least 18 years old and provided their consent to have their data used in our analysis. The only other criterion for inclusion was having visited at least two tourist sites within the Delta during their current trip. Surveyors approached 1169 visitors to the Delta, of whom 481 did not meet the selection criteria or declined to participate. This left 688 completed questionnaires. After screening the data, those who did not respond to questions about the management measures implemented or who had no opinion on the measures were excluded from the final analysis. This decision was made to avoid biased responses from visitors unfamiliar with our specific context. Thus, the final sample in our study was reduced to 452 individuals.

3.3. Variables

The primary focus of our study was to assess the degree of visitors' acceptance of parking management measures implemented in the Ebro Delta. The assessment placed particular attention on three key variables: (1) the acceptance of regulated parking, which involves zoning and



Fig. 1. Management measures implemented at Trabucador Beach in the Ebro Delta Natural Park: Multi-tiered fee scheme implemented (left). Advice on regulated areas (right). Source: Authors.

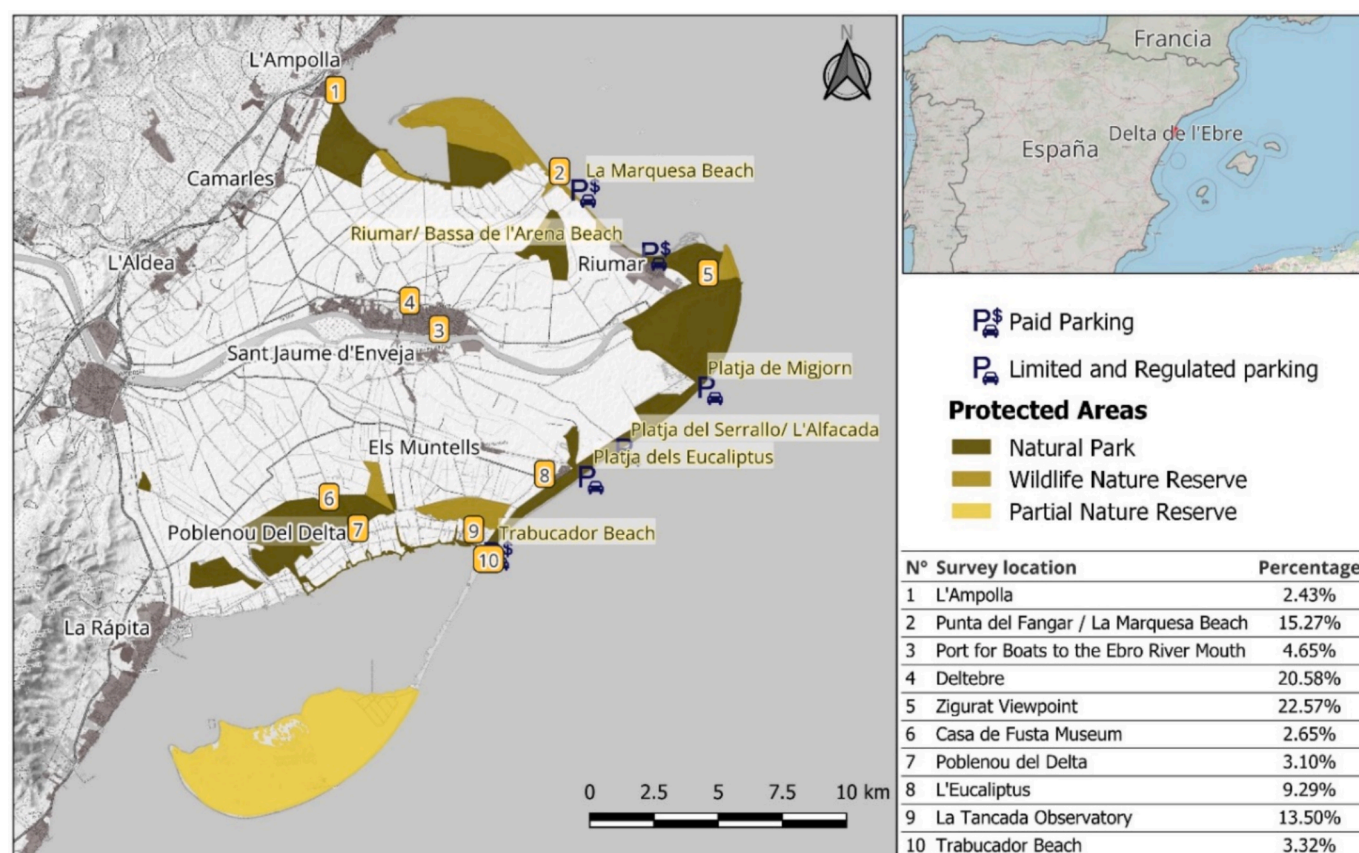


Fig. 2. Study area and survey locations at the Ebro Delta. Source: Authors' elaboration based on information from the Cartographic and Geological Institute of Catalonia.

delineating areas of use; (2) the acceptance of limited parking, which includes time limits, rationed carrying capacity and a reservation system; and (3) the acceptance of paid parking involving rationing through a fee. Participants were requested to rate their acceptance of the implemented parking measures on a scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). The variables included in our study are described in Table 1.

Five sociodemographic attributes were examined as covariates: gender, country of origin, age, level of education, and employment status. The questionnaire also gathered data about the participants' ongoing visits, including aspects such as travel companions, motivations (i.e., multiple answers possible), accommodation, type of mobility within the region (i.e., multiple answers possible), types of places visited (i.e., multiple answers possible), and the intensity of visits to the Ebro Delta (number of sites visited by the time of the survey). Although the covariates in those sections were both categorical and numerical; to facilitate analysis we transformed categorical variables into dichotomous variables. We also included the frequency of searches on environment-related issues and the frequency of visits to natural areas, rated on a scale from 1 (*never*) to 5 (*always*), as variables to capture visitors' affinity with environmental issues and natural areas. To test the effect of the COVID-19 pandemic on visitors' acceptance of the regulations imposed, we introduced a variable to indicate whether the participants increased their frequency of visits to natural areas following the pandemic or not. Last, we included variables to measure visitors' perception of parking quality and their overall satisfaction with their current visits.

3.4. Descriptive statistics

Table 2 provides an overview of the descriptive statistics of the

sample. The observations for dichotomous variables assumed a value of either 0 or 1, and the mean values for those variables correspond to the proportion of participants surveyed who provided a positive response to the item. For continuous variables, mean and standard deviations are exhibited. Regarding demographic attributes, most participants identified as women. The sample had a mean age of 44.19 years, mostly within the range of 36 to 45 years (35%). The most prevalent travel groups were couples (33%) and families (51%), and the average size of the travel group ranged from three to four people per group. A considerable proportion of participants had a university degree (70%) and were employed or self-employed (89%). It is noteworthy that the Ebro Delta is a relevant destination within the national market, representing 86% of the sample. Approximately 38% of participating visitors were in the area for the first time. By contrast, more than 60% were repeating the destination, with 41% of them having visited the region five times or fewer, whereas 20% indicated having visited the Delta more than five times. At least 80% of participants were staying overnight in the Ebro Delta, with a mean duration of stay of 3.70 nights, and the preferred type of accommodation was a hotel (37%). This also indicates that 20% of the respondents were visiting the Delta as a day trip.

Other results provide insights into visitors' motivations, places visited, and types of mobility used to travel within the Delta. Because responses provided to those items were not mutually exclusive, visitors could have selected more than one choice. On that count, participants were interested in engaging in activities related to culture (59%), including gastronomy and cultural activities in towns; the coast (85%), including visiting the beach, engaging in water sports, going on a cruise, fishing recreationally, and relaxing; and nature (91%), including observing wildlife and landscapes, hiking, cycling, and photographing nature. At the destination, the most-visited types of places were natural scenic locations (87%), followed by beaches (79%), villages (31%), and

Table 1

Variables.

Dependent variables					
Acceptance: Regulated parking		Acceptance: Limited parking		Acceptance: Paid parking	
1 = <i>Totally disagree</i>		1 = <i>Totally disagree</i>		1 = <i>Totally disagree</i>	
2 = <i>Slightly agree</i>		2 = <i>Slightly agree</i>		2 = <i>Slightly agree</i>	
3 = <i>Moderately agree</i>		3 = <i>Moderately agree</i>		3 = <i>Moderately agree</i>	
4 = <i>Quite agree</i>		4 = <i>Quite agree</i>		4 = <i>Quite agree</i>	
5 = <i>Totally agree</i>		5 = <i>Totally agree</i>		5 = <i>Totally agree</i>	
Explanatory variables					
Dichotomous variables	Gender: Woman	Origin: Foreign country	Traveling as couple	Traveling with family	Traveling with other options
	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>
	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>
	Level of education: University	Employment status: Employee/self-employed	Motivation: Beach	Motivation: Nature	Motivation: Culture
	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>
	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>
	Accommodation: Hotel	Overnight stay at Delta	Mobility: Motorized private transport	Mobility: Active	Mobility: Other
	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>
	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>
	Visited natural sceneries	Visited beaches	Visited museums	Visited villages	
	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	
	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	
	First-time visitor	Repeat visitor (≤5 times)	Frequent visitor (>5 times)	Effect of COVID-19 pandemic on visits to natural spaces	
	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	0 = <i>No</i>	
	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	1 = <i>Yes</i>	
Continuous variables	Age	Group size	Length of stay	Intensity of visits	
Likert-scale variables	Frequency of searches for environmental issues	Frequency of visits to natural areas	Perception of parking quality	Satisfaction with visit	
	1 = <i>Never</i>	1 = <i>Never</i>	1 = <i>Deficient</i>	1 = <i>Strongly disagree</i>	
	2 = <i>Rarely</i>	2 = <i>Rarely</i>	2 = <i>Poor</i>	2 = <i>Slightly disagree</i>	
	3 = <i>Sometimes</i>	3 = <i>Sometimes</i>	3 = <i>Half</i>	3 = <i>Neutral</i>	
	4 = <i>Frequently</i>	4 = <i>Frequently</i>	4 = <i>Good</i>	4 = <i>Somewhat agree</i>	
	5 = <i>Always</i>	5 = <i>Always</i>	5 = <i>Excellent</i>	5 = <i>Strongly agree</i>	

Source: Own Development.

museums or interpretation centers (22%). Regarding types of mobility within the Delta, the preferred mode of transport was vehicles, including private cars, motorbikes, and campervans (98%), while a limited proportion opted for active mobility alternatives, including walking or biking (38%). Concerning the intensity of their visits, the participants visited an average of three to four sites in the Delta. Moreover, a quarter of participants acknowledged having increased their visits to natural areas following the onset of the COVID-19 pandemic.

3.5. Empirical approach

The empirical approach employed in our study involved an ordinal logistic regression, following Campisi et al. (2020) and Vich et al. (2022). Given its suitability for samples in which the outcome variable is presented on an ordered categorical scale, this approach allowed assessing the effect of the covariates that explain visitors' acceptance of parking management measures in the Ebro Delta. For an ordinal logistic regression to be suitable, the dependent variable should consist of three or more categories with a meaningful order, which in our case was possible with Likert-scale responses.

In this sense, the probability that individual j falls into category i can be mathematically expressed as follows:

$$p_{ij} = \Pr(y_j = i) = \Pr(k_{(i-1)} < x_j\beta + u_j \leq k_i) \quad (1)$$

This probability is calculated as:

$$\frac{1}{1 + \exp(-k_i + x_j\beta)} - \frac{1}{1 + \exp(x_j\beta - k_{i-1})} \quad (2)$$

Where x_j denotes a vector of covariates of individual j , β a vector of coefficients and u_j a vector of error terms. k_i refers to the cutpoints that determine each of the categories in which individuals can fall into.

We performed our ordinal logistic regression analysis in SPSS Statistics (IBM, version 29). Data collected in our study is available from the authors upon reasonable request.

As stated in section 3.2, not all the surveyed individuals answered the questions related to their perception of the different parking measures. This might raise concerns due to potential sample selection bias. For this reason, ordered probits corrected by sample selection were estimated. No evidence of sample selection bias was found, as ρ was not significant in any of the models.¹ As a result, ordered logit with the sample of 452 observations has been finally used.

Visitors' acceptance of the parking-related measures was gauged on a scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). The mean scores for regulated parking and limited parking were 4.48 and 4.38, respectively, both of which indicate a relatively high degree of acceptance. However, for paid parking, the mean acceptance score was only 3.40. Regarding the frequency of searches for environmental issues and the frequency of visits to natural areas, rated on a scale ranging from 1 (*never*) to 5 (*very frequently*), the results reflected mean values of 3.01 and 3.24, respectively. Lastly, regarding visitors' perceptions of the quality of parking areas and their overall satisfaction with their visits, the average ratings were 4.09 and 4.81, respectively, on a scale from 1 to 5, with 5 being the highest possible score.

¹ Results not provided due to space reasons. Available upon request.

Table 2

Descriptive statistics of the sample by type of visit, sociodemographic characteristics, and acceptance of measures implemented in parking lots.

Variables		<i>M</i> (<i>N</i> = 452)	<i>SD</i>
<i>Dichotomous variables</i>	Gender: Woman	0.55	
	Country of origin: Foreign country	0.14	
	Level of education: University	0.7	
	Employment status: Employed/self-employed	0.89	
	Traveling with family	0.51	
	Traveling as a couple	0.33	
	Traveling with another group	0.16	
	Motivation: Coast	0.85	
	Motivation: Nature	0.91	
	Motivation: Culture	0.59	
	Accommodation: Hotel	0.37	
	Overnight stay at Delta	0.8	
	Mobility mode: Motorized private transport	0.98	
	Mobility mode: Active modes	0.39	
	Mobility mode: Other	0.15	
	Visited: Beach	0.79	
	Visited: Museum	0.22	
	Visited: Villages	0.31	
	Visited: Natural scenery	0.87	
	First-time visitor	0.38	
	Repeat visitor (≤ 5 times)	0.41	
	Frequent visitor (> 5 times)	0.2	
	Effect of COVID-19 pandemic (i.e., more visits to natural spaces)	0.25	
<i>Continuous variables</i>	Age	44.19	11.72
	Group size	3.45	2.22
	Length of stay (nights)	3.7	5.41
	Intensity of visits (number of places visited)	3.44	1.78
<i>Likert-scale variables</i>	Acceptance: Regulated parking	4.48	0.99
	Acceptance: Limited parking	4.38	1.07
	Acceptance: Paid parking	3.4	1.64
	Frequency of searches for environmental issues	3.01	1.10
	Frequency of visits to natural areas	3.24	0.98
	Perception of parking quality	4.09	0.86
	Overall satisfaction with the visit	4.81	0.45

Source: Own Development.

4. Results

The results of the ordered logistic regressions, using regulated, limited, and paid parking as dependent variables, are presented in Table A.1 in the Appendix and Table 3. Initially, a full specification was estimated controlling for all the explanatory variables described in Table 2 (see Appendix A.1). However, these models yielded several non-significant associations, which heavily penalized the Adjusted Pseudo- R^2 . To avoid potential misinterpretations regarding the models' explanatory power and overall significance, Table 3 presents a more parsimonious specification. This version excludes variables that were not significant at the 5% level in any of the specifications of the initial full models. The removal of these non-significant predictors leads to Adjusted Pseudo- R^2 values that are much closer to the McFadden's Pseudo- R^2 and lower BIC and AIC indicators.

The values of these indicators make it apparent that the explanatory variables have a greater power to account for regulated parking than for limited and paid parking. In the particular case of paid parking, the combination of substantially higher AIC and BIC values, together with the lower Pseudo- R^2 , pinpoints the more modest predictive power of the independent variables. This result indicates that unobserved variables play a much more important role in accounting for visitors' perceptions of paid parking.

Two specific variables center our attention as predictors of visitors' attitudes. Visitors' satisfaction (SATISF) is a key in the design of parking policies. Indeed, their goal is to ensure that the carrying capacity of the protected area is not exceeded, which would threaten the ecological balance of the protected environment and compromise the visitor experience. The effect of the perception of the quality of parking areas (QUAPARK) is another variable of interest as it enables us to assess whether this perception yields an effect on visitors' attitudes. In this sense, it is central to prevent that the perceived quality of the parking areas constitute a barrier for the acceptance of the actions. Thus, we estimated two distinct models for each analyzed measure: one including the variables SATISF and QUAPARK (i.e., Models 1.1, 2.1, and 3.1) and the other excluding them (i.e., Models 1.2, 2.2, and 3.2).

A first readily noticeable result was that the pseudo R^2 values across the three models considerably increased when SATISF and QUAPARK were introduced in the specifications of the three models. This improvement is evident in both the full models (Table A.1) and the more parsimonious specifications (Table 3). Likewise, significant improvements in the AIC and BIC indices occurred once these two variables were included. In order to delve into the separate contributions of both variables, Table 4 showcases the goodness of fit, AIC and BIC indexes as well as the Wald test that assesses the global significance for models including SATISF and excluding QUAPARK (models 1.3, 2.3 and 3.3) compared to specifications that exclude SATISF and include QUAPARK (models 1.4, 2.4 and 3.4). According to the table the increased pseudo R^2 values are essentially attributable to the effect of SATISF. Similarly, the improvement of AIC and BIC also derives from the inclusion of SATISF. Pseudo R^2 , BIC, AIC and overall significance tests take different values depending on the dependent variable of each specification. However, all three models share in common the impact of the inclusion of SATISF in the specification. Moreover, we have checked what happens when other significant predictors are removed from the specifications (nationality, culture and nature interests and active mobility).² These indicators get worse, but the impact is far from being as large as the one associated to SATISF.

Both Table 3 and Table A.1 include odds ratios to present the effects of the independent variables and facilitate the interpretation of the results. These ratios confirm that SATISF emerges as the critical variable of the models. Whereas the coefficient associated with QUAPARK was significant only in Models 1.1 and 3.1 (i.e., regulated and paid parking), the positive effect of SATISF was consistently significant at the 1% level across all three models. Furthermore, the odds ratios indicate that the magnitude of the effect is also greater for SATISF in each of the models. It is noteworthy that the odds ratio associated to SATISF declines in model 3.1 (paid parking), even though remaining highly significant, in comparison with models 1.1 and 2.1 (regulated and limited parking), while the odds ratio attached to QUAPARK reached its greatest effect when predicting paid parking (model 3.1). Models 1.1 and 1.2 provided the estimates portraying the association between the acceptance of regulated parking and the covariates. Regarding visitors' country of origin, foreigners were more likely to accept the regulations than their counterparts in Spain. Visitors motivated by nature-related interests and/or by cultural factors were more inclined to accept the regulations, although the significance of their acceptance was less pronounced in the former group. Conversely, visitors motivated by coast-related factors did not have any significant outcomes. Individuals interested in environmental issues showed a high likelihood of accepting regulated parking, as did ones inclined toward active mobility options such as walking or biking. Although visitors who opted for motorized mobility represented a substantial majority in the sample, the estimation did not achieve significance; nevertheless, the negative coefficient suggests their reduced likelihood of accepting the regulation.

Models 2.1 and 2.2 yielded estimations for the relationship between

² Available upon request.

Table 3
Ordered Logit Estimations.

Variables	Model 1.1: Regulated parking, including SATISF and QUAPARK		Model 1.2: Regulated parking		Model 2.1: Limited parking, including SATISF and QUAPARK		Model 2.2: Limited parking		Model 3.1: Paid Parking, including SATISF and QUAPARK		Model 3.2: Paid parking	
	Odds ratio	Robust st. error	Odds ratio	Robust st. error	Odds ratio	Robust st. error	Odds ratio	Robust st. error	Odds ratio	Robust st. error	Odds ratio	Robust st. error
Level of education: University	1.23	(0.29)	1.27	(0.3)	1.03	(0.23)	1.06	(0.24)	1.35	(0.27)	1.35	(0.27)
Country of origin: Foreign country	2.2*	(0.89)	2.15**	(0.83)	1.74	(0.63)	1.76	(0.61)	1.76*	(0.52)	1.8**	(0.53)
Motivation: Nature	1.58**	(0.36)	1.71**	(0.39)	1.4	(0.31)	1.51*	(0.32)	0.86	(0.16)	0.86	(0.15)
Motivation: Cultural	2.9***	(0.98)	3.1***	(0.98)	2.3***	(0.72)	2.5***	(0.73)	1.01	(0.28)	1.07	(0.29)
Frequency of searches for environmental issues	1.25**	(0.13)	1.22*	(0.13)	1.14	(0.11)	1.11	(0.11)	1.12	(0.1)	1.11	(0.1)
Active mobility	1.62**	(0.37)	1.57*	(0.36)	1.6**	(0.35)	1.57**	(0.34)	1.33	(0.25)	1.28	(0.24)
Number of nights	0.99	(0.01)	0.99	(0.01)	0.99	(0.0d1)	0.99	(0.01)	0.99	(0.02)	0.99	(0.02)
SATISF	2.99***	(0.5)			2.8***	(0.47)			1.89***	(0.29)		
QUAPARK	0.77**	(0.1)			0.89	(0.12)			1.25**	(0.13)		
McFadden's Pseudo R ²	0.0858		0.04892		0.0594		0.0296		0.0248		0.0112	
McFadden's Adjusted Pseudo R ²	0.0642		0.0321		0.0393		0.014		0.011		0.0005	
AIC	787.1852		813.911		868.2635		890.9663		1297.096		1310.856	
BIC	840.6631		859.1615		921.7414		936.2168		1350.574		1356.107	
Log Pseudo Likelihood	-380.5926		-395.9555		-421.13177		-434.4832		-635.54806		-644.42805	
Wald χ^2 test	82.66***		38.72***		59.50***		25.90***		38.62***		12.66*	

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Table 4
Indexes of performance.

Variables	Model 1.3: Regulated parking; including SATISF, excluding QUAPARK		Model 1.4: Regulated parking; excluding SATISF, including QUAPARK		Model 2.3: Limited parking, including SATISF, excluding QUAPARK		Model 2.4: Limited parking; excluding SATISF, including QUAPARK		Model 3.3: Paid Parking; including SATISF, excluding QUAPARK		Model 3.4: Paid parking; excluding SATISF, including QUAPARK	
	SATISF	QUAPARK	SATISF	QUAPARK	SATISF	QUAPARK	SATISF	QUAPARK	SATISF	QUAPARK	SATISF	QUAPARK
	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES
McFadden's Pseudo R ²	0.0809		0.0509		0.0584		0.0297		0.0211		0.0161	
McFadden's Adjusted Pseudo R ²	0.0617		0.0317		0.0406		0.0118		0.0088		0.0038	
AIC	789.2606		814.24151		867.1491		892.8575		1299.926		1306.507	
BIC	838.6247		863.6057		916.5133		942.2217		1349.29		1355.872	
Log Pseudo Likelihood	-382.6303		-395.1207		-421.5746		-434.4288		-637.9628		-641.2537	
Wald χ^2 test	76.74***		39.09***		58.32***		25.75***		31.22***		19.52**	

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Source: Own Development

the acceptance of limited parking and the covariates. According to the results of Model 2.1, the likelihood of accepting limitations significantly increased when visitors were motivated by cultural factors or opted for active mobility. Even when SATISF and QUAPARK were omitted in Model 2.2, those variables remained significant in relation to the acceptance of limitations. Conversely, visitors motivated by natural features demonstrated a significantly higher likelihood of accepting the implemented limitations only in Model 2.2 (without SATISF and QUAPARK). Finally, foreign visitors do not appear to be significantly more likely to accept limited parking as a management measure.

Models 3.1 and 3.2 explored the relationship between the acceptance of paid parking and the explanatory variables. In these models, visitors' motivation and type of mobility were no longer significant predictors of acceptance. Instead, visitors from foreign countries were more likely to accept the parking fee. It must be highlighted that the positive effect associated with the level of education and the negative impact of the duration of stay (number of nights), which were significant in Table A.1, lost their significance in the more parsimonious model presented in Table 3. This loss of significance can be attributed to the fact that these variables might be capturing opposing effects from some of the variables

that were omitted. For this reason, we are inclined to suggest that both duration of stay and education level should be regarded as relevant for paid parking. The loss of significance of the duration of stay also occurred for regulated and limited parking.

Variables associated with age, employment status, type of group, group size, frequency of visits to natural areas, prior visits to the Ebro Delta, and intensity of visits were not significant in any of the models. Except in Model 1.1 of Table A.1, the four covariates related to the places visited also did not play a key role in the acceptance of any of the three measures. It must be noted that some variables can gain significance or lose them with the inclusion of SATISF and QUAPARK. Those changes simply reflect the correlations between the covariates.

Last, robustness checks have been applied to ensure the consistency and validity of these results. First, as stated in section 3.4, we have found no evidence of the need of estimating models corrected by sample selection bias. Robust standard errors have been calculated to avoid potential concerns related to heteroscedasticity. Besides, VIF analysis has been carried out to verify that multicollinearity is not a problem.

5. Discussion and conclusions

5.1. Main findings

This research offers unique insights into visitors' acceptance of parking management measures in a car-dependent nature-based destination. The study area is a multidynamic region grappling with the consequences of climate change, where spaces designated as protected areas suffer the pressure exerted by visitors interested both in these natural areas, and on activities proper of coastal destinations. The increased influx of visitors to the Ebro Delta, coupled with a heavy reliance on private means of transport, poses a significant threat to sustainability. With the inevitable recovery of national and international mobilities to levels that surpass pre-pandemic numbers, managers should implement thoughtful strategies to preserve and protect the region from the negative effects of upcoming challenges. This includes mechanisms to encourage proper behavior among visitors, considering both the fragility of the area and the levels of satisfaction among users. Under these circumstances, our exploratory study focused on visitors' acceptance of parking management measures implemented in the Ebro Delta.

We investigated sociodemographic profile of visitors, the characteristics of their stays, their affinity with environmental issues and natural areas, and various perceptual variables using data drawn from a survey conducted during the Summer of 2022. The survey pinpoints a notable acceptance of regulated and limited parking was apparent, while acceptance of paid parking was significantly lower, a result that aligns with the findings of Benkhard et al. (2018) and Martin et al. (2009).

Traffic management strategies, and particularly parking restrictions, can arouse different attitudes from different users, whereas the econometric model showed results both contrasting and consistent with those from the literature. The evidence obtained is consistent with the existence of a tied relationship between transportation and visitors experience in a destination, which can be enhanced and managed through actions focused on access and traffic on the destinations (Monz et al., 2016). This result is consistent with Frost and McCool (1988) who proposed that attitude toward management measures is a function of visitors' perceptions. It must be noted that the perception of parking quality is not the central aspect that enhances visitors' acceptance, as our results showed that it did not influence the acceptance of regulated or limited parking. In contrast this variable had a positive and significant effect on the acceptance of paid parking. This underscores the importance of maintaining high-quality parking infrastructures, since visitors' perception plays a role in shaping their acceptance of stricter management measures, including the introduction of fees.

Evidence revealed that the strongest association is the one attached to visitors' overall satisfaction, which emerges as critical to account for their support to all three types of parking measures. The literature consistently shows the positive effect of management measures on visitors' experiences and overall satisfaction (Bushell and Mccool, 2007; Frost and McCool, 1988; Qaddhat et al., 2021). This effect is sustained by the fact that overtourism and the perception of crowding at the destination negatively impact tourist satisfaction, revisiting intentions and positive recommendations (Papadopoulou et al., 2023). This phenomenon becomes even more important in natural areas (Sæþórsdóttir and Hall, 2020; Yoon et al., 2024), where visitors' pressure on the environment becomes an added threat for fragile environments, that constitute the real attraction in these contexts. In light of this, those management measures that pursue the enhancement of the quality of the destination can be positively perceived even though they generate a certain degree of annoyance to the visitor by introducing some limitations and regulations or even the payments of fees, as long as the visitor has a satisfactory experience. Hence, it becomes strategic that these measures are effective and proportionally designed with respect to their purpose. This reinforces the importance of traffic management measures

not only as regulatory tools but as essential components in improving visitor satisfaction.

Results also confirmed Gundersen et al.'s (Gundersen et al., 2015) findings, as foreign visitors were more likely to accept managers' actions than domestic ones. Aligning with Song et al. (2021), higher levels of education were associated with greater acceptance of paid parking. The role of motivations related to natural and cultural elements in shaping visitors' support of management strategies aligns with Martin et al. (2009).

We have also found contrasting nuances compared to prior research. Yun et al. (2021) and Song et al. (2021) suggested that a strong interest in natural protected areas and frequent visits positively influence visitors' attitudes. Our results show that these factors did not lead to a higher acceptance of regulations. The interest for environmental issues, however, positively influenced the acceptance of regulated parking. Additionally, in contrast to Gundersen et al. (2015), being a first-timer or a repeat visitor did not significantly affect the acceptance of parking management measures. This highlights the complexity of visitors' behavior, challenging the assumption that repeat visitors are more likely to support management strategies. Regarding the length of visitors' stays, Song et al. (2021) suggested that longer stays lead to higher willingness to pay entrance fees, as costs were distributed across the duration of the stay. However, our results suggest the opposite, since longer stays reduced the likelihood of accepting regulations. This phenomenon could be attributed to the requirement that visitors pay full parking fee each time they access a paid parking location, with no discount for repeated use. Finally, about one-quarter of the visitors reported increasing their visits to natural areas after the pandemic, in line with trends observed in the first two years of the pandemic (Medina-Chavarria et al., 2024). However, this behavior did not significantly influence the acceptance of regulations.

5.2. Implications

In terms of implications, traffic management strategies arise as a suitable tool to manage visitors flows in protected or sensitive areas, which are particularly vulnerable to the effects of overtourism and require the implementation of effective measures to mitigate its impact (Rogowski et al., 2025). Indeed, the capacity of attracting visitors in protected areas depends on the preservation of its natural values while the balance between visitation and conservation is complex (Mandić and Marković Vukadin, 2021). As a result, the fact that the acceptance of parking measures by visitors is intimately bonded with tourist satisfaction reflects the necessity of designing effective actions that ensure the preservation of the natural environment while can be understood by visitors. The scrutiny of the intricate relationship between visitor acceptance and traffic management strategies allows us to highlight implications for the management nature-based destinations, enabling managers to predict visitor responses and tailor policies that are more likely to be accepted by the public. Consequently, the implementation of parking management measures is not only integral for environmental sustainability, but also a way to enhance visitors' experience in destinations challenged to ensure both a satisfying experience for visitors and the reduction of pressures on the environment.

Nature-based destinations, like Ebro Delta, are characterized by the prevalence of motorized private vehicles as the primary mode of transport. Streifeneder and Omizzolo (2017) and Weitowitz et al. (2019) indicated that fees alone have limited impact on discouraging motorized traffic, thus its application requires complementary measures that enhance their effectiveness. Since fee payment was the least accepted measure among participants in our study, managers should consider combining such measures with sustainable mobility alternatives, such as enhanced public transport options, to promote a genuine modal shift. This combined approach would be more likely to alleviate pressure in ecologically sensitive environments. Furthermore, the study has also confirmed that reliance on cars influences visitors' likelihood of

accepting parking management measures. Visitors engaged in active mobility (e.g., walking or cycling) demonstrated greater support for these regulations. This suggests that increasing opportunities for active mobility could improve visitors' attitude towards management. The relevant association of practicing active mobilities and parking management acceptance is a crucial insight for managers, to encourage alternative and sustainable travel behaviors, improve infrastructure for walking and cycling, and ultimately reduce environmental impact from motorized mobilities.

Additionally, since education has emerged as a significant factor, it is noteworthy to point out the need for tailored strategies that address the diverse socioeconomic backgrounds of visitors. It is not only a matter of ensuring that parking measures are successful in mitigating the impact of tourists' flows, but visitors must be aware of their contribution to the conservation of what they are visiting. Thus, it is necessary to provide appropriate and complete information to visitors, to enhance their awareness about the role of traffic management measures to increase their support for such actions. The support of stakeholders is also key. For this reason, the success of the measures requires their participation in the design of the strategy (Rogowski et al., 2025).

Moreover, the effects of cumulative costs associated with longer stays can lead to dissatisfaction, a decline in future visits and, as proved by this study, less acceptance of regulations and specifically of paid parking. Visitor management strategies could consider balanced pricing models that do not penalize visitors for longer visits. Furthermore, the lower acceptance of paid parking may inform visitors about the need to improve these facilities and effectively communicate about the benefits of such measures as valid management strategies.

Additionally, the planification of these strategies can benefit from continuous monitoring that leverages the automation advances in surveillance and counting technologies, as mentioned by Job et al. (2021). Such efforts open the possibility of activating new streams of research, including the development of carrying capacity and limits of acceptable change frameworks within the destination. Future research can also involve similar analyses in other PAs, from which comparable results can help to create informed management policies within larger territories.

5.3. Limitations and future research

This study has come with limitations. From a methodological point of view, the parallel regression assumption of the ordered logit is not met. The violation of this assumption frequently occurs when the ordered logit is used. As a consequence, results must be interpreted as an average for all the categories of the dependent variable, instead of a constant result that can be applied to all of them (Harrell, 2015). Another technical aspect concerns the potential effect of unobserved heterogeneity in the models addressing the acceptance of paid parking,

as indicated by the goodness-of-fit measures. Given the extension of the Ebro Delta's territory and the number of destinations therein, many of the surveyed visitors were unaware of the management measures analyzed or informally indicated that they were not informed about the use of the fees, and therefore chose not to express an opinion. This ultimately reduced the sample included in our data analysis. Furthermore, our findings need to be contextualized and interpreted within the specific territorial framework of the Delta and the measures evaluated. Future studies on other PAs, featuring diverse visitor profiles and alternative measures, would facilitate the comparison with results presented here. Moreover, examining visitor attitudes following the lifting of the regulations would be an important avenue for future research.

The complex diversity of land uses and competing interests among both residents and visitors at the Delta calls for knowledge-based solutions to enable comprehensive, adaptive management. The outcomes of our study are thus useful for policymakers responsible for enabling the sustainability of visitors and traffic flows within the Delta.

CRedit authorship contribution statement

Maria E. Medina-Chavarria: Writing – review & editing, Writing – original draft, Formal analysis, Data curation. **Daniel Miravet:** Writing – review & editing, Writing – original draft, Methodology. **Òscar Saladié:** Writing – review & editing, Supervision, Conceptualization. **Aaron Gutiérrez:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Funding acquisition, Data curation, Conceptualization.

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.

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Appendix A1. Results of ordinal logistic regression (full model especifications)

Variables	Model 1.1: Regulated parking, including SATISF and QUAPARK			Model 1.2: Regulated parking			Model 2.1: Limited parking, including SATISF and QUAPARK			Model 2.2: Limited parking			Model 3.1: Paid Parking, including SATISF and QUAPARK			Model 3.2: Paid parking		
	Odds ratio	Robust std. error		Odds ratio	Robust std. error		Odds ratio	Robust std. error		Odds ratio	Robust std. error		Odds ratio	Robust std. error		Odds ratio	Robust std. error	
Gender: Woman	0,72	(0,17)		0,64*	(0,15)		0,86	(0,19)		0,77	(0,17)		0,85	(0,16)		0,8	(0,15)	
Age	1	(0,01)		1	(0,01)		0,99	(0,01)		1	(0,01)		1,01	(0,01)		1,01	(0,01)	
Level of education: University	1,19	(0,31)		1,28	(0,33)		1,02	(0,25)		1,09	(0,27)		1,49*	(0,32)		1,51**	(0,32)	
Employment status: Employed/self-employed	0,78	(0,34)		0,73	(0,32)		0,77	(0,31)		0,73	(0,3)		1,09	(0,36)		1,09	(0,36)	
Country of origin: Foreign country	2,56**	(1,1)		2,59**	(1,06)		1,76	(0,66)		1,82*	(0,66)		1,71*	(0,53)		1,72*	(0,52)	

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Variables	Model 1.1: Regulated parking, including SATISF and QUAPARK		Model 1.2: Regulated parking		Model 2.1: Limited parking, including SATISF and QUAPARK		Model 2.2: Limited parking		Model 3.1: Paid Parking, including SATISF and QUAPARK		Model 3.2: Paid parking	
	Odds ratio	Robust std. error	Odds ratio	Robust std. error	Odds ratio	Robust std. error	Odds ratio	Robust std. error	Odds ratio	Robust std. error	Odds ratio	Robust std. error
Traveling with family	Reference category											
Traveling as a couple	1,3	(0,39)	1,2	(0,34)	1,1	(0,3)	1,05	(0,27)	0,84	(0,2)	0,83	(0,2)
Traveling with another group	1,28	(0,39)	1,36	(0,41)	1,03	(0,29)	1,11	(0,32)	0,9	(0,23)	0,95	(0,25)
Group size	1,14*	(0,08)	1,1	(0,08)	1,06	(0,06)	1,04	(0,06)	0,93	(0,06)	0,93	(0,06)
Motivation: Coast	1,09	(0,33)	0,98	(0,3)	1,19	(0,34)	1,09	(0,31)	1,07	(0,29)	1,07	(0,28)
Motivation: Nature	3,46***	(1,27)	3,43***	(1,21)	2,47***	(0,84)	2,5***	(0,83)	0,95	(0,3)	0,99	(0,31)
Motivation: Cultural	1,49*	(0,36)	1,68**	(0,4)	1,35	(0,31)	1,52*	(0,34)	0,89	(0,18)	0,89	(0,17)
Frequency of searches for environmental issues	1,3**	(0,15)	1,28**	(0,15)	1,15	(0,13)	1,14	(0,13)	1,14	(0,12)	1,13	(0,11)
Frequency of visits to natural areas	0,87	(0,11)	0,85	(0,1)	0,97	(0,11)	0,96	(0,11)	0,96	(0,1)	0,97	(0,1)
Effect of the COVID-19 pandemic	1,51	(0,41)	1,52	(0,4)	1,31	(0,34)	1,31	(0,33)	1,25	(0,28)	1,24	(0,28)
First-time visitor	Reference category											
Repeat visitor	1,2	(0,32)	1,36	(0,35)	0,98	(0,24)	1,08	(0,26)	0,88	(0,18)	0,85	(0,17)
Frequent visitor	0,98	(0,32)	1,27	(0,4)	1,01	(0,31)	1,25	(0,37)	1,21	(0,34)	1,25	(0,34)
Motor mobility	0,66	(0,82)	0,48	(0,56)	1,31	(1,16)	0,9	(0,8)	0,35	(0,43)	0,25	(0,33)
Active mobility	1,71**	(0,41)	1,64**	(0,4)	1,58**	(0,37)	1,53*	(0,36)	1,31	(0,27)	1,24	(0,25)
Other mobility	0,8	(0,25)	0,87	(0,27)	0,87	(0,26)	0,94	(0,28)	1,29	(0,35)	1,37	(0,36)
Hotel	1,05	(0,27)	1,01	(0,26)	0,85	(0,21)	0,81	(0,2)	0,67*	(0,15)	0,66*	(0,15)
Number of nights	0,98*	(0,01)	0,98*	(0,01)	0,97**	(0,01)	0,97**	(0,01)	0,96*	(0,02)	0,97*	(0,02)
Overnight	1,49	(0,5)	1,4	(0,45)	1,39	(0,45)	1,32	(0,41)	1,67*	(0,51)	1,56	(0,47)
Intensity of visit	1,07	(0,1)	1,08	(0,1)	1,05	(0,09)	1,07	(0,09)	1,04	(0,07)	1,04	(0,06)
Place visited: Beach	0,8	(0,24)	0,93	(0,27)	0,81	(0,24)	0,93	(0,27)	0,97	(0,25)	1,07	(0,28)
Place visited: Museum	1,04	(0,31)	0,94	(0,27)	1	(0,29)	0,93	(0,26)	1,09	(0,27)	1,09	(0,27)
Place visited: Villages	0,6*	(0,17)	0,64*	(0,17)	0,78	(0,2)	0,83	(0,21)	0,79	(0,18)	0,86	(0,19)
Place visited: Natural scenery	1,22	(0,43)	1,37	(0,46)	1,4	(0,45)	1,53	(0,49)	1,33	(0,35)	1,41	(0,37)
Satisfaction	3,15***	(0,57)			2,88***	(0,51)			1,74***	(0,28)		
Perception of parking quality	0,8	(0,12)			0,91	(0,13)			1,27**	(0,14)		
McFadden's Pseudo R ²	0,1066		0,0718		0,0699		0,0411		0,0359		0,0245	
McFadden's Adjusted Pseudo R ²	0,0392		0,0093		0,0069		-0,017		-0,0079		-0,0167	
AIC	809,8628		834,887		898,8414		920,6667		1322,661		1333,456	
BIC	945,6143		962,4111		1034,593		1048,191		1458,412		1460,98	
Log Pseudo Likelihood	-371,93139		-386,4435		-416,4207		-429,33336		-628,33032		-635,72808	
Wald χ^2 test	93.23***		51.90***		70.21***		35,52		55.78***		30,79	

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Source: Own Development.

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