Exploring Visitors' Valued Cultural Ecosystem Services and Satisfaction with Infrastructure: A Case Study of the Ōtākaro Avon River Precinct, Christchurch, New Zealand

Katerina (Aikaterini) Stamou
MSc Thesis in Environmental Sciences
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Supervisor:
Bas Amelung (bas.amelung@wur.nl)

Examiner:
Solen L'Clech
(solen.leclech@wur.nl)

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Preface

I would like to express my deepest gratitude to my family, who have supported me throughout my entire life with unconditional love, encouragement and belief in my dreams. Without them, I would not have reached this point. I am also sincerely thankful to my friends, who stood by me despite the distance, proving that true friendship can bridge even thousands of kilometres.

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Finally, I would like to thank my supervisor, Bas Amelung, for his unwavering support and insightful contributions from the very first day of this project. His guidance has been instrumental in bringing this thesis to completion.

Joya Kemper from University of Canterbury, New Zealand (joya.kemper@canterbury.ac.nz) | Department of Management, Marketing and Tourism

Richard Aquino from University of Canterbury (richard.aquino@canterbury.ac.nz) | Department of Management, Marketing and Tourism

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Summary

This thesis examined how visitors perceive and value Cultural Ecosystem Services (CES) in Ōtākaro Avon River Precinct (ARP) in Christchurch, New Zealand, a post-earthquake urban green and blue space. The aim was to identify which CES are most important by the visitors, how demographic characteristics influence these values and lastly how tourism infrastructure and stakeholders' perspectives contribute to CES delivery.

A mixed-methods approach was applied, combining a structured questionnaire (n=215) with semi-structured interviews involving four key stakeholders from local government, environmental education and urban design. The quantitative data were analysed through descriptive statistics, cross-tabulations and Chi-square tests, while the qualitative data were thematically analysed.

The results showed that aesthetic and emotional CES were the most highly valued. In contrast, CES related to spirituality and cultural learning received lower ratings but were appreciated by specific subgroups, including older adults and international visitors. Age and gender significantly influenced CES preferences, while education and income had minimal impact. Visitors who accessed the site on foot or by bike reported stronger CES experiences compared to those using cars or public transport. Infrastructure elements such as walking tracks and bridges were positively assessed, while cycle paths and transport signage received lower ratings.

Interviewees confirmed the importance of infrastructure in supporting CES and emphasized the role of the ARP in promoting cultural identity, environmental awareness, and community involvement. However, some different perspectives were found between stakeholders' perspectives and visitors views regarding CES values that receive not enough recognition.

Overall, the thesis emphasised the importance of designing urban green spaces that align the diverse needs and motivations of the visitors. Enhancing both the strongest CES values, such as scenery and relaxation, and the less prominent but culturally important values can contribute to a more inclusive, meaningful and sustainable visitor experiences.

1. Introduction

Tourism in New Zealand is a platform for promoting environmental conservation and cultural identity and public engagement with natural spaces (Ausseil et al., 2022). As a major tourism

destination and second largest city in New Zealand, Christchurch, represents a unique environment where cultural and natural resources are combined (Stewart et al., 2004). Christchurch is a planned city situated on a coastal plain on the east coast of the South Island.

However, in 2010 and 2011, the city experienced catastrophic earthquakes which had a severe impact on the physical landscape and challenged the city's social, cultural and environmental identity (Potter et al., 2015). On 4 September 2010, the earthquake destroyed older brick and masonry buildings and approximately 100 people were injured. More than five months after the main shock, on 22 February 2011, the second aftershock occurred. This earthquake resulted in 185 deaths and the collapse of several buildings. Those earthquakes not only caused a disrupted environment but also influenced daily life, fractured communities and led to the loss of many culturally significant buildings (Potter et al., 2015; Christchurch, 2019). Hence, the city was faced with the urgent need to recover and rebuild (Christchurch, 2019).

The Minister for Canterbury Earthquake Recovery, Hon Gerry Brownlee, approved *The Christchurch Central Recovery Plan*, which was formally adopted and published by the government in July 2012. This plan presented a vision for a greener city that reflects cultural identity and supports a wide range of activities after the earthquakes. The plan aimed not only to restore infrastructure but also to increase the social and cultural value of the city. To achieve this, the plan proposed several anchor projects that reflect the community's wishes for the central city, replace facilities that were destroyed, stimulate other development, attract people and regenerate and improve the urban form of the city. One of these anchor projects is the *Ōtākaro Avon River Corridor Regeneration Plan*, established in 2019, a central urban space designed to support both residents and visitors.

The Ōtākaro Avon River Corridor Regeneration Plan includes strategies for revitalizing Christchurch following the 2010/2011 earthquakes. It aims to transform the former residential 'red zone', areas damaged by the earthquakes where rebuilding was deemed infeasible according to Christchurch City Council, into a dynamic, multi-functional urban environment (WSP, n.d.).

The plan focuses on ecological, social, cultural and economic regeneration. The ecological vision of the plan focuses on restoring native habitats and improving water quality to support *mahinga kai* (a Māori concept referring to the traditional value of food resources, including the species themselves, their habitats, and the practices involved in gathering and protecting these resources), birdlife and indigenous species. Moreover, the Avon River will transform to a 'living laboratory' which tests and creates innovative responses to climate change, natural hazards and sustainable living. Socially, the plan seeks to foster healthy communities by providing safe and inclusive spaces which are well connected with each other and the wider city. It also highlights cultural and recreational participation by creating opportunities for leisure, community events and public engagement. Lastly, economically the plan's objective is to create opportunities for sustainable economic activities and connections that enhance well-being and local prosperity while attracting both domestic and international visitors. These goals aim to connect individuals with nature, foster community identity and create a vibrant, sustainable future for Christchurch.

Another essential vision of the Ōtākaro Avon River Corridor Regeneration Plan (2019) is to enhance the visitor experience and community engagement through improved accessibility, design and interpretive infrastructure. A central feature of the plan is the '*City to Sea path'*, an 11-kilometer accessible route for walking, cycling and scootering, with lateral trails connecting surrounding neighbourhoods. Furthermore, four new footbridges will be constructed to

reconnect communities across the river, improving accessibility and connectivity. Improvements to transportation infrastructure, including upgraded road connections, a proposed east-west road and bridge and enhanced traffic signage, aim to ensure easier access for both locals and visitors. The plan also includes the installation of interpretive signage and digital platforms for sharing cultural, ecological and historical information in a shared-use trail along the river, the '*Cultural Trail'*, for walking and biking (Te Ara Ōtākaro Avon River Trail, n.d.). Moreover, the creation of gathering spaces, including picnic areas, barbecue spaces, seating and gathering spots alongside small-scale hospitality outlets such as cafes, bars, and restaurants for the community and visitors offers leisure and social opportunities. These elements are designed to create a welcoming, inclusive and functional environment that supports recreation, learning and community connection while attracting visitors.

To understand how these goals can be achieved and experienced by the visitors in the Avon River Precinct (ARP), it would be beneficial to explore the benefits people derive from nature in this region, as they play a key role in shaping people's emotional and recreational connections to the landscape (Ram & Smith, 2019). These benefits are called Ecosystem Services (ES). ES are the benefits which people derive from the functions of the natural environment and are categorized as supporting, regulating, provisioning and cultural services (Baggethun et al., 2010). The intangible values which support wellbeing, cultural identity and quality of life are interpreted as the Cultural Ecosystem Services (CES) (Castañeda et al., 2024).

As reported by the Millennium Ecosystem Assessment (2005), CES are 'nonmaterial benefits people obtain from ecosystems', including 'cultural diversity, spiritual religious values, knowledge systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage values, recreation and ecotourism'. As cities integrate more green and blue infrastructure, CES provide a lens through which to assess not only ecological performance but also the social and cultural value of urban nature (Castañeda et al., 2024).

While previous studies have recognized the importance of CES in New Zealand's tourism (McDonald et al., 2008), limited research has examined how tourists perceive and prioritize these services, particularly in a unique post-earthquake context such as Christchurch (Sun et al., 2014; Simmons, 2013). One key challenge in addressing CES into research is their intangible or subjective nature, which makes them difficult and complex to quantify and evaluate (Taff et al., 2019). In addition, the awareness of what CES are and how they are perceived by stakeholders, especially tourists, remains limited (Romanazzi et al., 2023). Due to this complexity and the scarcity of studies, the inclusion of CES in decision making processes is controversial. As Milcu et al. (2013) noted in their literature review, some scientists argue that CES are often overlooked, while others contend that they are considered more frequently than other ES in economic valuation and planning (Schröter et al., 2014).

Understanding how tourists value the CES can inform sustainable tourism development, as CES such as recreation, aesthetic enjoyment and cultural identity are often closely linked to tourism experiences (Ausseil et al., 2022). These values are influenced by sociodemographic characteristics such as, the age, gender, nationality and educational background of tourists play a role in shaping CES preferences (Ram & Smith, 2019). Zhang et al., (2022) found that for elderly visitors, it is more important to obtain recreation value and visiting sites which have gathering spaces whereas rivers, landscapes and trails were more important for the youth. As stated by Meurk et al. (2013) although CES are especially difficult to quantify they have a significant impact on quality of life and social capital in cities, which influence mental well-being, innovation and economic activity. By recognizing how tourists value CES, policymakers

and tourism operators can design tourism management strategies that foster conservation, cultural appreciation and long-term sustainability (Romanazzi et al., 2023). Smith and Csurgó (2018) explored the relationship between tourism, well-being and CES within Őrség National Park in Hungary by analysing and documenting tourism management strategies based on the most valued CES by tourists in the park. These strategies included guided walks and study trails which educated visitors on ecological awareness and the importance of protecting natural heritage. The park also emphasized local traditions and cultural heritage through initiatives like product labelling for traditional goods and crafts and by showcasing the unique rural landscape. Lastly, the park's tourism policies aimed to balance socio-economic development with ecological conservation, involving local communities and entrepreneurs in sustainable tourism activities.

Delivering CES in urban green and blue spaces relies not only on the ecological quality but also on who the visitors are and the elements that shape their experiences such as accessibility, design and interpretive infrastructure. As Su et al. (2022) stated in their research, infrastructure is not only a physical or functional support, but also an experiential and symbolic medium that delivers non-material benefits. This is supported by the concept of 'place-making', which refers to the way elements like signage, trails, benches or gathering spaces can influence emotional, cultural or spiritual experiences (Russo et al., 2025). Elements such as cycle paths, parking opportunities, footbridges, signage for learning, gathering spaces, traffic signs, public transportation, cafes, bars and restaurants are function as enablers of CES based on tourist experiences in ARP (Ramírez-Guerrero et al., 2021; Russo et al., 2025). A case study by Ramírez-Guerrero et al. (2021) in Spain highlighted the role of ecosystem services in tourism management. They recommended providing accessible information on each site regarding their cultural significance, installing additional signage and offering specialized guided tours to help tourists understand the historical connection between the touristic attraction and the surrounding landscape. Similarly, Amoiradis et al. (2023) emphasized the importance of physical and informational infrastructure in connecting visitors to the cultural and aesthetic dimension of a site. This study contributes to that understanding by assessing infrastructure satisfaction alongside CES valuation in the ARP.

Despite growing recognition of CES in tourism and urban planning, limited empirical research has examined how tourists themselves perceive and experience CES in urban regeneration settings (Li et al., 2024; Cheng et al., 2021). This gap is particularly evident in post-disaster contexts, like Christchurch, where green and blue infrastructure plays a key role in rebuilding both physical space and cultural identity (Tian et al., 2024; Deri et al., 2023). CES associated with river landscapes remain understudied in terms of their positive influence on people's well-being (Veerkamp et al., 2021). Moreover, the role of tourism infrastructure such as signage, pathways, public transportation and gathering spaces, in shaping CES delivery remains underexplored, especially from the visitor's perspective (Deri et al., 2023; Russo et al., 2025). A more nuanced understanding of how these infrastructure elements contribute to specific CES experiences and how visitor characteristics, such as age, gender or nationality, mediate such interactions can support more inclusive and culturally responsive planning in urban river tourism.

Even though their significance in terms of the benefits that people obtain from the environment, CES remain underrepresented in environmental valuation compared to more easily quantifiable services (Sánchez et al., 2020). Schröter et al. (2014) highlight that CES are overshadowed by provisioning and regulating services in cost-benefit analyses and policymaking. This neglect risks undermining the full spectrum of ecosystem values and

ignoring the human experiences that contribute to positive bonds people form with places, i.e. place attachment (Brown et al., 2012), and cultural sustainability.

Exploring these values helps researchers and tourism managers understand which aspects of the environment are most important to visitors which help them to enhance strategic planning focused on improving the visitor experience (Romanazzi et al., 2023).

This study addresses these gaps by using the CES framework to explore tourist experiences and infrastructure satisfaction within the ARP. By understanding what types of non-material experiences tourists value and whether infrastructure supports these experiences, the study provides insights that can guide culturally sensitive and sustainable urban tourism planning. Hence, the research question of this study is: *How do visitors experience and value Cultural Ecosystem Services in the Avon River Precinct, and how are these experiences supported by tourism infrastructure and services?*

Specific research questions that will be answered are:

I. *Which CES are most valued by visitors visiting the ARP, and how do these values vary by type of tourism experience (e.g., recreation, heritage, aesthetics, relaxation)?*
II. *How do visitors' demographic profiles (e.g., age, nationality, education, income) influence their preferences for different types of CES in the ARP?*
III. *How do visitors assess the extent to which tourism infrastructure (e.g., signage, seating, trails, information panels) enhances their experience in the ARP?*
IV. *How do local stakeholders perceive the role of the ARP in delivering CES, engaging diverse visitor groups, and addressing sustainability and planning challenges?*

The remainder of this thesis consists of five main chapters. The Literature review includes existing literature on CES and the role of infrastructure in shaping visitor experiences. The Methods, that outlines the research methodology, including the study area, data collection process and analytical approach. The Results, presents the findings of the study. The Discussion interprets the results in relation to the literature and acknowledging the study's limitations. Lastly, the Conclusion summarizes key insights of the research and offers recommendations for policymakers, urban designers and future researchers.

2. Literature review

2.1. Cultural Ecosystem Services Framework

The Cultural Ecosystem Services (CES) framework systematically categorizes the different types of non-material benefits people derive from nature (Romanazzi et al., 2023). These categories include cultural diversity, spiritual and religious values, knowledge systems, educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage values, recreation and ecotourism (Millennium Ecosystem Assessment, 2005). The framework highlights the various experiences visitors may have such as leisure, education, landscape use, recreation, relaxation, cultural identity, inspiration and spiritual enrichment (Millennium Ecosystem Assessment, 2005). This categorization is essential for understanding how CES contribute to the experiences and well-being of visitors (Ram & Smith, 2019).

The benefits of CES to human well-being, according to Plieninger et al. (2013), are associated with several domains that closely align with those defined by the Millennium Ecosystem Assessment (MEA, 2005) and are presented in Table 1. While the MEA (2005) provides the foundational framework for categorizing ecosystem services, including CES, the study by Plieninger et al. (2013) focuses specifically on CES at the community level, based on the MEA framework. This means that 'cultural diversity' and 'knowledge systems', which are part of CES categories defined by the MEA, were excluded from the list of services assessed in Plieninger et al. (2013) study due to challenges in translating them into meaningful indicators for local users.

Table 1. Benefits to human well-being from CES based on Plieninger et al. (2013) adapted to this study.

Category of CES	**Definition and Example**
Spiritual services	Site of spiritual, religious, or other forms of exceptional personal meaning
Educational values	Site that widens knowledge about plant and animal species (bird watching and investigate riparian vegetation)
Inspiration	Site that stimulates new thoughts, ideas or creative expressions (landscape painting and photography)
Aesthetic values	Site of beauty (enjoying the river)
Social relations	Site serving as meeting points with friends (exploring the city, food, shopping)
Sense of place	Site that fosters a sense of authentic human attachment (relaxation, meditating, reading)
Cultural heritage values	Site relevant to local history and culture (Māori heritage)
Recreation and ecotourism	Site used for recreational activities (walking, dog walking, punting, biking etc.)

In this thesis, the CES framework based on Plieninger et al. (2013) study offers a practical lens through which to examine visitor experiences in the ARP and to assess how these intangible benefits are supported by infrastructure.

2.2. CES In Urban Green and Blue Spaces

Urban green and blue spaces, i.e. rivers, are essential sources of CES offering non-material benefits that people obtain by interacting with nature directly or indirectly (Grzyb, 2023). River landscapes are considered by society as aesthetically pleasing landscapes and have a long history of human-nature interaction (Thiele et al., 2020). Visiting green and blue spaces contributes to the people's well-being in multiple ways such as by empowering them, fostering their identities and improving their experiences (Fish et al., 2016).

The ways in which CES are perceived and valued can vary greatly among individuals depending on their profile. Previous studies (Daniel et al., 2012; Ram & Smith, 2019) have applied the CES framework to examine tourists' appreciation of scenic beauty and engagement, in cultural heritage activities and the perceived value of recreational opportunities. Additionally, they have shown that visitor characteristics such as age, nationality, education and income may influence the types of CES prioritized (Ram & Smith, 2019; Dou et al. 2017; Ramírez-Guerrero et al., 2021).

2.3. The Role of Infrastructure in Supporting CES

While CES are often associated with intangible experiences such as relaxation, inspiration or cultural identity these experiences are closely connected to physical infrastructure (Russo et al., 2025). Elements such as pathways, signage, rest areas, bridges, and public transport can shape these experiences (Ramírez-Guerrero et al., 2021; Amoiradis et al., 2023). Well-designed infrastructure not only facilitates access but also improves the quality and inclusivity of CES-related experiences (Deri et al., 2023).

Infrastructure quality influences visitor satisfaction and perceived value of the experience (Tang et al., 2020). For example, Ramírez-Guerrero et al. (2021) found that visitors were more likely to identify cultural and recreational benefits when infrastructure supported comfort, orientation and learning. Additionally, they emphasized that the absence of infrastructure can limit CES delivery and exacerbate social exclusion.

Transportation networks also play a critical role. Duşcu and Rîşnoveanu (2025) found that limited public transport to Băneasa Forest in Romania restricted access for those living farther away, while those within a 10-minute route visited more frequently, often daily. Their study further highlighted that older visitors (aged 51 and above) prioritized roads and paths for recreation and valued structured recreational facilities for educational purposes. These findings highlight those different types of visitors may value infrastructure differently based on their needs, expectations, and capabilities.

2.4. Conceptual Framework

This study applied a conceptual framework that aligns visitors' sociodemographic profiles with their CES experiences and their evaluations of supporting tourism infrastructure in the APR. Additionally, insights from stakeholders involved in the planning, design and community management of the ARP are also included.

The framework is grounded in the CES literature (Millennium Ecosystem Assessment, 2005; Ram & Smith, 2019; Plieninger et al. 2013) and adapted from empirical research that examines the relationship between human well-being, landscape features and the delivery of non-material benefits in urban green and blue spaces.

The conceptual framework in Figure 1 below integrates the following four components, which also align with the specific research questions (SRQ); CES experiences, Visitors profile, Visitors perception of tourism infrastructure and Stakeholders view.

The types of CES are reflected in the 'CES experiences' variable, which includes recreation, aesthetic appreciation, sense of place, cultural identity and spiritual experiences (Dou et al., 2017; Ram & Smith, 2019; Atsiz & Akova, 2021). The non-material benefits visitors obtain from interacting with the ARP answer the SRQ I and may influence by their profiles. 'Visitor profiles' address SRQ II and include variables such as age, nationality, education level, and income. Research studies (Ram & Smith, 2019; Pinheiro et al., 2021; Tang et al., 2020) have

demonstrated the influence of these characteristics on individuals' perception and prioritization of different CES.

Infrastructure conceptualized not only as physical support but as a social-ecological enabler of CES delivery (Russo et al., 2025; Cheng et al., 2021). 'Visitors perception of tourism infrastructure' component addressing SRQ III. It focuses on how visitors assess both the physical and experiential aspects of infrastructure such as signage, trails, gathering spaces and public transportation and how these elements influence CES delivery (Tang et al., 2020; Ramírez-Guerrero et al., 2021; Denney, 2015). Finally, 'Stakeholder views' includes stakeholder insights into CES priorities, infrastructure design, community inclusion and long-term planning goals for the ARP as a socially and ecologically resilient urban space. These insights answer SRQ IV.

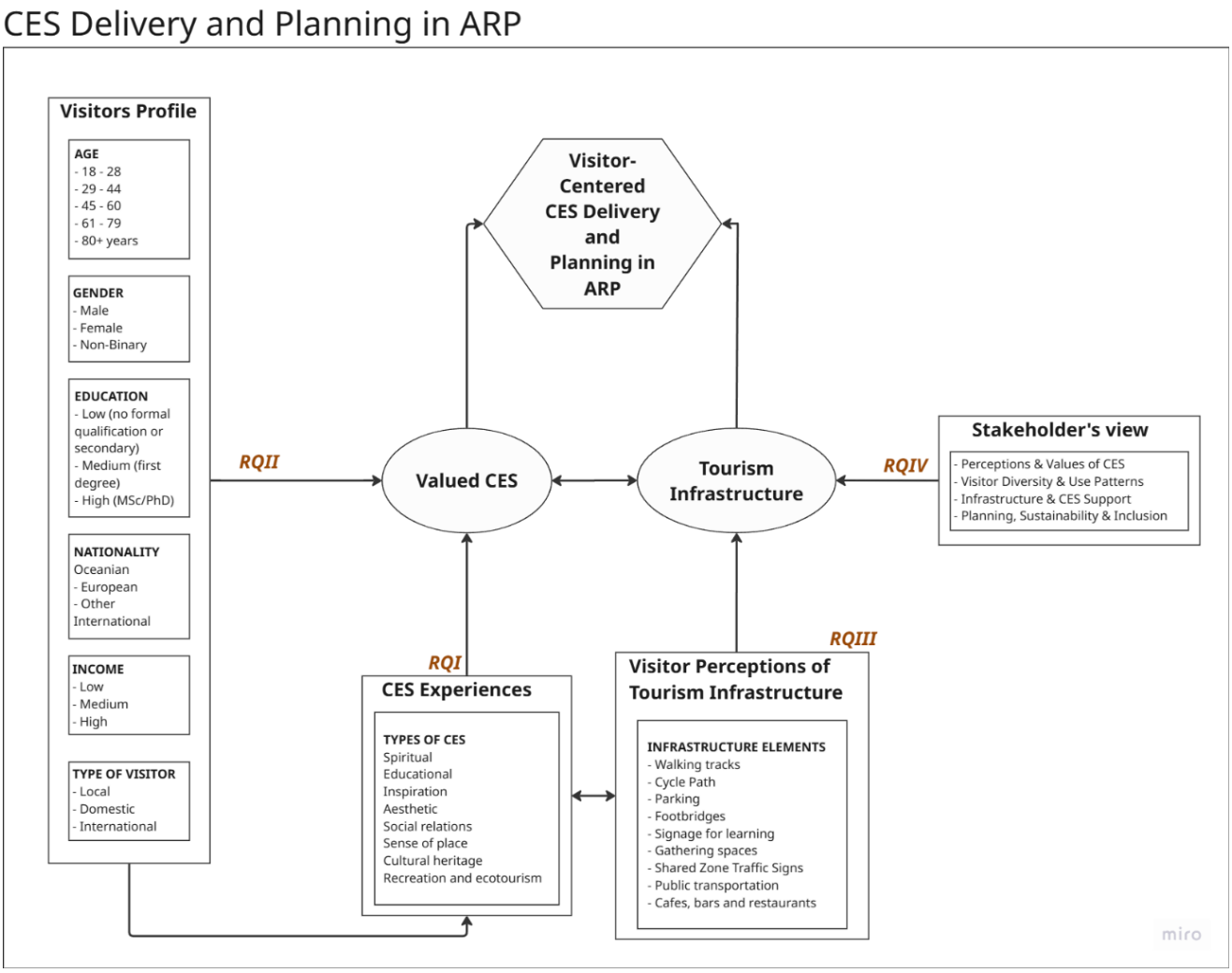

Figure 1. Illustrates the conceptual framework used in this study, which connects four key components aligned with the research questions (SRQs).

3. Methods

3.1. Case study Description

The geographical focus of this research is Christchurch, located on the South Island of New Zealand, as depicted by the brown spot in Figure 2. The main site is on the Ōtākaro Avon River Precinct in central Christchurch indicated in Figure 3 A. The selected section of the river extends from the Christchurch Botanic Gardens to Fitzgerald Avenue and consists of the core part of Ōtākaro Avon River Corridor Regeneration Plan. This area combines natural, cultural and recreational features that contribute to the delivery of CES such as green spaces, parks, public art, footbridges, walking or cycling pathways, gathering spaces, cafés and community gardens.

In Figure 3 B, the specific research sites are highlighted with red circles. From left to right, the first circle represents the Christchurch Botanical Garden. Continuing along the river the smaller one indicated the Antigua Boat Sheds café. The last three circles correspond to the Riverside market, Victoria Square and The Margaret Mahy Family Playground respectively. This mix of sites reflects different types of visitor engagement from organized attractions to informal, everyday uses of urban green space which helped capture a sufficient range of CES perceptions and infrastructure evaluations.

Figure 2. Location of Christchurch in New Zealand, indicating the broader geographical context of the Avon River Precinct. Source: Stats NZ, 2024.

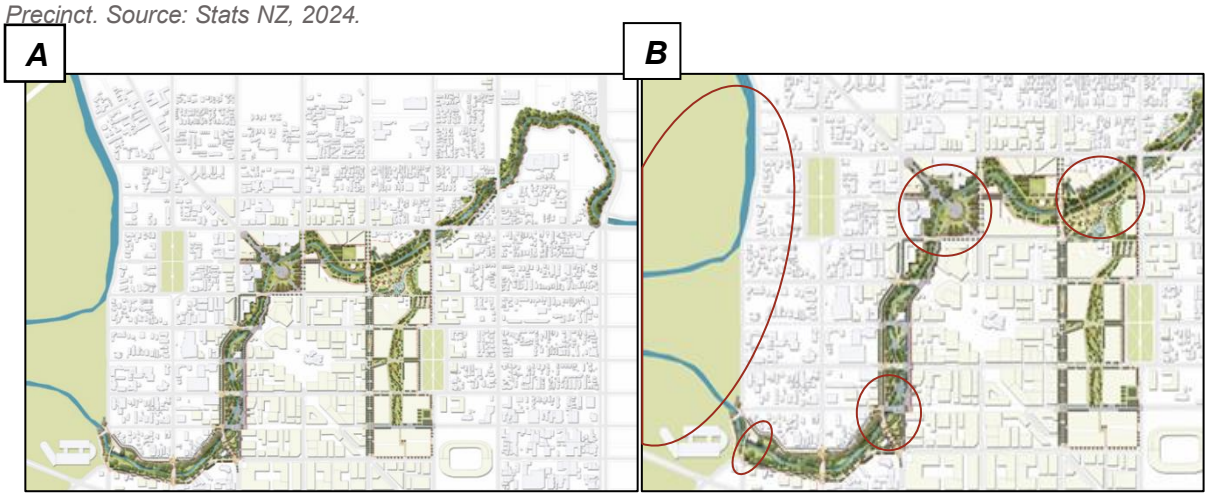

Figure 3. Overview map of the Avon River. Picture A shows the full river corridor; Picture B highlights the five research sites selected for CES analysis. Source: Te Papa Ōtākaro – Avon River Park and Terraces | Boffa Miskell. (n.d.). PWA.

3.2. Research Design

This study adopted a mixed-methods approach consisting of two distinct components. The first component, specific research question I - III (SRQ I - III), involved the collection and analysis of quantitative data through a structured visitor questionnaire. This component aimed to explore how sociodemographic characteristics relate to CES experiences and how infrastructure influences those experiences. The second component, SRQ IV, focused on qualitative data collection through semi-structured interviews with key stakeholders. This part of the study aimed to understand how planning, design and community perspectives align with CES delivery in the ARP context.

This section outlines the specific knowledge requirements for addressing each of the four research questions. It explains what was needed to be understood for collecting suitable data and made the methodological choices that follow.

3.2.1. SRQ I – III: Visitor Questionnaire

3.2.1.1. Design and Purpose

SRQ I aims to identify which CES are most valued by visitors to the ARP and how these values vary according to the type of tourism experience. To answer this question, non-material benefits which are associated with visitors experience in the river are determined. This includes how visitors perceive this experience in terms of spiritual and educational values, inspiration, aesthetic values, social relations, sense of place, cultural heritage values, recreation and ecotourism. Additionally, to examine how different types of tourism experiences (e.g., leisure, cultural heritage, relaxation etc.) correlate with specific CES values, the visitor's motivation for visiting the site is captured.

SRQ II focuses on how visitors' demographics profiles influence their preferences for different types of CES. To address this question, the detailed profile of the visitors including age, gender, education level, income, nationality and type of visitor (local or tourist) are identified.

SRQ III investigates how visitors assess the extent to which tourism infrastructure (e.g., signage, seating, trails, information panels) enhances their experience in ARP. Specifically, how physical and informational infrastructure elements contribute to CES valuation. For this reason, visitors' perception of accessibility, comfort, learning facilitation and social interaction is examined.

3.2.1.2. Questionnaire

A structured questionnaire (see detailed questionnaire in Appendix A) was employed to answer SRQ I - III. This method includes multiple choice questions and Likert 7 scale items related to visitors' preferences of their experience in ARP adapted from Smith and Ram (2019) and Dou, et al. (2017). It identifies which CES are most valued by visitors and how these vary by type of tourism experience, answering SRQ I. Research items on the questionnaire, such as age, nationality, educational background, income, and visitor type, were based on Smith & Ram (2019), Pinheiro et al. (2021), and Tang et al. (2020) surveys, which answer the SRQ II. The last three questions of the questionnaire evaluated infrastructure in the study area and included multiple choice questions and Likert 7 scale items based on Tang et al. (2020), Atsiz & Akova (2021), Ramírez-Guerrero et al. (2021) and Denney (2015) questionnaires. Their insights answer the SRQ III.

For more details of the research items and their corresponding indicators for each research question see Appendix D.

3.2.1.3. Data Collection

Five key locations within this area have been selected for data collection based on their high visitor presence and potential to reflect diverse CES experiences. First is Christchurch Botanic Gardens, one of the city's most visited attractions, featuring a wide variety of native and exotic plant species. Second is Antigua Boat Sheds café, a popular tourist activity offering traditional boat rides along the river. This site represents a strong recreational and cultural component within the visitor experience. Third is Riverside Markert, another popular tourist attraction. Is an enclosed spot next to the river consists with 7-day-trading fresh farmers' market and boutique shopping. Also, next to this Markert there are many benches where visitors are observed resting or engaging in quiet. These spaces are closely linked to CES such as sense of place, tranquillity and relaxation. Third is Victoria Square, a central urban park located within the study area, frequented by people of various age groups. It provides space for leisure, social interaction and passive recreation, making it relevant for understanding CES cultural identity. Lastly, the Margaret Mahy Family Playground is a space where parents are encountering their children to play in the playground while they are enjoying the view of the river. This site offers opportunities to explore CES related to recreation, social relations and landscape appreciation.

Although the five locations were initially selected to reflect a range of visitor experiences, the data collection after three weeks of fieldwork took place at only three: the Christchurch Botanic Gardens, Antigua Boat Sheds Café and Riverside Market. These sites consistently demonstrated the highest visitor amount during the data collection period, making them the most effective settings for approaching a diverse range of participants.

Additionally, a flyer which included a QR code linked directly to the Qualtrics questionnaire was implemented for the respondents which wished to participate in the survey later the day or preferred the online version (see the detailed flyer in Appendix B).

3.2.1.4. Participants and Sampling

The data used for the quantitative analysis were collected from a field questionnaire that was carried out within the study area from 14 April to 30 May 2025.

Potential respondents of the survey were selected using stratified random sampling at the 5 different hotspots along APR (see Figure 3B). Target audience was domestic, international tourists and local visitors visiting the area. The survey excluded individuals under 18 years old. A total of 215 questionnaires, with 211 valid responses were collected. Out of the total 215 respondents, 180 completed the survey using the paper format, while 35 respondents completed the online version via a QR code. The questionnaire was distributed for 13 days at various times throughout the day, mainly around midday from 12.00 to 18.00 o'clock, to capture a diverse profile. These hours were selected after observations during the first week of data collection indicated that the ARP received the highest number of visitors during midday and early afternoon. Sociodemographic information such as age, gender, educational background, nationality and income was recorded to examine differences in CES preferences.

Participants who chose to be surveyed on site were given an information sheet explaining the purpose of the study before they completed the questionnaire. Those who chose to participate

in the online survey scanned the flyer's QR code, which directed them to the questionnaire where the relevant information was provided on the first page.

3.2.1.5. Analytical approach

The data for evaluating CES and infrastructure elements were analysed by the responses from participants through the questionnaires from visitors. The analysis involved statistical methods in IBM SPSS Statistics 28.0 to quantify the responses, identify patterns and draw conclusions about the importance and distribution of CES.

Descriptive statistics including frequencies, percentages, means and standard deviations were calculated for CES items using a 7-point Likert scale to identify the most frequently valued CES of the participants. Additionally, One-Way ANOVA was conducted to examine whether visitors' primary reason to visit ARP affected CES valuations. Visitors were grouped based on their self-reported reason for visiting the ARP, as indicated in the VisitorReason variable. This variable was used as a factor in the analysis to explore potential differences in CES values. When the ANOVA results were significant, a post hoc Tukey HSD test was applied to identify which specific visitor groups differed significantly in their CES valuations. Effect size (Eta squared, η^2) was also calculated to assess the strength of these relationships.

To assess differences in CES values across demographic groups, different analytical tests were conducted for each demographic feature: age, gender, education, income and visitor's type (domestic, international, local visitor). For age, a one-way ANOVA was conducted to examine whether visitors' CES preferences differed significantly across 6 age groups (18 - 28, 29 - 44, 45 - 60, 61 - 79, 80+ years). Due to low sample sizes in the non-binary and 'prefer not to say' categories (1% and 0% respectively), the gender variable was recoded to include only respondents identifying as male or female. This decision was made to ensure reliable group comparison and valid statistical inference. An Independent Samples t-test was conducted to compare CES values between these two groups, with a Cohen's d to quantify the effect size. To address small sample sizes in some original education categories, the education variable was recoded into three broader groups for analysis: Low (no certificate, primary and secondary education), Medium (first degree), and High (MSc/PhD). This grouping ensured enough cases per category and allowed for valid statistical comparisons using one-way ANOVA and post hoc Tukey tests. Income was also examined using a one-way ANOVA. Participants were grouped into five income categories: Far below average, Below average, Average, Above average and Far above average. Where relevant, Tukey post hoc tests were performed to assess differences between specific income groups. Regarding nationality, three categories were recorded to allow valid group comparisons: Oceanian (including New Zealander, New Zealander European, Pākehā, Australian), European (e.g., British, German, French, Dutch, Italian), Other International (e.g., USA, Canada, India, China, Malaysia, Chile, Argentina). This grouping was based on geographic region and frequency distribution to ensure each group had sufficient sample size for ANOVA analysis. Finally, an independent samples t-test was conducted to examine the differences in CES ratings between tourists (a combined group of domestic and international visitors) and locals. In this test, the t-value indicates the size of the difference between the group means, while the degrees of freedom (df) reflect the sample size. This grouping was based on the percentage of domestic visitors was 13%, internationals was 40% and local visitors was 47%. As a result, domestic and international visitors were combined into a single 'tourist category' (53%) and compared against 'local visitors' (47%).

To examine associations between infrastructure satisfaction and CES experience, two analyses were conducted. First, visitors' mode of transportation was analysed using

descriptive frequency analysis, while descriptive statistics (means and standard deviations) were calculated for each infrastructure element using a 7-point Likert scale to evaluate visitor satisfaction. Lastly, a series of cross-tabulations and Chi-Square tests were conducted to explore associations between travel mode and visitors' experiences of CES. The Chi-square test of independence is a non-parametric test used to determine whether there is a significant association between two categorical variables namely, transportation mode and CES response levels.

A detailed overview of the analytical tools applied per research question is presented in Appendix E.

3.2.2. SRQ IV: Stakeholder Interviews

3.2.2.1. Design and Purpose

SRQ IV focuses on understanding how local stakeholders perceive the role of the ARP in delivering CES, engaging diverse visitor groups and addressing sustainability and planning challenges. Insights were obtained to explore how institutional, design and community perspectives align with visitor CES experiences and site infrastructure. This was achieved with stakeholders involved in landscape design, visitor engagement, ecological restoration and long-term planning of the ARP.

3.2.2.2. Interview

To capture stakeholder perspectives on the ARP's role on delivering CES and addressing visitors experience, semi-structured interviews (see detailed interview questions in Appendix C) were selected as the primary method. This qualitative approach gathered complementary insights regarding the delivery and planning of CES in the ARP. The semi-structured interviews contained four sections covering topics of CES - perceptions & values, visitor diversity & use patterns, infrastructure & CES support and planning, sustainability & inclusion. The insights from the interviews answer SRQ IV.

3.2.2.3. Participants and Sampling

Four semi-structured interviews were collected from 26 May to 3 June 2025 and conducted with stakeholders involved in the planning, management, or use of the ARP. The first interviewee was identified through a recommendation by Joya Kemper. Then a snowball sampling approach was applied, asking each interviewee if they could recommend others who were involved directly or indirectly with the ARP. They introduced me to their contacts and then I followed up via email to request an interview. This approach enabled access to a diverse group of interviewees connected to the planning, management and use of the precinct. Eventually, the interviewees represented the local government and tourism, urban design, non-governmental organization and community network.

Interviews were conducted either online or in person at the interviewees' offices, depending on availability and preference. Each session lasted approximately 30 - 45 minutes and followed a semi-structured format guided by open-ended questions. Thematic areas included infrastructure planning, visitor experience, CES delivery and post-disaster regeneration. All interviews were conducted in English, recorded with consent and later transcribed for analysis.

3.2.2.4. Analytical Approach

A thematic analysis was conducted to identify key findings and delve into infrastructure planning and perceived CES benefits related to the ARP.

Interview transcripts were analysed using thematic analysis following Braun and Clarke's six-phase approach. Initial codes were generated manually by reviewing each transcript line-by-line. Codes were then grouped into broader thematic categories that aligned with the study's research questions regarding cultural ecosystem services, infrastructure and visitor engagement.

For ease of analysis, stakeholders were grouped and coded as follows: those involved in local government and tourism (LGT), urban design (UD), urban ecology (UE) and the community network (CN).

3.3. Ethical Considerations

All participants were given sufficient time to review the study details before providing informed consent, ensuring their voluntary participation without pressure. Written consent was obtained before any in-person survey took place. In the online survey after scanning the QR code participants reviewed the study details and provided informed consent before participation. The questionnaire and the interviews have been approved by the University of Canterbury Ethics Committee, HREC 2025/07/LR-PS.

4. Results

4.1. Specific Research Question I

4.1.1. Cultural Ecosystem Services Items

Among the CES items, 'I came here to enjoy the beautiful scenery or views' (M = 6.25, SD = 1.04) and 'Being in this landscape makes me feel happy' (M = 6.12, SD = 0.89) received the highest average scores, indicating strong consensus among visitors regarding aesthetic and emotional appreciation of the landscape. Figures 4 and 5 below illustrate the frequency distributions across the 7-point Likert scale for these two items.

In contrast, 'I came here to learn something new about cultural traditions' (M = 3.63, SD = 1.63) and 'I came to this landscape for spiritual reasons' (M = 3.41, SD = 1.91) received the lowest scores. These items exhibited high standard deviations, reflecting a wider spread in responses and the possible presence of minority groups with distinct cultural or spiritual motivations. Figures 6 and 7 below depict the frequency distributions across the 7-point Likert scale for these two items.

The item 'I would like to visit this landscape again' also received strong agreement (M = 6.20, SD = 1.03), highlighting high visitor satisfaction and repeat-visit potential. While this item is not a CES per se, it was included as a behavioural indicator of overall site satisfaction and potential emotional attachment, following the approach of Ram and Smith (2019).

Means and standard deviations were calculated for each CES item and are presented in detail in Table 2.

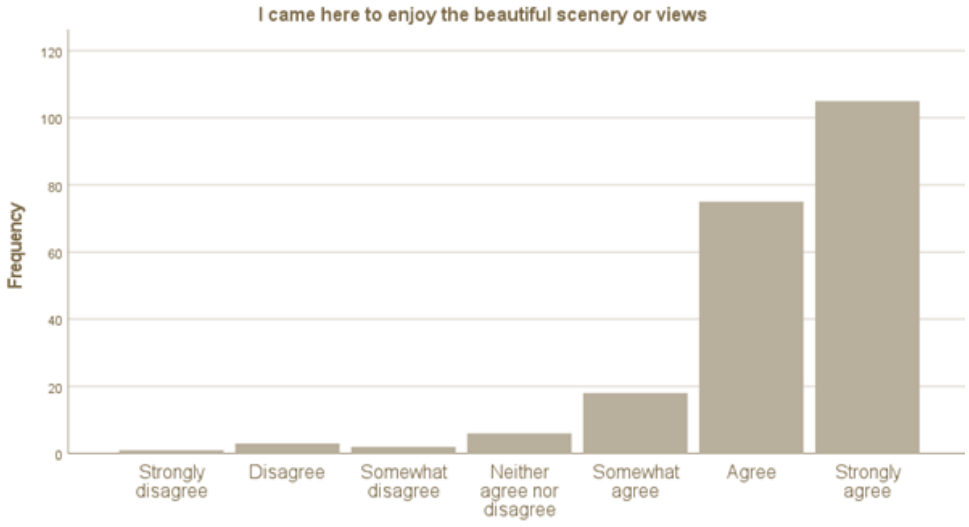

Figure 4. Bar chart showing frequency distribution for the 'I came here to enjoy the beautiful scenery or views' item.

Figure 5. Bar chart showing frequency distributions for the 'Being in this landscape makes me feel happy' item.

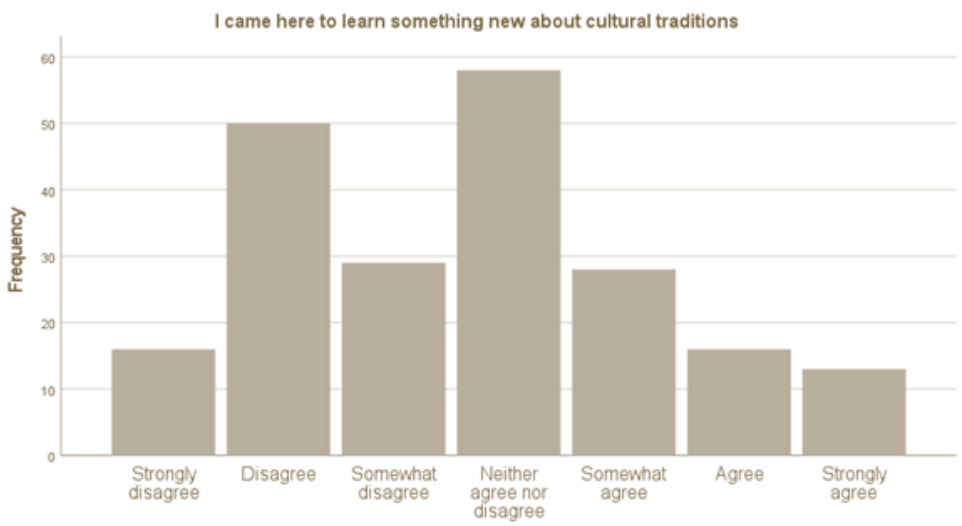

Figure 7. Bar chart showing frequency distributions for the 'I came here to learn something new about cultural traditions' item.

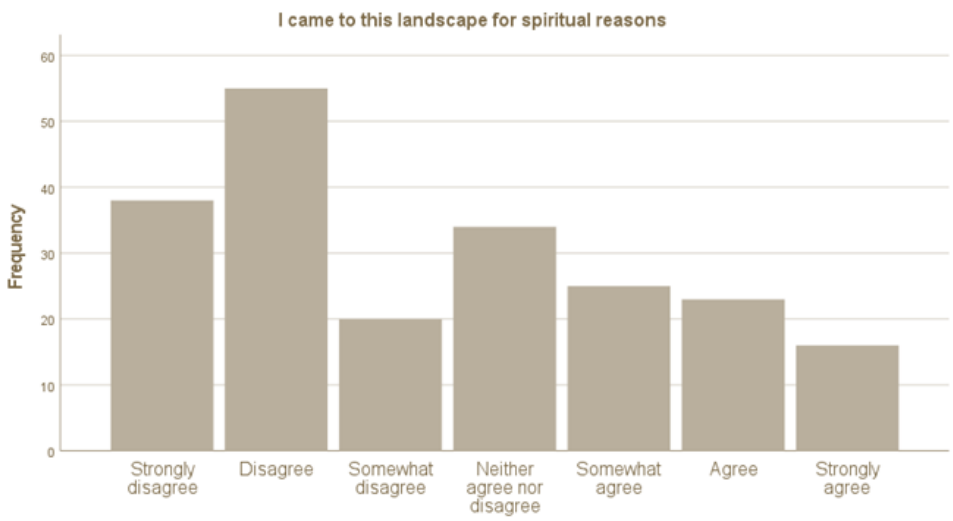

Figure 6. Bar chart showing frequency distributions for the 'I came to this landscape for spiritual reasons' item.

Table 2. Means and standard deviations for each CES item. Responses are based on a 7-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree).

CES items	N (valid)	Mean	Std. Deviation
I came here to enjoy the beautiful scenery or views	210	6.25	1038
I came here to enjoy the plants and flowers	211	5.87	1.196
I came here to view wildlife/animals	208	4.95	1.460
I came here because of the interesting cultural heritage attractions	204	4.57	1.568
I came to this landscape for spiritual reasons	210	3.41	1.914
Being in this landscape makes me feel happy	211	6.12	0.886
I find this landscape awe-inspiring	211	5.40	1.256
This landscape makes me feel creative (e.g. to write, draw, paint or make music)	210	4.76	1.586
I feel a close connection to nature here	212	5.53	1.194
I feel connected to a special energy here	209	4.30	1.718
This landscape is unique and unlike other landscapes that I have been to	210	4.36	1.572
This landscape is linked to peoples' cultural traditions	211	4.78	1.381
I feel a strong sense of place in this landscape	211	4.87	1.403
I came here to learn something new about the natural environment	211	3.90	1.609
I came here to learn something new about cultural traditions	210	3.63	1.627
I came here to enjoy recreational activities linked to fitness or sports (e.g. hiking, biking, climbing, swimming)	211	4.16	1.895
I came here to feel calmer	211	5.31	1.358
I came here to reduce my stress levels	211	5.24	1.509
I came here to relax	211	5.80	1.211
I would like to visit this landscape again	212	6.20	1.034

4.1.2. Primary Reason for Visiting ARP

As shown in Figure 8, nearly half of the respondents (50.70%) reported that their primary reason for visiting was leisure. Other common reasons included relaxation (15.81%) and landscape use (10.70%). Less frequent motivations included education, spiritual or cultural inspiration and daily routines. These insights provide the background for understanding how visitor motivations might relate to their perceptions and experiences of CES.

The analysis revealed statistically significant differences in several CES based on visitors' reason for visiting the ARP as it shows in Table 3. More specifically, those who visited to enjoy nature and scenery reported higher scores in CES related to scenic views ($F = 4.11$, $p < .001$), wildlife ($F = 3.27$, $p = .002$) and awe-inspiring landscapes ($F = 2.14$, $p = .034$).

Similarly, visitors motivated by spiritual reasons rated higher the CES items relating to spiritual connection ($F = 3.21$, $p = .002$) and special energy ($F = 2.35$, $p = .019$). Those who visited to relax or reduce stress scored higher on feeling calm ($F = 4.08$, $p < .001$), relaxation ($F = 5.00$, $p < .001$) and stress reduction ($F = 3.73$, $p < .001$). In addition, people who expressed interest in learning set higher value on learning about the natural environment ($F = 3.77$, $p < .001$) and cultural heritage ($F = 2.43$, $p = .016$). In contrast, perceptions of CES such as happiness or uniqueness of the landscape did not differ significantly based on visitors' motivations.

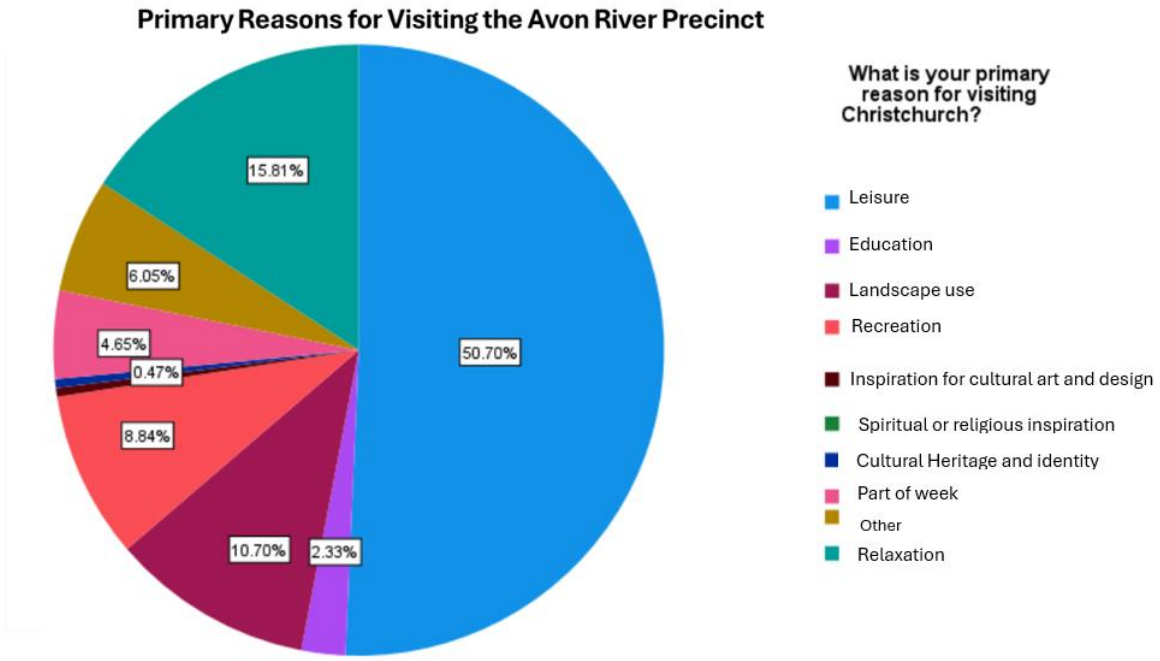

Figure 8. Visitors' primary reasons for visiting the Avon River Precinct, based on survey responses.

Table 3. Results of One-way ANOVA for primary Visitors Reason in the Avon River Precinct.

CES Item	**F**	**p-value**
Enjoy scenery/views	*4.109*	*< .001*
View wildlife/animals	*3.273*	*.002*
Cultural heritage attractions	*2.430*	*.016*
Spiritual reasons	*3.206*	*.002*
Awe-inspiring landscape	*2.141*	*.034*
Feel creative	*3.107*	*.002*
Connection to nature	*2.350*	*.020*
Special energy	*2.354*	*.019*
Linked to culture	*2.189*	*.030*
Sense of place	*3.031*	*.003*
Learn about natural environment	*3.767*	*< .001*
Recreational activities	*2.291*	*.023*
Feel calmer	*4.076*	*< .001*

Reduce stress	*3.739*	*< .001*
Relax	*5.004*	*< .001*
Visit again	*2.755*	*.007*

4.2. Specific Research Question II

4.2.1. Age

The analysis revealed that age had a statistically significant effect on several CES items, particularly those related to spiritual, emotional and restorative experiences as indicated in Table 4. Older adults (61- 79) were more likely to visit the ARP for spiritual reasons, relaxation, stress reduction and feeling calm. Middle-aged visitors (29 - 44) tended to value awe-inspiring scenery and learning experiences. They also placed higher value on learning about the natural environment and connecting with nature.

In contrast, young visitors (18 - 28) consistently gave the lowest ratings across most CES items but expressed the strongest intention to revisit the site. This pattern suggests that while younger visitors may not prioritize reflective or restorative CES dimensions, their interest in returning could reflect other motivations, such as social interaction, urban vibrancy or general satisfaction.

Table 4. Results of One-Way ANOVA Testing Differences in CES Ratings Across Age Groups, with Post Hoc Interpretations.

CES Item	F	p-value	Highest Mean Age Groups	Lowest Mean Age Groups	Interpretation*
Spiritual reasons	3.86	.005	80+, 61-79	18-28	Older visitors value more
Feel calm	2.54	.041	29-44, 61-79	18-28	Older > younger
Reduce stress	2.80	.027	29-44, 45-60	80+	Middle > others
Awe-inspiring landscape	3.19	.014	29-44, 61-79	45-60, 80+	Middle age inspired more
Learn about natural environment	2.66	.034	29-44, 80+	18-28	Older > younger
Visit again	2.54	.041	18-28, 29-44	80+	Younger > older

**Post hoc tests (Tukey HSD) are not performed for 'I came here to enjoy the plants and flowers' and 'This landscape is unique and unlike other landscapes that I have been to' because at least one group has fewer than two cases.*

4.2.2. Gender

As illustrated in Table 5, the results revealed that female participants rated several CES items significantly higher than males.

Female visitors assigned higher scores to 'enjoying plants and flowers' ($p < .001$, $d = 0.47$), 'viewing wildlife/animals' ($p = .015$, $d = 0.35$) and 'cultural heritage attractions' ($p = .008$, $d = 0.34$). Also, they expressed stronger emotional and spiritual connections to the landscape, with significantly higher ratings for feeling happy ($p = .005$), creative expression ($p = .001$), feeling a close connection to nature ($p = .001$) and feeling connected to a special energy ($p <$

.001). Learning-related CES were also rated higher by females, including learning about the natural environment (p = .005) and cultural traditions (p = .008). These differences were supported by small to medium effect sizes, indicating that gender plays a meaningful role in shaping CES preferences, particularly in areas related to emotion, creativity and learning.

Notably, there were no CES items for which male respondents provided significantly higher ratings than female respondents.

Table 5. Differences in CES Ratings by Gender: Independent Samples t-test Results and Effect Sizes (F = Female, M = Male).

CES Item	Mean (F)	Mean (M)	p	Cohen's d	Effect Size
Enjoying plants and flowers	6.10	5.55	< .001	0.47	Medium
Viewing wildlife/animals	5.17	4.67	.015	0.35	Small-Medium
Cultural heritage attractions	4.80	4.26	.008	0.34	Small-Medium
Feeling happy	6.25	5.93	.005	0.36	Small-Medium
Creative expression	4.96	4.45	.001	0.51	Medium
Connection to nature	5.75	5.25	.001	0.50	Medium
Special energy	4.62	3.98	< .001	0.57	Medium-Large
Learn about natural environment	4.14	3.57	.005	0.36	Small-Medium
Learn about cultural traditions	3.89	3.28	.008	0.38	Small-Medium

4.2.3. Education

The analysis revealed no statistically significant differences across these groups for any CES items (all p > .05). Although mean values showed slight variations (e.g., stress reduction: Low = 5.16, Medium = 5.43, High = 5.02), these differences were not statistically significant.

These results suggest that education level, whether lower (no formal qualification or secondary), medium (first degree), or higher (MSc/PhD), does not substantially influence how visitors experience or value CES in the ARP.

4.2.4. Income

The analysis revealed no statistically significant differences for any CES item at the p < .05 level. However, some CES items approached significance, including learning about the natural environment (p = .059), spiritual reasons (p = .061) and learning about cultural traditions (p = .082). In each case, participants in the 'Below average income' group gave the highest ratings, while those in the 'Far above average income' group gave the lowest. These trends suggest that income may have a small influence on CES values related to experiences and learning, though effect sizes were small ($\eta^2 \approx .04$). Post hoc comparisons (Tukey HSD) did not reveal any statistically significant differences between specific income groups.

4.2.5. Geographic Origin

The analysis revealed statistically significant differences (p < .05) for several CES items demonstrating in the Table 6 below.

Table 6. CES Items Significantly Differing by geographic region (One-Way ANOVA, p < .05).

CES item	p

Viewing wildlife/animals	042
Cultural heritage attractions	.003
Spiritual reasons	.002
Feeling a close connection to nature	.038
Feeling connected to a special energy	.004
Landscape uniqueness	.023
Sense of place	.020
Learning about cultural traditions	.002

Post hoc comparisons (Tukey HSD) showed that European visitors generally rated spiritual CES lower than both Other Internationals and Oceanians. As shown in Table 7, mean scores for spiritual reasons were highest among Oceanians (M = 3.74) and Other Internationals (M = 3.52), compared to Europeans (M = 2.62). In Table 8, learning about cultural traditions was rated significantly higher by Other Internationals (M = 4.31) than by both Europeans (M = 3.60) and Oceanians (M = 3.34).

Table 7. Post hoc Tukey HSDa,b test of research item 'I came to this landscape for spiritual reasons' between nationalities. Means for groups in homogeneous subsets are displayed. The harmonic mean of the group sizes is used.

I came to this landscape for spiritual reasons			
NZ/European/Other	N	Subset for alpha = 0.05	
		1	2
European	53	2.62	
Other International	50		3.52
Oceanian	108		3.74

Table 8. Post hoc Tukey HSDa,b test of research item 'I came here to learn something new about cultural traditions' between nationalities. Means for groups in homogeneous subsets are displayed. The group sizes are unequal. The harmonic mean of the group sizes is used.

I came here to learn something new about cultural traditions			
NZ/European/Other	*N*	*Subset for alpha = 0.05*	
		1	*2*
Oceanian	*109*	*3.34*	
European	*52*	*3.60*	
Other International	*49*		*4.31*

Although some mean differences did not reach statistical significance in the post hoc tests, patterns suggest that visitors from different global regions perceive and prioritize CES in distinct ways. European visitors generally reported lower mean scores for cultural-spiritual dimensions (e.g., connection to special energy, cultural learning), while Other International visitors valued these intangible benefits more strongly. Effect sizes for significant CES items ranged from small to moderate (η^2 = .030 to .059).

4.2.6. Tourist vs Local Visitors

The results showed several statistically significant differences. Tourists rated scenery/views significantly higher (M = 6.40, SD = 0.87) than locals (M = 6.06, SD = 1.19), t(208) = 2.34, p =

.021, with a small-to-medium effect size (d = 0.33). Tourists also placed greater value on cultural heritage attractions, learning about the natural environment, and learning about cultural traditions, all showing small to medium effect sizes ($p < .05$, d = 0.28–0.50). Conversely, local visitors gave significantly higher ratings for spiritual reasons and the likelihood of visiting again ($p < .05$), both with medium effect sizes. The significant results are shown in Table 9 below.

Table 9. Differences in CES Ratings by Visitor Type (Independent Samples t-test Results) (T= Tourist, L= Locals, S = Small, M= Medium).

CES Item	**M (T)**	**SD (T)**	**M (L)**	**SD (L)**	**t**	**df**	**p**	**Cohen's d**	**Effect Size**
Scenery/views	6.40	0.87	6.06	1.19	2.34	208	.021	0.33	S/M
Spiritual reasons	3.11	1.91	3.76	1.87	-2.47	208	.014	-0.34	S/M
Cultural heritage	4.77	1.55	4.33	1.56	2.03	208	.043	0.28	S
Learn about nature	4.25	1.49	3.47	1.65	3.59	208	<.001	0.50	M
Learn about traditions	3.96	1.61	3.23	1.56	3.36	208	<.001	0.46	M
Visit again	5.97	1.16	6.46	0.79	-3.64	210	<.001	-0.49	M

4.3. Specific Research Question III

4.3.1. Infrastructure Elements

The features that contributed most to the visitor experience were walking tracks (M = 5.45, SD = 1.73), cafes, bars and restaurants (M = 4.94, SD = 2.18), and footbridges (M = 5.03, SD = 1.82). In contrast, the infrastructure elements that received the lowest mean scores were cycle paths (M = 2.80, SD = 2.41), public transportation (M = 2.97, SD = 2.49) and parking (M = 2.83, SD = 2.38). These ratings suggest more moderate to low perceived contribution to the overall visitor experience.

Standard deviations for the lower-rated infrastructure elements (e.g. cycle paths, parking, and public transport) ranged from 2.38 to 2.49, suggesting greater variability in how visitors perceived their contribution to the overall experience. In contrast, higher-rated elements, such as walking tracks and footbridges, had lower standard deviations (e.g. SD = 1.73–1.82), indicating more consistent evaluations across respondents.

A bar chart of mean scores (on a scale from 1: not at all to 7: very much) for different infrastructure elements is illustrated below in Figure 9. The bars show the mean values, while the error bars (±1 standard deviation) indicate the variation in responses among participants.

See Appendix F for detailed mean scores and standard deviations for each item.

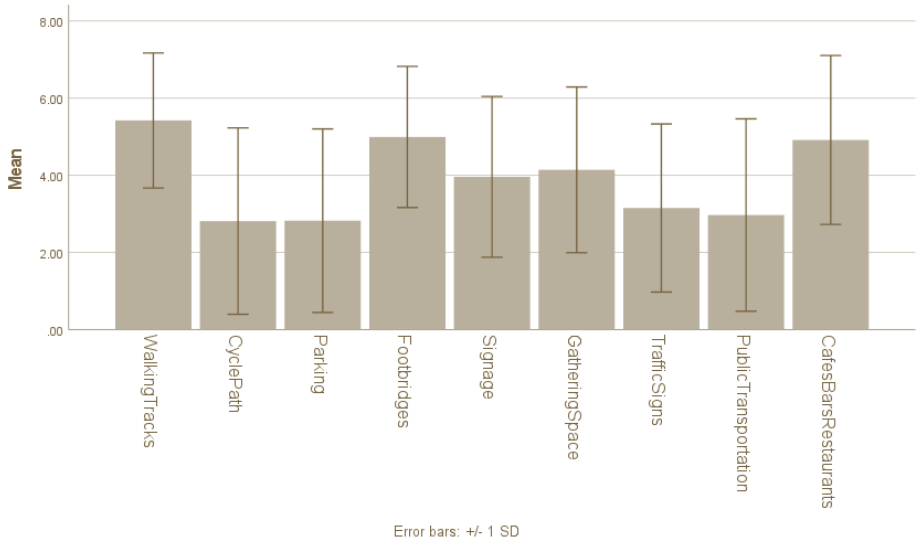

Figure 9. Mean visitor satisfaction with tourism infrastructure at the Avon River Precinct. Error bars represent ±1 standard deviation, indicating variability in visitor responses.

4.3.2. Transportation Mode and CES

A total of 211 valid responses were collected regarding visitors' travel mode to the ARP (see detailed Appendix G). As is illustrated in Figure 10, the most common means of transportation was on foot, used by 90 respondents (41.9%), followed by private car (80 respondents, 37.2%). Fewer participants used public transport such as bus or tram (23 respondents, 10.7%) and only 3 respondents (1.4%) reported arriving via tour bus or group transport. Other means, including bicycle or e-scooter and custom responses, accounted for the remaining responses.

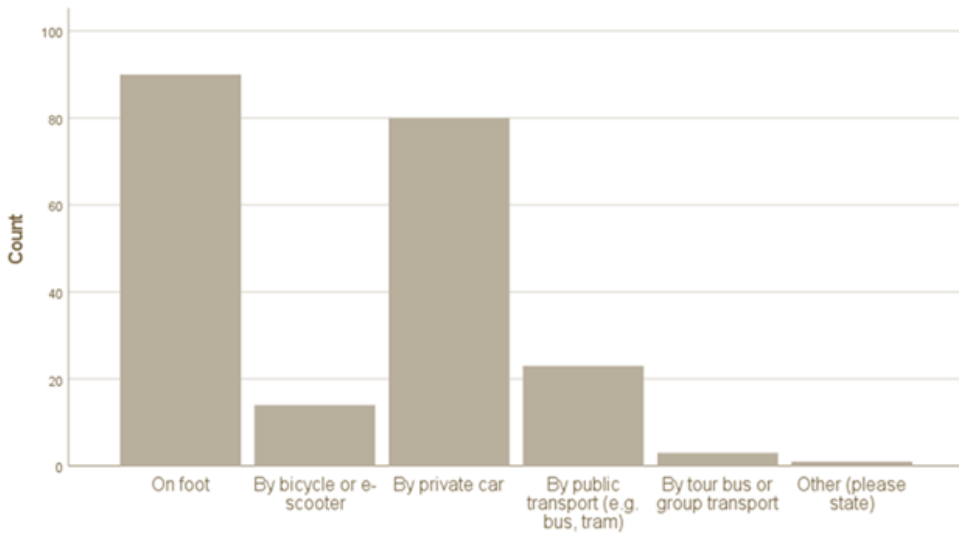

Figure 10. Frequency of travel modes used by visitors to access the Avon River Precinct (e.g., walking, private car, public transport).

A series of cross-tabulations and Chi-Square tests were conducted to explore associations between travel mode and visitors' experiences of CES. Among the twenty CES items assessed, four showed statistically significant associations with the mode of transport used to reach the ARP. These were: 'I came here to relax' ($\chi^2(30) = 81.035$, $p < .001$, $V = .277$) which showed a strong effect size and was most strongly agreed respondents who arrived on foot (48.9% strongly agree), 'I feel a strong sense of place in this landscape' ($\chi^2(30) = 45.468$, $p = .035$, $V = .208$) which also highly rated by on-foot visitors (43.2% strongly agree), 'This landscape makes me feel creative' ($\chi^2(30) = 44.466$, $p = .043$, $V = .206$) with 50% of bicycle

users selecting ‘strongly agree’, and ‘I would like to visit this landscape again’ ($\chi^2(30) = 44.640$, $p = .042$, $V = .206$) with 47.8% of public transport users selecting ‘agree’. All other CES items did not show any statistically significant association with travel mode ($p > .05$).

These findings suggest that visitor experiences relating to relaxation, emotional connection, creativity and intention to revisit may be influenced by how individuals travel to the site and the statistical results are indicated in the Table 10 below.

Table 10. Chi-square test results showing statistically significant associations between the main mode of transportation and selected CES items. Cramer's V indicates effect size, with moderate to strong associations found for four CES variables. No significant relationships were observed for other CES items ($p > .05$).

CES Item	Travel mode	Frequency	Pearson χ^2	p-value	Cramer's V	Effect Size
I came here to relax	On foot	48.9% strongly agree	81.03	< .001	.278	Strong
I feel a strong sense of place	On foot	43.2% strongly agree	45.47	.035	.208	Moderate
This landscape makes me feel creative	By bicycle	50% strongly agree	44.47	.043	.206	Moderate
I would like to visit this landscape again	By public transportation	47.8% agree	44.64	.042	.206	Moderate

4.4. Specific Research Question IV

The coding process revealed five main thematic pillars that emerged across participants’ responses: CES, Infrastructure Supporting CES, Visitor Diversity and Engagement, Planning and Sustainability Challenges and Community Involvement and Management. These five themes reflect how individual and shared experiences align in terms of how the ARP supports well-being, recreation, environmental connection and urban resilience.

Table 11 provides a summary of the five thematic pillars derived from the interviews. It includes each theme’s title, description, corresponding codes, and the interviewees who contributed to them, namely those involved in local government and tourism (LGT), urban design (UD), urban ecology (UE), and the community network (CN).

4.4.1. CES

All interviewees referred in some way to the non-material benefits visitors derive from the ARP. These benefits include emotional, well-being and sense of place values.

LGT highlighted the visual beauty and calmness of the river noting that ‘*international visitors appreciate the clarity of the water’* even though it is not clean enough for swimming. Similarly, CN involved for river restoration emphasized the importance of water accessibility and clarity noting that ‘*any engagement near the water, if the water is clean*’ contributes to positive experiences and wellbeing of the visitor.

UE, working in the Ōtākaro Orchard, a community garden and an environmental and educational hub nearby the river, provided a more ecological perspective. She mentioned how nature and soil around the river inspire reflection and raise environmental awareness. Meanwhile, UD described design intentions to promote relaxation, inspiration and a sense of place through high-quality public space along the river.

4.4.2. Infrastructure Supporting CES

Infrastructure was seen important in facilitating CES experiences. UD emphasized the importance of wide footpaths, bridges, shared spaces for trams and cyclists and ground-floor activation with restaurants and cafes. The goal of a project that she was engaged in regarding the design of ARP after the earthquakes was to create a '*pedestrian-oriented, inclusive environment that allows people to stay close to the water'*.

LGT pointed out the centrality of walking and cycling paths for urban connectivity, while also referring to planned infrastructure such as '*Lighting project*' to enhance nighttime safety and cultural appeal. CN highlighted on the recreational map which is in progress which promote orientation and visitors' engagement.

UE noted that the Ōtākaro Orchard includes green infrastructure like gardens, seating areas and educational spaces that enhance visitor experiences in line with sustainability values.

4.4.3. Visitor Diversity and Engagement

Stakeholders recognized the diversity of visitors and emphasized design for inclusion. LGT distinguished between locals, international tourists and cruise ship visitors, noting especially the participation of US and Australian visitors. He also highlighted strategies like partnerships with 'Punting on the Avon' to enrich visitor interaction.

UE stated that most visitors to the Orchard are young international travellers, especially solo travellers from Europe and the US. She emphasized that the project was not initially designed for tourists, but tourism emerged too due to the project's appeal and the nearby hostel promotion.

UD insisted that planning prioritized residents over tourists: '*If you design for locals, tourism will follow. If you design only for tourists, it feels artificial'*. This perspective reflects a sustainability-driven approach to long-term engagement.

Additionally, both the lighting initiative and the recreational map were mentioned not only as infrastructure developments but also as tools for connecting visitors to cultural heritage and recreational assets. These features were seen as enhancing the safety, accessibility and experiential quality of the river environment.

4.4.4. Planning and Sustainability Challenges

All interviewees mentioned limitations in infrastructure implementation or maintenance and lack of fundings. UD noted that although green roofs and residential units were part of the original plan, they were never realized due to high costs or lack of developer interest.

CN highlighted serious environmental issues such as 27 stormwater drains discharging untreated water into the river, posing ecological and public health challenges. LGT identified lack of lighting as a current limitation, suggesting innovations like under-bench lighting to improve safety and attractiveness at night. Yet, both mentioned the lack of funding.

UE did not emphasize infrastructure gaps but did mention the post-disaster loss of environmental awareness, suggesting a challenge of reconnecting the community with nature.

4.4.5. Community Involvement and Management

Stakeholders described a mix of formal and informal mechanisms for engaging the public in the planning and management of the ARP.

UE explained that the Ōtākaro Orchard relies heavily on community participation, especially through weekly volunteer activities focused on gardening, harvesting and selling the local products from the garden. These experiences serve both educational and community building purposes.

CN mentioned the Avon Ōtākaro Network and its initiatives such as recreational mapping and riverbank restoration activities, including planting native vegetation to support environmental stewardship.

LGT discussed the involvement of both the City Council and private companies, such as the cleaning and maintenance services provided by 'Punting on the Avon'. He also personally raised the issue of Canadian geese overpopulation, reflecting an ongoing challenge of environmental management.

Table 11. Thematic Analysis Overview.

Theme	Description	Code	Interviewee
CES	Visitors gain non-material benefits like inspiration, beauty and reflection	Visual appeal, relaxation, connection to nature	LGT
		Inspiration, food/environmental awareness	UE
		Pedestrian connection, sense of place	UD
		Wellbeing from water access	CN
Infrastructure Supporting CES	Physical features that facilitate CES, accessibility and comfort	Paths, cycling lanes, lighting project (paused)	LGT
		Walking paths, wide footpaths, bridges	UD
		Recreational map to connect spaces	CN
Visitor Diversity and Engagement	The area attracts and accommodates a range of visitor groups	Cruise tourists, commuters, hospital visitors	LGT
		Youth, solo travellers, Europeans	UE
		Inclusive design for locals first	UD
		Initiatives like kayak hire and community map	CN
Planning and Sustainability Challenges	Challenges in water quality, urban ecology and post-quake redevelopment goals	Planning and Sustainability Challenges	LGT
		Debates over native vs. exotic plants	UD
		Lack of green roofs and urban greenery	
		Stormwater drains, water pollution	CN

Community Involvement and Management	Local involvement through NGOs, volunteering and informal stewardship	Volunteer cleanups, council maintenance	LGT
		Volunteer gardening sessions, market harvests	UE
		Tools for riverbank planting, engagement maps	CN

5. Discussion

This thesis examined how visitors of ARP value CES, the influence of visitor demographics on CES preferences, the role of tourism infrastructure in improving visitor experiences and lastly, how stakeholders perceive CES in this area. While the results provide meaningful insights, they must be interpreted considering certain limitations, methodological considerations and comparisons with existing research.

5.1. Discussion of Findings

5.1.1. Most valued CES by visitors visiting the ARP and what they reveal about visitor experience

Aesthetic and emotional values were the most valued CES for the visitors in ARP, with scenery and happiness receiving the highest ratings. This finding aligns with Ram and Smith (2019), who similarly identified that happiness and relaxation were the most highly valued CES in their study. Grzyb (2015) also reported that aesthetic appreciation, relaxation and social interactions were the main values associated with urban riverscapes. The strong emphasis on scenery in the results reveals that the ARP functions as a visually engaging and emotionally restorative urban landscape.

Nearly half of the respondents reported that their main reason for visiting the river was relaxation. Those who visited the river to relax or reduce stress rated higher scores in CES aligned to feeling calm, relaxation and stress reduction. This suggests that ARP is also a restorative space for well-being. Similarly, those who visited to enjoy nature and scenery reported higher scores in CES related to scenic views, wildlife and awe-inspiring landscapes.

Although motivations such as education, spiritual or cultural inspiration and daily routines were less frequently scored, the high standard deviations in CES items scores suggest that these values are meaningful to smaller but significant groups. These patterns will be further explored in the next subchapter, which focuses on demographic influences. This highlights the importance of not overlooking minority perspectives when designing inclusive and culturally urban spaces.

The research conducted in green and blue space of Beijing by Dou et al. (2017) found that recreational CES were the most highly valued by of visitors, followed by aesthetic appreciation and educational opportunities. Like the ARP, these urban green and blue spaces were primarily used for stress relief, scenic enjoyment and informal learning. ARP's regeneration plan indicates the river as a 'living laboratory', educational and cultural learning CES received relatively low average scores among visitors in this study. Enhancing interpretive signage, guided tours or cultural programming could help bridge this gap and engage a broader audience.

Identifying the most valued CES highlights that it's not just about making the ARP visually attractive, but also about creating spaces where people can relax, reflect or learn something new. At the same time, recognising that smaller visitor groups also seek cultural or reflective experiences highlights the need for a multi-dimensional visitor environment, where diverse values can coexist and be expressed. As a result, the ARP can become a place that feels inclusive and meaningful for a wide range of people.

5.1.2. Demographic influences on CES preferences in ARP

Ram and Smith (2019) reported only a small influence of demographic variables on CES valuation, especially in age and gender of the visitors. However, the analysis of this thesis revealed that age and gender play a statistically significant role in shaping how visitors experience and value different CES within the ARP. While nationality and visitor type played a smaller role, they still contributed meaningfully to CES preferences.

Age emerged as the most influential variable. Older visitors, especially those over 60, rated significantly higher the CES values related to spiritual reasons, feeling calm and connecting with nature. These findings align with Wang et al. (2024), who found that older adults prioritize reflective, calm environments and spiritual well-being. Such preferences may be linked to broader life-stage dynamics or mental restoration. In contrast, younger visitors expressed less interest in spiritual CES, but showed the strongest intention to revisit, possibly related to other aspects of the experience such as its visual appeal, social atmosphere or general sense of enjoyment. These results probably reflect the conclusions of Zhang et al. (2022), who found that younger visitors tend to perceive recreational values more frequently.

Gender differences were also evident. Female visitors rated CES related to emotions, inspiration and cultural learning more highly than male visitors. These included enjoyment of nature, feeling connected to special energy and learning about culture. The findings reflect similar patterns to those observed by Grzyb (2023) and Pinheiro et al. (2023) who observed that women tend to report stronger emotional connections with nature-based and heritage-based CES.

Nationality and visitor type also played a role on shaping how individuals experienced CES. Visitors from outside Europe and Oceania reported higher ratings to CES such as spiritual reasons, connection to special energy, sense of place and learning about cultural traditions. In contrast, European visitors gave lower scores to these values. This evokes the findings of Liu et al. (2024) which demonstrate that people tend to respond more positively to environments reflecting their own cultural context. Similarly, tourists valued cultural learning and heritage more strongly, whereas locals expressed deeper emotional and spiritual connections to the landscape, including a stronger intention to revisit. This supports findings of Jiang et al. (2024), where tourists expressed greater appreciation for social and cultural values, highlighting a stronger bond with the place.

As noted by one interviewee, '*If you design your public space for your local population, then tourism will come. But if you design only for tourists, the place will feel artificial'*. This highlights the importance of developing spaces that reflect on local identity, which can also appeal to visitors seeking authentic experiences.

On the other hand, education and income showed no statistically significant impact on CES ratings. However, slight trends indicated that participants with lower income to valued CES such as learning and spiritual connection more than those in higher income. This is in line with Pinheiro et al. (2023), who noted that limited education and low-income levels may affect the understanding and appreciation of CES such as cultural heritage and educational opportunities. This is an area that could be further explored in future studies.

These patterns suggest that urban river environments benefit from design elements that resonate with specific demographic groups. For example, incorporating quiet zones or nature immersion for older visitors, while preserving open, social, or dynamic areas for younger audiences, may support broader engagement.

5.1.3. The role of tourism infrastructure in supporting CES delivery in ARP

The analysis indicates that tourism infrastructure plays a critical role in shaping how CES are experienced by visitors to the ARP. Walking tracks, cafes and footbridges emerged as the most positively perceived elements, interpreting that infrastructure supporting movement, leisure, and navigation contributes to CES such as relaxation, sense of place, and scenic enjoyment. These findings align with Ramírez-Guerrero et al. (2021), who emphasized that navigational and leisure infrastructure improves visitors' emotional and aesthetic experiences in urban green spaces.

Conversely, cycle paths, public transportation and parking had lower scores suggesting that those features are less connected to CES delivery. This may be due to their limited cultural, aesthetic or symbolic value, even though they remain functionally important. Differences in transportation mode also revealed statistically significant associations with specific CES. Visitors who arrived on foot reported stronger experiences of relaxation and sense of place, bicycle users felt more creative and public transport users expressed stronger intention to revisit the site. These findings underscore the idea that the mode of access can influence how people engage with the space emotionally and culturally.

These findings advocate the idea that infrastructure is not only a physical framework but also a social-ecological interface that shapes visitors' perceptions and experiences (Li et al., 2024). Maintaining and improving infrastructure that combines accessibility, aesthetics and experiential value, such as well-designed paths, places to sit and reflect and culturally meaningful signage, can help support and create inclusive visitor experiences in urban river environments like the ARP. This supports the conclusions of Cheng et al. (2021) and Tang et al. (2020), who argue that infrastructure can encourage sustainable mobility and simultaneously improve CES delivery.

The findings suggest that infrastructure should be approached as more than functional, it can also be a cultural and emotional facilitator. Recent research by Deri et al. (2023) emphasizes that improving tourism infrastructure, such as interpretive signage, can enhance accessibility, aesthetics and visitor experience. Planners should prioritise multi-use infrastructure that encourages exploration and sensory engagement, such as scenic paths, rest spots, and interpretive signage. Ensuring accessibility while integrating cultural and aesthetic value can improve CES delivery and support more profound visitor experiences in urban nature settings.

5.1.4. *Interviewees perspectives on CES, inclusivity and long-term planning*

Interviewees provided valuable insights in how the ARP is perceived as a space for delivering CES, engaging diverse visitors and supporting sustainable urban regeneration. While quantitative findings highlighted the importance of aesthetic and emotional values for visitors, interviewees added depth by emphasizing the intentional design elements that enable these experiences, such as footpaths, bridges and shared spaces. These infrastructural features are not just functional but are perceived as enablers of emotional connection and accessibility, aligning with the findings by Cheng et al. (2012) which infrastructure works as a CES enabler.

Additionally, they pointed out the growing diversity of the ARP's visitors, including local commuters, families, international tourists and young people. Some of the interviewees noted that although the ARP was initially planned for locals, it has attracted tourists too. One interviewee noted, '*If you design for locals, tourism will follow',* emphasizing the importance of inclusive design that prioritizes everyday users. This view aligns with the concept of place-making and the idea that culturally grounded, community-oriented spaces often hold broader

appeal (Russo et al., 2025). These insights reinforce the findings that scenery, calmness, and relaxation are central CES, especially among older and local visitors and suggest that planners should continue prioritizing comfort, visual access to the river, and leisure.

They also emphasized the importance of community involvement. Initiatives such as volunteer gardening at Ōtākaro Orchard, educational hubs and river maintenance by the city council near the river aim to promote collaborative stewardship, components of participatory governance and shared responsibility. These actions sustain both ecological and cultural values in the ARP over time.

However, they identified challenges too. They mentioned the presence of stormwater drains polluting the river, the absence of green roofs, permanent residential use, lack of lighting and features that support safe and enjoyable visits after dark. These concerns reinforce the need to align long-term planning with both ecological sustainability and user experience goals. For example, addressing lighting gaps could support both safety and CES delivery after dark, especially for younger visitors who expressed a stronger intention to revisit.

5.1.5. Comparison between interviewees views and visitor perspectives

Overall, the interviewees' perspectives align in general with the survey findings, especially in terms of the most valued CES. Both visitors and stakeholders identified relaxation, happiness and connection with nature as key experiences in the ARP. Stakeholders emphasized the importance of infrastructure elements in supporting these values which corresponds with the high satisfaction scores visitors attributed to walking tracks, cafes and footbridges.

However, differences were also observed. Stakeholders involved in community and environmental education emphasised cultural heritage and environmental awareness as key aspects of ARP's mission. In contrast, visitors rated spiritual and cultural CES relatively low, suggesting a potential disconnect between what visitors currently experience and what stakeholders hope to promote. This gap highlights an opportunity to better integrate cultural interpretation and environmental education into the site's infrastructure and programming.

Additionally, another difference concerns community involvement and stewardship. Stakeholders suggest that volunteering, gardening and restoration efforts are essential part of ARP maintenance, but most visitors focused on relaxation and enjoyment of the scenery in the river. This suggests the need to improve communication about opportunities for participation and to design experiences that invite deeper visitor involvement.

5.2. Limitations of the Study

Several limitations shaped this research and the conclusions that can be drawn. First, the data collection took place during May and June, which is early winter in New Zealand. This corresponds to out of season of tourism activity and likely influenced both visitor numbers and the types of activities undertaken, particularly those related to outdoor recreation and cultural programming. Similarly, Grzyb (2023) in his study in the Vistula River in Warsaw found that the urban riverscapes attract significantly more visitors in spring and summer than in autumn or winter, emphasising that seasonal period can substantially affect patterns of CES preferences and valuation.

Second, strict ethics protocols in New Zealand posed challenges during fieldwork. Approval processes slowed progress and restrictions limited interviews to managers rather than including tourists and tourism operators. This narrowed the scope of qualitative insights regarding CES delivery and experience. In addition, language barriers also played role in the

data collection. Offering translated survey instruments, such as a Chinese version of the questionnaire, would have enabled broader inclusion.

Third, weather conditions may have reduced participation in cultural and recreational activities. Some days the weather was rainy and the number of visitors was low, leading to an under-representation of CES related to cultural learning or recreational engagement.

Another limitation is the limited academic literature that explicitly links CES with specific elements of tourism or urban infrastructure. Cheng et al. (2021) highlights that most studies focus on certain CES categories like recreation and ecotourism, while other aspects remain less explored. This posed challenges in comparing the findings of this study to existing frameworks or results. While this reinforces the originality of the current research, it also highlights the need for further empirical studies to better understand how infrastructure shapes CES experiences in urban river environments.

Despite these limitations, the methods applied were appropriate given the study context. Extending fieldwork over additional days helped approach weather disruptions. The combination of quantitative and qualitative data allowed for triangulation of findings. Although ethics restrictions constrained access to certain groups, they also contributed to the credibility and transparency of the data collection process. The alignment of findings with existing literature further supports their reliability.

5.3. Future Research

Overall, the findings of this study specified clear trends within the acknowledged limitations. They underscore the importance of infrastructure and demographic considerations in CES delivery and valuation in ARP. However, future research would improve precision.

First, future studies conducted during peak tourism seasons (summer in New Zealand) would offer a more holistic understanding of how CES are valued across the year since cultural and recreational activities are more prevalent and visitor numbers are higher.

Second, expanding stakeholder engagement to include tourists and tourism operators would provide more insight into the CES delivery. Such perspectives could complement institutional or managerial viewpoints.

Third, the use of multilingual data collection tool would help including a diverse visitor population, particularly those who may not speak English as a first language. Finally, longitudinal studies could identify more complete data for CES valuation regarding to infrastructure developments. Exploring visitor experiences before and after developments such as the lighting project or improved public transport options could reveal how specific infrastructure elements influence CES delivery and place attachment over time.

6. Conclusions

This thesis assessed the perceived cultural ecosystem services (CES) of a post-earthquake urban green and blue space using Avon River Prestrict (ARP) in Christchurch, New Zealand, as a case study. ARP offers visitors a mix of recreational, aesthetic and reflective opportunities, enabling them to connect with the city's identity after the earthquakes. Furthermore, it offers opportunities for outdoor recreational activities, such as recreational kayaking, cycling and punting.

Most respondents valued aesthetic and emotional CES the most. Enjoyment of beautiful scenery and the sense of happiness by the landscape receive the highest ratings. In contrast, CES linked to cultural learning and spiritual connection receive lower ratings but showed higher standard deviations. Additionally, tourists value cultural learning and heritage more than locals, while locals expressed stronger spiritual and emotional connections to the cite. This means that ARP is not only a place for recreation, but also supports cultural, emotional and reflective experiences for different groups of people.

Sociodemographic characteristics, particularly age and gender significantly influence CES preferences. Older visitors value spiritual, emotional and restorative CES more, while younger visitors prioritize other aspects such as scenery. Female responders rate CES related to emotion, creativity, nature appreciation and cultural heritage higher than male visitors. In contrast, education and income have minimal impact on CES preferences.

Infrastructure emerged as a key enabler of CES delivery. Infrastructure elements supporting leisure and navigation, especially walking tracks, cafes and footbridges are positively assessed by the visitors. In contrast, cycle paths, public transportation and traffic signage are rated lower, suggesting a disconnect between functional infrastructure and the experiential qualities that shape CES. These findings highlights that infrastructure is seen as playing a crucial role in shaping CES delivery by improving accessibility, comfort and orientation.

Interviewees' views aligned with visitor responses, emphasizing the importance of infrastructure that supports relaxation, well-being and nature connection. While infrastructure supports relaxation, well-being, and nature connection, stakeholders place greater emphasis than visitors on values such as cultural learning, environmental awareness, and community involvement. Identified planning challenges included pollution from stormwater drains, limited night-time features, lack of residential integration, and funding constraints for maintenance and improvements.

Overall, the findings of this study highlight the importance of designing and managing urban river spaces in ways that reflect the diverse needs, values and motivations of their visitors. By integrating inclusive infrastructure, recognizing cultural variation and promoting co-stewardship, spaces like ARP can evolve into meaningful and sustainable place that serve both residents and tourists. These insights contribute to ongoing discussions on post-disaster regeneration, nature-based tourism and CES delivery in urban planning.

6.1. Recommendations

Identifying CES provides important support for efforts to raise public awareness of CES. CES values are also an important consideration for helping policy development and environmental managers to ensure sustainable use of ARP for both current and future generations. In the context of the ARP, the following recommendations are proposed for urban planners, site managers and researchers based on the findings of this study.

The findings suggest that future planning in the ARP would benefit from continuing to support the most valued CES identified in this study, such as relaxation, happiness, and sense of place. These experiences are linked with infrastructure elements that already support highly valued CES for example walking tracks, cafes and footbridges. Investing in these features may enhance both everyday use and long-term visitor engagement.

While cycling paths, public transportation and parking scored lower in relation to CES, they still contribute to accessibility. The results suggest that how visitors travel to the ARP can influence the way they experience certain CES. Walking to the site was linked with stronger

feelings of relaxation and sense of place, while those who cycled reported higher levels of creativity. Public transport users also showed strong intentions to revisit. These findings imply that different travel modes may support different emotional or cultural experiences. This highlights the role of accessibility and mobility in shaping how visitors engage with the landscape.

Management bodies of the ARP should consider strengthening both less prominent and already well-appreciated CES. While CES such as cultural learning and spiritual connection received lower average ratings, their higher standard deviations indicate that these values matter deeply to specific visitor groups. Designing targeted cultural and educational initiatives (e.g., signage, guided tours, interactive installations) could help engage these underrepresented perspectives and support a more inclusive experience

Additionally, upcoming initiatives such as '*Lighting Festival*', organised by the City Council and the Arts Centre, is an opportunity to combine cultural heritage, artistic expression and community engagement.

For future researchers, it is recommended to focus on long term studies to examine how CES values change over time with new infrastructure and seasonal variation. Fieldwork conducted during peak tourism periods would also help capture diverse CES experiences related to recreation and cultural participation.

Furthermore, future studies could explore how visitors perceive their role in environmental stewardship and identify effective strategies for encouraging public participation in river conservation. Collaborating with stakeholders involved in the ARP's management, such as city council staff, educators, or local NGOs, may help identify strategies that are both practical and widely supported. Given that almost all interviewees highlighted concerns about poor water quality and its impact on visitor experience, future research could examine the extent to which visitors are willing to contribute to environmental improvement efforts around the ARP. Understanding these dynamics can support participatory governance and long-term environmental sustainability of the ARP.

References

Amoiradis, C., Velissariou, E., & Poulios, T. (2023). Overview of sustainable development and promotion in tourism. *Journal of Economics and Business, 6(3).* https://doi.org/10.31014/aior.1992.06.03.516.

Ausseil, A. E., Greenhalgh, S., Booth, P., Lavorel, S., & Collins, A. (2023). A novel approach to identify and prioritize the connections between nature and people's Well-Being in New Zealand. *Frontiers in Environmental Science, 10.* https://doi.org/10.3389/fenvs.2022.782229.

Atsiz, O., & Akova, O. (2021). Cultural destination attributes, overall tourist satisfaction and tourist loyalty: First Timers versus Repeaters. *Advances in Hospitality and Tourism Research (AHTR), 9(2), 268–291*. https://doi.org/10.30519/ahtr.894577.

Baggethun, E. G., Murlis, J., White, P., Thornes, J., Azapagic, A., Dennis, J., & Norris, K. (2010). Ecosystem services. *In The Royal Society of Chemistry eBooks.* https://doi.org/10.1039/9781849731058.

Brown, B., Altman, I., & Werner, C. (2012). Place attachment. In *S. J. Smith (Ed.), International encyclopedia of housing and home* (pp. 183–188). Elsevier. https://doi.org/10.1016/B978-0-08-047163-1.00543-9

Canterbury Earthquake Recovery Authority (2012). *Christchurch central recovery plan summary.* Christchurch: Canterbury Earthquake Recovery Authority.

Castañeda, N. R., Pineda-Pinto, M., Gulsrud, N. M., Cooper, C., O'Donnell, M., & Collier, M. (2024). Exploring the restorative capacity of urban green spaces and their biodiversity through an adapted One Health approach: A scoping review. *Urban Forestry & Urban Greening, 100, 128489.* https://doi.org/10.1016/j.ufug.2024.128489.

Cheng, X., Van Damme, S., & Uyttenhove, P. (2021). A review of empirical studies of cultural ecosystem services in urban green infrastructure. *Journal of Environmental Management, 293, 112895.* https://doi.org/10.1016/j.jenvman.2021.112895.

Daniel, T. C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J. W., Chan, K. M. A., Costanza, R., Elmqvist, T., Flint, C. G., Gobster, P. H., Grêt-Regamey, A., Lave, R., Muhar, S., Penker, M., Ribe, R. G., Schauppenlehner, T., Sikor, T., Soloviy, I., Spierenburg, M., Von Der Dunk, A. (2012). Contributions of cultural services to the ecosystem services agenda. *Proceedings of the National Academy of Sciences, 109(23), 8812–8819*. https://doi.org/10.1073/pnas.1114773109

Denney, J. (2015). Avon River Precinct: Shared zones for Christchurch. IPENZ Transportation Group Conference. https://trid.trb.org/view/1357896.

Deri, M. G., Chiti, L., & Ciuffoletti, A. (2023). A sustainable approach to tourist signage on heritage trails. *Sustainability, 15(23), 16251.* https://doi.org/10.3390/su152316251.

Dou, Y., Zhen, L., De Groot, R., Du, B., & Yu, X. (2017). Assessing the importance of cultural ecosystem services in urban areas of Beijing municipality. *Ecosystem Services, 24, 79–90.* https://doi.org/10.1016/j.ecoser.2017.02.011.

Dușcu, D., & Rîșnoveanu, G. (2025). Understanding visitor preferences: perceived importance of anthropogenic and natural forest features in supplying cultural ecosystem services. *Forest Ecosystems, 100306.* https://doi.org/10.1016/j.fecs.2025.100306.

Fish, R., Church, A., & Winter, M. (2016). Conceptualising cultural ecosystem services: A novel framework for research and critical engagement. *Ecosystem Services, 21, 208–217.* https://doi.org/10.1016/j.ecoser.2016.09.002.

Grzyb, T. (2023). Mapping cultural ecosystem services of the urban riverscapes: the case of the Vistula River in Warsaw, Poland. *Ecosystem Services, 65, 101584.* https://doi.org/10.1016/j.ecoser.2023.101584.

Jiang, S., & Liu, J. (2024). Comparative study of cultural landscape perception in historic districts from the perspectives of tourists and residents. *Land, 13(3), 353.* https://doi.org/10.3390/land13030353.

Li, J., Xu, H., Ren, M., Duan, J., You, W., & Zhou, Y. (2024). Knowledge Mapping of Cultural Ecosystem Services Applied on Blue-Green Infrastructure - A Scientometric Review with CiteSpace. *Forests, 15(10), 1736.* https://doi.org/10.3390/f15101736.

Liu, T., Yunos, M. Y. M., Muthuveeran, A. a. S., Mundher, R., & Ismail, N. A. (2024). Cultural elements' influence on visual preferences in urban waterfronts' walkways in Malaysia. *Frontiers in Built Environment, 10.* https://doi.org/10.3389/fbuil.2024.1393187

McDonald, G., Patterson, M. G., & Economics, N. Z. C. F. E. (2008). *Canterbury Region's "hidden" Economy: Assessing the Value of the Region's Ecosystem Services and Biodiversity.*

Meurk, C. D., Blaschke, P. M., & Simcock, R. C. (2013). Ecosystem services in New Zealand cities. *Landcare Research.* https://doi.org/10.7931/DL1B59.

Milcu, A. I., Hanspach, J., Abson, D., & Fischer, J. (2013). Cultural Ecosystem Services: A Literature Review and Prospects for Future research. *Ecology and Society, 18(3).* https://doi.org/10.5751/es-05790-180344.

Millennium Ecosystem Assessment. (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.

Pinheiro, R. O., Triest, L., & Lopes, P. F. (2021). Cultural ecosystem services: Linking landscape and social attributes to ecotourism in protected areas. *Ecosystem Services, 50, 101340*. https://doi.org/10.1016/j.ecoser.2021.101340.

Plieninger, T., Dijks, S., Oteros-Rozas, E., & Bieling, C. (2013). Assessing, mapping, and quantifying cultural ecosystem services at community level. *Land Use Policy*, *33*, 118–129. https://doi.org/10.1016/j.landusepol.2012.12.013.

Potter, S., Becker, J., Johnston, D., & Rossiter, K. (2015). An overview of the impacts of the 2010-2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction, 14, 6–14*. https://doi.org/10.1016/j.ijdrr.2015.01.014.

Ram, Y., & Smith, M. K. (2019). An assessment of visited landscapes using a Cultural Ecosystem Services framework. *Tourism Geographies, 24(4–5), 523–548.* https://doi.org/10.1080/14616688.2018.1522545.

Ramírez-Guerrero, G., García-Onetti, J., Arcila-Garrido, M., & Chica-Ruiz, J. A. (2021). A Tourism Potential Index for Cultural Heritage Management through

the Ecosystem Services Approach. *Sustainability, 13(11), 6415.* https://doi.org/10.3390/su13116415.

Regenerate Christchurch. (2019). *Ōtākaro Avon River Corridor Regeneration Plan.* Christchurch, New Zealand: Regenerate Christchurch. https://creativecommons.org/licenses/by/4.0/.

Romanazzi, G. R., Koto, R., De Boni, A., Palmisano, G. O., Cioffi, M., & Roma, R. (2023). Cultural ecosystem services: A review of methods and tools for economic evaluation. *Environmental and Sustainability Indicators, 20, 100304.* https://doi.org/10.1016/j.indic.2023.100304.

Russo, A. P., Rabbiosi, C., Hoed, W. D., & Paulino, I. (2025). Beyond destination accessibility: tourism infrastructure across mobilities, technologies and embodiments. *Applied Mobilities, 1–12.* https://doi.org/10.1080/23800127.2025.2510124.

Sánchez, M. L., Cabrera, A. T., & Del Pulgar, M. L. G. (2020). The potential role of cultural ecosystem services in heritage research through a set of indicators. *Ecological Indicators, 117, 106670.* https://doi.org/10.1016/j.ecolind.2020.106670.

Schröter, M., Van Der Zanden, E. H., Van Oudenhoven, A. P., Remme, R. P., Serna-Chavez, H. M., De Groot, R. S., & Opdam, P. (2014). Ecosystem Services as a Contested Concept: A Synthesis of Critique and Counter-Arguments. *Conservation Letters, 7(6), 514–523*. https://doi.org/10.1111/conl.12091.

Smith, M. K., & Csurgó, B. (2018). Tourism, wellbeing and cultural ecosystem services: a case study of Örség National Park, Hungary. In *CAB International eBooks* (pp. 26–38). https://doi.org/10.1079/9781786391315.0026.

Simmons, D. G. (2013). *Tourism and ecosystem services in New Zealand.* Manaaki Whenua Press.

Stewart, G. H., Ignatieva, M. E., Meurk, C. D., & Earl, R. D. (2004). The re-emergence of indigenous forest in an urban environment, Christchurch, New Zealand. *Urban Forestry & Urban Greening, 2(3), 149–158.* https://doi.org/10.1078/1618-8667-00031.

Su, Y., Zhu, C., Lin, L., Wang, C., Jin, C., Cao, J., Li, T., & Su, C. (2022). Assessing the cultural ecosystem services value of protected areas considering stakeholders' preferences and Trade-Offs—Taking the Xin'an River Landscape Corridor Scenic area as an example. *International Journal of Environmental Research and Public Health, 19(21), 13968.* https://doi.org/10.3390/ijerph192113968.

Sun, M., Zhang, X., & Ryan, C. (2014). Perceiving tourist destination landscapes through Chinese eyes: The case of South Island, New Zealand. *Tourism Management, 46, 582–595*. https://doi.org/10.1016/j.tourman.2014.08.010.

Taff, B. D., Benfield, J., Miller, Z. D., D'Antonio, A., & Schwartz, F. (2019). The role of tourism impacts on cultural ecosystem services. *Environments, 6(4), 43.* https://doi.org/10.3390/environments6040043.

Tang, X., Wang, D., Sun, Y., Chen, M., & Waygood, E. O. D. (2020). Choice behavior of tourism destination and travel mode: A case study of local residents in

Hangzhou, China. *Journal of Transport Geography, 89, 102895.* https://doi.org/10.1016/j.jtrangeo.2020.102895.

Te ara Ōtākaro Avon River Trail. (n.d.). Christchurch City Council. https://ccc.govt.nz/parks-and-gardens/explore-parks/waterways/avon-river/te-ara-trail.

Thiele, J., Albert, C., Hermes, J., & Von Haaren, C. (2020). Assessing and quantifying offered cultural ecosystem services of German river landscapes. *Ecosystem Services, 42, 101080*. https://doi.org/10.1016/j.ecoser.2020.101080.

Tian, T., Yu, T., Qian, Y., Deng, L., & Che, Y. (2024). Assessing public perceptions of the cultural ecosystem services waterfront spaces provide along the Huangpu River in Shanghai, China, in support of urban waterfront planning and design. *Socio-Ecological Practice Research, 6(141–154).* https://doi.org/10.1007/s42532-024-00181-1.

Veerkamp, C. J., Schipper, A. M., Hedlund, K., Lazarova, T., Nordin, A., & Hanson, H. I. (2021). A review of studies assessing ecosystem services provided by urban green and blue infrastructure. *Ecosystem Services, 52, 101367.* https://doi.org/10.1016/j.ecoser.2021.101367.

Wang, Y., Xu, Q., Tian, H., & Yin, P. (2024). Positive social mentalities and quality of spiritual living in old age: Roles of social participation and life meaning. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 61, 1–9.* https://doi.org/10.1177/00469580241282061

WSP. (n.d.). *Avon River Precinct*. WSP. https://www.wsp.com/en-gl/projects/avon-river-precinct.

Zhang, K., Tang, X., Zhao, Y., Huang, B., Huang, L., Liu, M., Luo, E., Li, Y., Jiang, T., Zhang, L., Wang, Y., & Wan, J. (2022). Differing perceptions of the youth and the elderly regarding cultural ecosystem services in urban parks: An exploration of the tour experience. *The Science of the Total Environment, 821, 153388.* https://doi.org/10.1016/j.scitotenv.2022.153388.

Tables and Appendices

Appendix A. Questionnaire.

1. **What is your age group?**
   18–28 years old
   29–44 years old

45–60 years old
61–79 years old
80+ years old

2. What is your gender?

Female
Male
Non-Binary
Another gender: _____
Prefer not to say

3. What is your nationality?

4. What best describes you as a visitor today?

I am an international tourist (visiting from outside New Zealand)
I am a domestic tourist (visiting from another part of New Zealand)
I am a local visitor (I live in Christchurch or the nearby area)

5. Educational level completed:

No certified education
Primary studies: (Basic general level)
Secondary level: (High school)
University level: (University Diploma or First Degree)
University level: (Postgraduate degree, Master's or PhD)

6. Which of the following best describes your annual income level?

Far below average
Below average
Average
Above average
Far above average

7. Who are you traveling with today?

Alone
With a partner
With family
With friends
With a tour group
Other: _____

8. What is your primary reason for visiting Avon River Precinct?

Leisure
Education
Landscape use
Recreation
Relaxation
Inspiration for cultural art and design
Spiritual or religious inspiration
Cultural heritage and identity
Part of my week
Other: Please state

9 Please indicate how strongly you agree or disagree with the following statements about your visit to Christchurch's cultural and natural

landscapes. (1: strongly agree, 2: disagree, 3: somewhat disagree, 4: Neutral, 5: Somewhat agree, 6: Agree, 7: Strongly agree)

I came here to enjoy the beautiful scenery or views
I came here to enjoy the plants and flowers
I came here to view wildlife/animals
I came here because of the interesting cultural heritage attractions
I came to this landscape for spiritual reasons
Being in this landscape makes me feel happy
I find this landscape awe-inspiring
This landscape makes me feel creative (e.g. to write, draw, paint or make music)
I feel a close connection to nature here
I feel connected to a special energy here
This landscape is unique and unlike other landscapes that I have been to
This landscape is linked to peoples' cultural traditions
I feel a strong sense of place in this landscape
I came here to learn something new about the natural environment
I came here to learn something new about cultural traditions
I came here to enjoy recreational activities linked to fitness or sports (e.g. hiking, biking, climbing, swimming)
I came here to feel calmer
I came here to reduce my stress levels
I came here to relax
I would like to visit this landscape again

10. To what extent did your visit to Avon River Precinct meet your expectations?

1: Much lower than expected
2: Lower than expected
3: Slightly lower than expected
4: As expected
5: Slightly better than expected
6: Better than expected
7: Far exceeded expectations

11. How did you travel to the Avon River Precinct today?

On foot
By bicycle or e-scooter
By private car
By public transport (e.g., bus, tram)
By tour bus or group transport
Other: _____

12 To what extent did the following elements contribute to your overall experience in the Avon River Precinct?

(1: not at all, 2: very little, 3: a little, 4: moderately, 5: quite a bit, 6: a lot, 7: very much, N/A)

Walking tracks
Cycle Path
Parking
Footbridges
Signage for learning
Gathering spaces
Shared Zone Traffic Signs
Public transportation
Cafes, bars and restaurants

Appendix B. Flyer with the QR code linked to the questionnaire.

Appendix C. Questions from the interviews with stakeholders.

Section 1: Cultural Ecosystem Services (CES) - Perceptions & Values

1. In your view, what kinds of non-material benefits do visitors typically gain from the Avon River Precinct? (e.g., relaxation, inspiration, sense of place, learning)

2. Have you observed changes in how people interact with the river since the earthquakes?

Section 2: Visitor Diversity & Use Patterns

3. What visitor profile you had in mind when developing the area, and what facilities resulted from that/those target profile(s)?
4. a. What kinds of visitors (e.g., locals, domestic tourists, international tourists, different age groups) do you typically see using the Precinct?
   b. Are there any strategies in place to attract or engage specific visitor groups?
5. Do you notice differences in how these groups use or value the space?
6. Do you receive any feedback or requests from visitors about their experience?

Section 3: Infrastructure & CES Support

7. What infrastructure elements (e.g., signage, benches, walking paths) are seen as key to supporting the visitor experience?
8. How is accessibility and inclusivity considered in the design and provision of infrastructure and recreational opportunities?
9. Are there any infrastructure elements that you think are missing or need improvement?

Section 4: Planning, Sustainability & Inclusion

10. What are the main goals of the Avon River Precinct redevelopment?
11. How do you involve local communities and international tourists in the management and planning of the Precinct?
12. What challenges have you faced in managing the Precinct, and how have they been addressed?
13. Are there any upcoming projects or events aimed at enhancing the visitor experience?

Appenidix D. Research Questions and Research Items with sources.

RQ	RESEARCH ITEMS	INDICATOR	SOURCE
RQ I	**Types of CES**		
	Multiple choice	Leisure, Education, Landscape use, Recreation, Relaxation, Inspiration for cultural art and design, Spiritual or religious inspiration, Cultural heritage and identity, Part of my weekly/daily routine	(Dou, et al., 2017)
	Likert-7 scale ratings	· I came here to enjoy the beautiful scenery or views · I came here to enjoy the plants and flowers · I came here to view wildlife/animals · I came here because of the interesting cultural heritage attractions · I came to this landscape for spiritual reasons · Being in this landscape makes me feel happy · I find this landscape awe-inspiring · This landscape makes me feel creative (e.g. to write, draw, paint or make music) · I feel a close connection to nature here · I feel connected to a special energy here	(Ram & Smith, 2019)

		· This landscape is unique and unlike other landscapes that I have been to · This landscape is linked to peoples' cultural traditions · I feel a strong sense of place in this landscape · I came here to learn something new about the natural environment · I came here to learn something new about cultural traditions · I came here to enjoy recreational activities linked to fitness or sports (e.g. hiking, biking, climbing, swimming) · I came here to feel calmer · I came here to reduce my stress levels · I came here to relax · I would like to visit this landscape again	
	Multiple choice	Expectation on Avon River	(Atsiz & Akova, 2021)
RQ II	**Visitor profile**		
	Multiple choice	Age, Gender, Nationality, Education	(Ram & Smith, 2019)
		Income, Visitor type	(Pinheiro et al., 2021)
		Group travel	(Tang et al., 2020)
RQ III	**Visitors' perception in infrastructure**		
	Multiple choice	Travel transportation	(Tang et al., 2020)
	Likert-7 scale ratings	Walking tracks, Cycle Path, Parking, Footbridges, Signage for learning, Gathering spaces, Shared Zone Traffic, Signs, Public transportation, Cafes, bars and restaurants	(Ramírez-Guerrero et al. 2021; Denney, 2015)
RQ IV	**Perspectives from stakeholders**		
	Semi structed interviews	Questions regarding CES - Perceptions & Values, Visitor Diversity & Use Patterns, Infrastructure & CES Support, Planning, Sustainability & Inclusion	By the author

Appendix E. Statistical techniques, variables involved and the purpose of each test.

RQ	**VARIABLES**	**TYPE OF DATA**	**STATISTICAL TEST**	**PURPOSE**
RQ I	CES rating scores (Likert scale)	Ordinal	Descriptive statistics (Means and SDs)	To identify the most frequently valued CES

	Visitor's reason for visiting	Nominal	One-Way ANOVA	Tested whether reason affects CES valuations
			Post Hoc Test: Tukey HSD	Applied when ANOVA was significant
			Effect Size Measure: Eta squared (η^2)	
RQ II	Age	Ordinal	One-Way ANOVA + Post hoc: Tukey HSD	To assess differences in CES values by demographic group
	Gender	Nominal (binary)	Independent Samples t-test (Male vs. Female only) + Effect Size: Cohen's d	
	Education	Nominal (3 levels: Low / Medium / High)	One-Way ANOVA	
	Income	Nominal	One-Way ANOVA	
	Nationality	Nominal (Grouped as Oceanian, European, Other International)	One-Way ANOVA + Post hoc: Tukey HSD, Effect Size: Eta squared (η^2)	
	Visitor Type	Nominal (Grouped as Tourists and Locals)	Independent Samples t-test + Effect Size: Cohen's d	
RQ III	Mode of Transportation	Nominal	Descriptive Frequency Analysis	To examine associations between infrastructure satisfaction and CES experience
	Infrastructure Evaluation (Likert scale)	Scale	Descriptive Statistics (Means and SDs for each infrastructure element) + Bar Chart	
	CES by Transport Mode	Mixed	Cross-tabulation + Chi-Square Tests + Effect Size: Cramer's V	
RQ IV	Answers form the interviews	Qualitative (textual data)	Thematic Analysis	Insights fro infrastructure planning and perceived CES benefits around the Avon River Precinct

Appendix F. Mean Ratings of Tourism Infrastructure Elements Based on Visitor Assessment (1 = Not at All, 7 = Very Much, 0=N/A).

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
WalkingTracks	211	.00	7.00	5.4550	1.73524
CyclePath	207	.00	7.00	2.7971	2.40497
Parking	209	.00	7.00	2.8230	2.38026
Footbridges	211	.00	7.00	5.0332	1.81629
Signage	211	.00	7.00	4.0047	2.07364
GatheringSpace	210	.00	7.00	4.1429	2.13393
TrafficSigns	209	.00	7.00	3.1531	2.18066
PublicTransportation	210	.00	7.00	2.9667	2.48899
CafesBarsRestaurants	212	.00	7.00	4.9434	2.17626
Valid N (listwise)	204				

Appendix G. Visitor transportation modes to the Avon River Precinct. Frequencies and percentages reflect valid responses (N = 211), with walking and private car being the most common travel methods.

How did you travel to the Avon River Precinct today?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	On foot	90	41.9	42.7	42.7
	By bicycle or e-scooter	14	6.5	6.6	49.3
	By private car	80	37.2	37.9	87.2
	By public transport (e.g. bus, tram)	23	10.7	10.9	98.1
	By tour bus or group transport	3	1.4	1.4	99.5
	Other (please state)	1	.5	.5	100.0
	Total	211	98.1	100.0	
Missing	System	4	1.9		
Total		215	100.0		

Appendix H. Use of AI.

In this thesis, ChatGPT was used as a support tool for vocabulary improvement and grammar checking. The tool was employed to refine sentence structure and improve word choice in various sections of the report. Below is a summary of how ChatGPT was utilized:

Purpose: ChatGPT was used to suggest alternative phrasing for complex sentences and to check for grammatical accuracy.

Prompts Used:

- Suggest a more concise way to phrase this sentence
- Check the grammar and clarity of this paragraph
- Is this correct grammatically?

Impact on the Work: The suggestions provided by ChatGPT were critically evaluated and incorporated only when deemed appropriate. All final decisions regarding the text were made by the author.

No content generated by ChatGPT was directly copied into the thesis without modification or critical review.