Author/s:
Parker, D;Soanes, K;Roudavski, S

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Learning with owls: Human–wildlife coexistence as a guide for urban design

Dan Parker | Kylie Soanes | Stanislav Roudavski

The University of Melbourne, Parkville, Victoria, Australia

Correspondence
Stanislav Roudavski
Email: stanislav.roudavski@deepdesignlab.online

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Abstract

1. Urban encroachment increasingly threatens wildlife survival and well-being, underscoring the need for design and management to consider nonhuman species. This article analyses cases of positive coexistence between humans and Powerful Owls (*Ninox strenua*) to identify key challenges, opportunities, objectives and practical strategies for urban planning. As a species historically linked to old-growth forests, powerful owls now inhabit urban environments but face significant human-induced pressures, including diminishing numbers of nesting sites.
2. To explore the potential for positive coexistence, we conducted 10 in-depth interviews with 19 individuals experienced in observing and advocating for powerful owls. These interviews took place either online or during guided walks through owl habitats in Australian cities. This approach allowed us to supplement existing scientific research, highlight future research areas and document human–owl interactions across three themes. First, participants identified barriers to improving coexistence, including insufficient consideration of owls in urban decision-making, conflicts between human activities and owl conservation, and the need for improved knowledge sharing. Second, participants' experiences demonstrated that greater knowledge of owl behaviour and habitat preferences can play a vital role in fostering positive coexistence. Third, participants provided specific examples of positive coexistence, illustrating how and why people form relationships with urban wildlife.
3. Building on these findings, we propose urban management strategies that incorporate contributions of nonhuman stakeholders, empowering them to influence decision-making. Such strategies can promote positive coexistence, facilitate knowledge exchange and guide informed actions.
4. This research can provide valuable guidance for land managers, conservationists, policymakers, ecologists, designers and researchers in environmental humanities working to create inclusive, more-than-human urban environments. This guidance includes (a) methods for integrating nonhuman stakeholders into design, planning, management and development processes; (b) approaches to redefining landscape features as catalysts for positive human–wildlife interactions; and (c) examples of

technical systems that enhance information flow among stakeholders, encouraging innovation, the adoption of new solutions and accountability.

KEYWORDS
conservation management, convivial conservation, in-context interviews, more-than-human design, multispecies cohabitation, positive human–wildlife coexistence, powerful owl, urban biodiversity

1 | INTRODUCTION

Urban design increasingly aims to accommodate wildlife, yet alignment between human and wildlife interests remains a significant challenge. Compounding this difficulty is the limited availability of detailed information about wildlife behaviour, particularly in novel ecosystems. Without such data, it is difficult to propose effective design improvements or evaluate their success. To address this gap, this article incorporates insights from human experts who have spent years observing and advocating for powerful owls (*Ninox strenua*, hereafter referred to as 'owls'). These insights, grounded in experiences of positive coexistence, can inform the collaborative development of urban planning strategies that address both human and wildlife needs. Such collaborations stand to benefit from the knowledge of dedicated volunteers, and this article seeks to foreground their expertise.

1.1 | Positive human–wildlife coexistence as a goal for urban living

The concept of positive human–wildlife coexistence offers a framework for designing cities in which different beings can live well together. As discussed by Pooley (2021), coexistence remains an open concept with no fixed theory, definition or set of principles, a flexibility that makes it applicable across various strands of conservation research. It represents a progression from earlier notions of human–wildlife interactions and, prior to that, human–wildlife conflict. The relevance of coexistence lies in the growing recognition of the need to shift focus from negative interactions with wildlife towards beneficial aspects of coexistence. Fundamentally, coexistence involves rethinking human relationships with wildlife in an era when resource sharing is both inevitable and desirable.

Ecological definitions of positive coexistence suggest that it occurs when co-present species engage in mutualistic (reciprocal benefit), commensal (one-way benefit) or neutral (no harm) interactions (Gao & Clark, 2023). In our view, positive coexistence describes enacted relationships and processes where compromise is necessary due to the co-presence of diverse needs and capabilities, including health, growth, reproduction, behaviour, resilience, social interaction and emotion (Parker, Soanes, & Roudavski, 2022). Here, 'positive' implies resilience and long-term viability, emphasising shared flourishing. Key characteristics of positive coexistence include respect, knowledge and agency (Bhatia, 2021; Pooley, 2021). It seeks to maximise collective thriving—defined as the ability of living beings to express their capabilities in a just and sustainable manner—addressing both human and nonhuman needs (Carter & Linnell, 2023). In contrast, negative coexistence denotes vulnerability and injustice. While environmental justice traditionally focuses on human concerns, ecological justice broadens this scope to include nonhuman life (Baxter, 2005; Celermajer et al., 2020). Related concepts include 'tolerance', 'acceptance' and 'cohabitation'. These approaches emphasise the equitable and just design of urban ecosystems to support the well-being of all urban dwellers (Hes & Bush, 2018; Roudavski, 2020, 2024).

Urban wildlife experiences both positive and negative impacts from human proximity. Some species benefit from urban environments, while others face significant threats from noise, light pollution, human activity, vehicle collisions, window strikes and attacks by introduced species (Taylor-Brown et al., 2019). Additionally, human concerns about disease transmission, attacks and property damage can hinder coexistence (Soulsbury & White, 2016). These issues necessitate strategies that not only mitigate conflicts but also work to cultivate the benefits (Frank & Glikman, 2019).

Facilitation of positive human–wildlife coexistence is increasingly important across disciplines, including conservation biology, urban ecology, urban planning, architecture, environmental humanities, ethics, geography, design and computing (Heitlinger et al., 2024). In response, research in many fields highlights the importance of fostering human–wildlife relationships (see Ives et al., 2017 for a review). Relationships here refer to knowledge of, care for and kinship with more-than-human beings in ways that have been integral to many Indigenous and traditional communities (Bawaka Country et al., 2016). Fostering the care for animals, plants, water and land that has long been integral to many Indigenous cultures is increasingly becoming a priority for cities worldwide (Mata et al., 2020). Experts increasingly advocate urban design that nurtures positive relationships between human and nonhuman inhabitants (Hernandez-Santin et al., 2022; Rigby, 2018; Weisser & Hauck, 2017). Cultivation of such relationships requires recognising that humans and wildlife not only coexist but also actively shape shared spaces together (Edelblutte et al., 2023; Roudavski, 2021). Humans altering architectural designs to support nesting, and birds adapting their nesting habits to suit urban settings, is an example of how species can modify their behaviour in response to one another (Sueur & Huffman, 2024). Designing for positive human–wildlife coexistence in cities is an emerging field that demands innovative methodologies and imaginative yet practical experiments (Roudavski, 2024). These efforts

should rebalance existing priorities by considering nonhuman needs and acknowledging contributions of nonhuman beings to shared urban living. In response to the limited number of studies on positive coexistence compared with conflict (Bhatia, 2021; Pooley, 2021) and the need for better translation of concepts into practice (Gao & Clark, 2024), our work seeks to highlight cases of positive human–wildlife coexistence that can inform design.

1.2 | Human–owl coexistence as a challenge for design and management

To explore the potential for positive coexistence, this article examines human–owl relationships. We focus on the powerful owl (*Ninox strenua*), Australia's largest owl species and an apex predator endemic to the country's south-eastern and eastern regions. Powerful owls represent a challenging yet viable case for studying urban coexistence, as they now inhabit city environments despite being historically associated with old-growth forests (Cooke et al., 2018). Our research aimed to enhance understanding of the (1) challenges, (2) opportunities and (3) examples of human–owl coexistence, with the overarching goal of informing design approaches that aim to support positive interactions between humans and wildlife in urban environments.

1.2.1 | What are the challenges of human–owl coexistence?

Human actions—such as urbanisation, deforestation and agricultural land clearing—have reduced suitable nesting areas for powerful owls. These and other pressures have led to their inclusion on lists of threatened species with a status of vulnerable in the states of Victoria, New South Wales and Queensland (NSW Government, 2024; Queensland Department of Environment and Science, 2024; The State of Victoria Department of Energy, Environment and Climate Action, 2024). Although these owls find abundant prey in cities, urban settings bring new obstacles, including limited roosting options (Bradsworth et al., 2021), a scarcity of nesting sites and frequent disturbances (Isaac et al., 2014). For example, exposure to toxic substances can cause secondary poisoning when owls consume contaminated prey (Cooke et al., 2022). Urban development often progresses with little consideration for their needs—even in instances like the Powerful Owl Park in Melbourne, recently completed by Development Victoria (2024).

1.2.2 | How can humans and owls achieve better coexistence?

To envision better futures for human–wildlife coexistence, planners, designers and managers need a better understanding of how humans and powerful owls can coexist more positively. Achieving this understanding requires diverse knowledge sources. Scientific research provides insights into owl behaviours, including diet, home range, habitats, interspecies interactions, movement and threats (Bradsworth et al., 2017). Citizen scientists contribute valuable data on territories and breeding successes (Parsons, 2023). Yet, many aspects of owl behaviours remain unknown due to their cryptic, nocturnal and elusive nature (Olsen, 2011). Notably, research on relationships between humans and powerful owls is sparse. Our earlier work researched this gap to imagine possible urban futures in which humans and powerful owls coexist (Parker, Roudavski, Isaac, & Bradsworth, 2022; Parker, Soanes, & Roudavski, 2022). During this work, we realised that much relevant knowledge is not shared or is shared only informally between close acquaintances, in personal communications, or via forums, such as Birds in Backyards.

1.2.3 | What are the outcomes of positive human–owl coexistence?

Cases of positive human–owl coexistence do occur but remain rare and often undocumented. Examples include powerful owls raising chicks in residential backyards (Gregory, 2019), humans finding solace in regular owl observations (Luff, 2024) and community initiatives that rescue powerful owls, set up informative signage, feature owls in local media and organise events (Cameron & Bianchino, 2017). Devoted individuals, such as volunteers with the Powerful Owl Project, closely follow and assist many powerful owls. These volunteers could benefit from further support in organising, sharing and acting on their knowledge (Parsons, 2023; Zeleny, 2023).

Like all living organisms (Odling-Smee, 2024), owls co-construct their niches and co-evolve with them. Their behaviours provide feedback on environmental disturbances and alterations while also demonstrating novel ways of using structures, such as fences and wires, and coexisting with previously unencountered species, including pigeons, dogs and rats. As apex predators, owls influence urban ecosystems by participating in trophic and detrital pathways, shaping their environment and potentially enhancing biodiversity (Clemens et al., 2020; Newton et al., 2002). They also contribute to human well-being, aligning with the principles of 'One Health' or 'ecological health'. For example, like other organisms, owls likely contribute to richer microbial environments that enhance human resistance to noncommunicable diseases (Mills et al., 2017), regulate zoonotic infections (Aguirre, 2002), encourage outdoor activities and strengthen regional engagement and solidarity (Stanton et al., 2023). As a well-known flagship species, powerful owls motivate public education and engagement with urban biodiversity, help mobilise commercial and governmental support, and—through these combined effects—enhance participatory urban design (Powerful Owl Coalition, 2018). However, many of these roles require further research.

In response to these challenges, this article gathers first-hand accounts of positive human–owl coexistence to propose strategies that can support and strengthen such relationships. To achieve this, we:

(1) introduce a multidisciplinary approach to studying coexistence; (2) use this approach to learn from individuals who have significant first-hand experience observing or interacting with powerful owls; (3) analyse interviews to document owl behaviours and related biodiversity conservation efforts, illustrating possibilities for positive coexistence; and (4) envision ambitious yet practical urban futures by integrating insights from these interviews with best practice in urban management and innovative approaches in urban design.

2 | APPROACH: SHARED WORLDS AS SOURCES OF LEARNING

This section outlines the ontological and epistemological underpinnings of our approach, emphasising methodological transparency as a cornerstone of interdisciplinary research. By integrating humanities-based methods (interviews and focus groups) with scientific approaches (ethology), we aim to contribute to the growing fields of animal geographies (Seymour & Wolch, 2010) and more-than-human design (Heitlinger et al., 2024). Central to this approach is the concept of learning from shared more-than-human worlds—contexts in which humans and animals coexist and interact positively. Such examples are valuable because they inspire ambitious and creative actions that extend beyond preserving increasingly rare, undisturbed ecosystems or simply mitigating harm. By examining the opportunities these interactions present, we can close the gap between aspirational goals and practical implementation, promoting improved coexistence across diverse environments and communities.

2.1 | Ontology: What the world is made of

Our ontological perspective relies on realist and materialist traditions informed by process philosophy. In this view, the world comprises dynamic processes and interdependent relationships that involve information, matter and energy (as in realism or positivism). These processes produce temporal stabilities perceived by humans as discrete states or agents. However, entities, such as organisms, species and ecosystems—and the autonomy often attributed to them—are abstractions. Instead, the world consists of interconnected living communities (such as holobionts) continuously reconstituted through dynamic processes, often shaped by directed action.

This perspective resists anthropocentric and individualistic interpretations, favouring relational frameworks, such as the concept of the Symbiocene (Albrecht, 2020). Processes leave traces in the world, which agents engage with, resulting in partial perspectives (as in relativism). Living beings, from microorganisms to owls, possess subjectivity and construct partial cognitive models of their shared environments (*umwelten*) (Barbieri, 2008; Lyon, 2015; Margulis, 2001). Together, these agents co-construct shared, relational realities through continuous interaction and interpretation. They assign meanings to activities, events and behaviours, reflecting a constructivist understanding of the world. In practice, this framework has significant implications for conservation, calling for recognition of animal individuality and personhood (Orrick et al., 2024; Wallach et al., 2020). This approach builds on the recognition of interconnectedness, moving beyond reductionist abstractions—such as viewing species as the primary focus of conservation efforts—to emphasise the significance of diverse interspecies relationships.

2.2 | Epistemology: How we know what we know

Epistemologically, our methodology builds on interpretivism, emphasising the co-construction of knowledge through dialogue and shared experience. While local, individualised and small-group knowledge can be difficult to verify or link to causal chains, it provides unique insights unattainable through other methods. For example, participants may document longitudinal familiarity with populations, mapping key events, such as births, deaths and relocations. Such accounts can reveal nuanced behaviours that escape laboratory or field observation.

Participants' experiences and interpretations offer granular insights into animal behaviour, relationships with humans and environmental dynamics, complementing broader quantitative analyses (Frank & Glikman, 2019; Gao & Clark, 2023; Pooley, 2021). For instance, animals' ability to recognise individual humans or develop consistent patterns of behaviour in response to human habits highlights the depth of cross-species interactions. Qualitative, constructionist methods—common in ethnography—are particularly well-suited to capturing these relational dynamics (Bhattacharya, 2017; Leavy, 2023). By considering animals as active participants in the co-construction of knowledge, our work aligns with existing multispecies ethnographies (Barua, 2023; Kirksey & Helmreich, 2010; Swanson, 2019; Van Dooren et al., 2016). As in these approaches, we resist dualist ontologies that see humans as distinct from nonhuman beings, instead emphasising relatedness between agents.

2.3 | Methodological integration and limitations

We employ a mixed-methods approach, integrating qualitative, descriptive and longitudinal case studies (Yin, 2015) to document human–owl interactions. Drawing from geographical and ethological frameworks (Barua & Sinha, 2017; Rubio-Ramon & Srinivasan, 2023; Seymour & Wolch, 2010), we use observations, field notes, photographs, video recordings and interviews to identify patterns and insights. This interpretative approach aligns with 'thick description' methodologies, which generate detailed accounts of social actions, their contexts, meanings and intentions (Geertz, 1973; Van Dooren et al., 2016). Additionally, our approach incorporates anecdotal accounts of motivations, behaviours, places and relationships—an often undervalued but essential research component that can inform more systematic studies (Kaplan, 2015). We strive to extend

beyond the limitations of positivism's reductionism, interpretivism's anthropocentric subjectivity and critical theory's human-centred political analysis by adopting methodologies that emphasise the creative cooperation of human and nonhuman beings. Recognising animals as holistic beings with emotions, behavioural profiles and subjectivities (Wemelsfelder, 2007), we also foreground their roles as active agents in conservation efforts (Edelblutte et al., 2023).

Reliance on human perspectives and experiences to interpret animal interests and actions has inherent limitations, including the risk of anthropocentric bias in data collection and interpretation. Quantitative observations of animal behaviour—which we also conduct and address in other publications (e.g. see Holland et al., 2024)—add rigour and complement the qualitative insights discussed in this article. However, observations intended to produce numerical assessments are often resource-intensive, shorter in duration and less effective at capturing nuanced, context-specific dynamics. While the limitations of our qualitative approach are explored further in the Discussion section, our findings highlight its capacity to provide rich, relational and contextually grounded insights into the complex interactions between humans and owls.

3 | METHOD: INTERVIEWS WITH EXPERIENCED HUMANS

Our rationale is that fostering coexistence between humans and owls requires examining the experiences of individuals with long-standing relationships with these birds. Their engagement provides a template for currently rare but attainable forms of interaction. To this end, we interviewed individuals who have sustained an interest in powerful owls over many years.

The University of Melbourne Low or Negligible Risk Human Research Ethics Committee (LNR 1A) granted approval for this project (2021-22438-20716-2). In line with our ethics approval, participants read a plain language statement about the project and provided written consent to take part. They also had the opportunity to review the quotes, images and ideas included in this article.

3.1 | Participants

Our participants were not merely individuals who happened to share space with wildlife; they were motivated by a commitment to studying, protecting and fostering cooperative relationships with powerful owls. Although united by a shared interest in owls, they represented diverse backgrounds, including ecology, land management, nature writing, conservation, volunteering, citizen science, nature tourism, wildlife rescue, journalism, filmmaking, social media, blogging and photography. Given their expertise, experience and dedication, participants acted in capacities akin to ethologists, cognitive ecologists, behavioural scientists and conservationists. However, their engagement went beyond observation and analysis—they actively practised and embodied the patterns of shared life with owls. As such, they also functioned as participant observers or ethnographers. Moreover, many participants contributed to public education by designing informational materials, organising data collection activities and creating habitat structures, thereby assuming the role of designers. Their primary motivation was to achieve practical outcomes rather than pursue abstract scientific questions. In this respect, their approach diverged from traditional scientific inquiries, such as Tinbergen's (1963) four questions of ethology (function, causation, evolution and development), emphasising instead the lived coexistence between humans and owls.

These attributes aligned with our goal of identifying individuals with the deepest, most enduring relationships with owls, providing experiential knowledge beyond what is available in literature, official records or scientific studies. Each participant had observed owls for periods ranging from one to 20 years, with an average duration exceeding 5 years. Most interviewees searched for owls at least once a week, often several times and during the breeding season, many conducted daily visits lasting up to 7 h. Given this level of engagement, our respondents offered unique insights that neither casual observers nor professional scientists in formal research roles could provide.

We identified potential interviewees through word-of-mouth referrals, preliminary visits to owl habitats with local experts, searches of published materials and recommendations from already selected interviewees. Recruitment concluded once we reached saturation, at which point no new relevant contacts emerged.

3.2 | Format

We conducted semi-structured interviews while traversing sites pertinent to the topic of study—in this instance, urban owl habitats. Semi-structured interviews, consisting of planned and opportunistic questions, enable interviewees to introduce unanticipated ideas and facilitate deeper discussion on topics in wildlife conservation (Moesch et al., 2024; Soanes et al., 2023). By building on methods in multispecies studies and ethnographies, we chose these walking interviews or 'go-alongs' because the environment and movement influence what participants feel, think, remember and report (Springgay & Truman, 2018). For instance, forest walks enhance understanding of nonhuman lives (Mäkelä & Aktaş, 2023) and yield richer insights into place than conventional interviews (Evans & Jones, 2011). Such immersive interviews can amplify the voices of knowledgeable and passionate humans who reside near or work closely with nonhuman stakeholders (Haldrup et al., 2022).

Semi-structured and in-context interviews allow for the collection of qualitative evidence. The use of qualitative approaches can direct urban design and planning towards fostering thriving interspecies relationships (Sutton et al., 2024). General audience books that document accounts of human relationships with owls illustrate the utility of collecting stories, anecdotes and studies (Ackerman, 2023; Angell, 2015; Safina, 2023). We assume that accounts from

experienced owl observers can enhance scientific research and that understanding their efforts to improve conditions for owls can inform the design of better strategies for positive interactions.

3.3 | Questions

To explore our research questions about human–owl coexistence, we invited interviewees to share:

A *Participant background*. Information about their background, motivations and expertise;
B *Owl behaviours*. Accounts of novel behaviours, such as the use of human-made structures, the ability to learn, instances of play or interactions with humans; and
C *Human behaviours*. Human actions and initiatives, including volunteering, citizen science and management practices.

Refer to the Supporting Information for the list of questions. We also encouraged interviewees to share supplementary materials, such as field notes, web links, images, text and other documents. We used this information to gain a deeper understanding of human–owl interactions. It provided valuable background, illustrated recording methods and interpretations, highlighted novel owl behaviours, shared stories of human–owl encounters and included photographs capturing owls' expressive poses and habitats. This information helps create a clearer picture of what positive coexistence can look like and enriches recommendations for design and management.

3.4 | Schedule

We conducted 10 interviews with 19 interviewees (one to eight per interview, depending on whether our primary contact invited others to join). Five interviews took place in person while walking through powerful owl habitats, as shown in Figure 1. The remaining five interviews occurred online due to COVID-19 restrictions. All in-context interviews included visits to at least one powerful owl territory within an urban environment. The interviewer (author D.P.) visited the sites discussed in three of the online interviews independently.

The interviewees chose the locations of the interviews in response to recruitment materials, our research articles and preliminary email exchanges. These included suburban bushland with remnant vegetation, backyards with nest boxes, golf courses and urban parks close to transport infrastructure. The sites covered the capital cities of Melbourne, Sydney and Brisbane. In total, we visited 17 powerful owl territories (one to five per in-context interview) and observed powerful owls at three sites, witnessing a total of six owls. Each interview lasted 1–8 h, with an average duration of 3 h. See the Supporting Information for a breakdown of each interview.

3.5 | Analysis

We audio recorded all interviews, transcribed them verbatim and analysed the transcripts. The analysis involved selecting and arranging the quotes in response to our research questions and reviewing additional materials supplied by interviewees. As common in techniques of thematic analysis (Guest et al., 2012), we started with several indicative topics and iteratively re-grouped responses until distinct themes emerged. We use anonymised interview group numbers (IG1–10) to attribute quotes and ideas in Section 4. Interviewees had the opportunity to review the article before submission to verify quotes and suggest edits.

4 | FINDINGS: INSIGHTS INTO HUMAN–OWL COEXISTENCE

Nine key themes emerged from the interviews, illustrating ways to improve coexistence between humans and powerful owls. We grouped these themes into three categories: challenges for coexistence, opportunities for better understanding and outcomes of positive coexistence.

FIGURE 1 Powerful owl territories visited during walking interviews (left), including one of six owl sightings (right) (image by the authors).

4.1 | Challenges of coexistence

4.1.1 | Accounting for nonhuman stakeholders in decision-making

Interviewees reported that governance failures have significantly harmed powerful owl habitats. Land management routinely removes roosts, for instance, because the trees are non-indigenous: 'For the last three or four years, the owls spent the whole summer there and now they're gone. They used to roost in flame trees, maybe 30 or 50 years old. There were about six of them, and they were cut down this year because they weren't in the reserve, they were on the edge of someone's property, and they're not on the protected species list' (IG4). Another example highlighted similar oversight: 'The council said, "had we known there were owls in that area, 72 houses would not have gone ahead"' (IG6). Cases of controlled burns and development projects in powerful owl habitats often result from inadequate or poorly timed ecological surveys. For instance, a survey conducted outside the breeding season failed to detect the presence of owls, leading to initial approval of a zip line in Queensland (IG10). Light pollution in cities also affects powerful owls: 'Now that the LED lights are next to the acacia, they don't bring their chicks to crèche at all. And the male, where he used to roost and see the nest tree, they've put a LED light at the front of the house, and he's now shifted' (IG3).

Despite existing legislation, interviewees noted that housing developments (IG2/7/8), illegal tree felling (IG2/4), removal of large old trees due to safety concerns (IG1/4/10), disruption of wildlife corridors (IG3/7) and pollution in creeks from storm water systems (IG2/4) contribute to fatalities. Juveniles have landed in unusual human-modified places, such as a boat workshop, car, warehouse, semi-industrial area, shopping centre and train (IG2/8). The gaps between vegetation patches create a risk of inbreeding if the populations cannot mix (IG3). This reality incites frustration: 'The realisation that there's a big conflict between the people who love the environment and the people who just want to build houses. That can be quite depressing. In particular, because people who want to build houses are so well funded. You feel like you're up against it. It's relentless. Every time you think you've dealt with one person who's asking about a development proposal you get the next one and the next one and there just seems to be no end to it' (IG8).

4.1.2 | Overcoming interspecies conflict

Interviewees reported that public awareness and attitudes towards owls vary widely, often affecting conservation efforts. Many residents remain indifferent to or unaware of powerful owls (IG3), while some illegally poison or cut down nest trees to enhance views (IG4) (Figure 2). Others feel hostile to powerful owls due to misunderstandings or off-putting owl behaviours (IG4). For instance, some humans dislike owls' hunting methods or their vocalisations, leading to a lack of support for their conservation. One respondent shared, 'Some people really hate them. They find them violent and horrible. One dude told me how he was watching a ringtail possum amble along the gutter and the owl came down and squeezed the possum. It popped the head off like a Pez. The possum body was spraying blood out the neck hole. And then the owl dropped the possum. The dude was screaming. As the possum dropped down it sprayed his face with blood. And then the owl wanted its dinner and was bouncing off the house to get the possum and take it away. He was really traumatised by this affair. He was like "I never want those birds anywhere near me again"… And some people find them very noisy. One lady used to go "I just wish I could throw my boot at it because it used to sit on her TV antenna and hoot"' (IG3). Concerns also arise about owls potentially attacking pet cats or dogs (IG3/4/5/7/8). Conversely, owls may become stressed by construction, playgrounds, mountain bikers (IG3/4/6), motorbikes (IG6), photographers (IG1/3/7/9), chainsaws (IG2/3/6) and dogs: 'The male owl wouldn't care if ten people walked underneath, but if one of them had a dog, then he would track it all the way along' (IG9). 'He literally paced up and down the branch' (IG5). Councils face pressure to allow residents to walk their dogs in protected areas, an activity which poses a danger to young owls on the ground and could lead to the abandonment of otherwise suitable habitats (IG4).

FIGURE 2 Nest tree for owls. Some residents illegally cut down or poison trees that obstruct sea views. Near this tree, a fledgling landed on the ground and died from a dog attack (image by the authors).

Most interviewees were reluctant to share the locations of owls due to the risks of increased visitation and disturbance. Some photographers accidentally or intentionally torment, provoke or change the behaviour or position of owls to get a 'good' shot (IG1/2/5/7/9)—for example, by wearing a welding mask to make owls swoop (IG3). Even well-meaning observers can inadvertently flush owls from their roosts and direct the attention of other birds to owls, resulting in dangerous or even fatal mobbing (IG1/6/10). Such disturbances will

worsen as cities expand and densify: 'I think the parents try to move young owls out of this area as the city gets built up. The only ones I've heard of attacking humans are in urban green spaces where owls are more confined and become more protective' (IG2).

4.1.3 | Supporting knowledge sharing

Interviews highlighted several challenges in knowledge accumulation and sharing that constrain conservation efforts. These challenges include insufficient funding, tensions among enthusiasts, issues with volunteer engagement and retention, difficulties in data collection, challenges of observation analysis and inadequate coordination between conservation groups. As a result, some interviewees have not shared data on nest microclimates, films capturing owl behaviours or notes on the interactions between owls and Indigenous peoples. The knowledge of Indigenous Australians, whose ancestors have lived alongside owls for thousands of years and have given owls different names, represents another important source of insight rarely considered in current management (IG3/7).

Interviews revealed ongoing debates about acceptable ways to interact with owls, obstacles to knowledge exchange due to the desire of some observers to be primary knowledge holders and limitations in observation, data collection and interpretation (IG3/5). These disagreements often result in a reluctance to collaborate, further complicating conservation efforts. Even in the best of circumstances, the time and effort required to find and observe owls makes sustaining volunteer interest difficult (IG10). Volunteers often cease involvement due to dissatisfaction with project management, the lack of collaborative sharing and competition for credit or positions (IG1/7). The subtlety and variability of behaviours exhibited by powerful owls make learning and interpretation challenging. Even the most dedicated observers cannot see everything owls do (IG5). 'The more territories I see and the more different families I see, the more times I watch them, and more anecdotes I hear, the less sure I am about anything. There's so much variation' (IG8).

4.2 | Opportunities for better understanding

4.2.1 | Empathising with nonhuman experiences of anthropogenic environments

The interviewees discussed their perceptions of powerful owl experiences in urban environments, especially in relation to their bonds to mates and offspring. In one example, a mother owl kept returning to the hollow where her chick died: 'She seemed distressed and kept looking into the hollow as if searching for the chick' (IG3). For several years, this pair switched hollows each year, moving further down the creek after repeated unsuccessful breeding attempts. In another example, when construction work killed the chicks the parents continued to call for them for weeks and were reluctant to hunt or move from their tree: 'They just stay in the same tree. They don't even hunt, they just sulk. And you can tell they're really upset. Like we knew straight away that the mother was just going "Where's the baby?"' (IG4). Others described similar distress when chicks died from drowning in a swimming pool (IG8) and after attacks by kookaburras (IG5) and cockatoos (IG6). These behaviours suggest that owls have a strong bond with their family members and even adopted chicks (IG3/8). Several interviewees referred to reporting by Fleay (1968) (IG2/3/5/8), who mentions a powerful owl dying of a broken heart (p. 19) and mothers speaking in caressing tones to offspring (p. 28). IG2 also referred to Hollands (2008), who suggests parents encourage their young to leave the nest site by calling or withholding food. A better understanding of such relationships can build solidarity through recognition of owls as sentient beings: 'You begin to realise there's a lot more going on than you think. They are not simple automata, running around doing some automated machine-type process' (IG7).

Owls also make calls to convey different meanings. These calls range from hoots to growls (IG6) and purring (IG4). Many interviewees said it is possible to learn to recognise these calls and understand what they mean. Some calls are for courtship (IG3), some are warnings, some are for communicating with other owls (IG4/10) and others express displeasure. For example, owls use sheep-like calls in various scenarios, such as when the mother owl communicates with the chicks or when the father owl tries to fend off crows (IG10). Courtship communication is particularly engrossing: 'Before the female incubates, they do courtship display and there's this chatter that they do, this little mumbling. They talk to each other. At that moment, they're so engaged that all sorts of stuff goes on around them that they do not notice' (IG3).

Under these conditions, anthropomorphic descriptions can prove useful as long as they do not misinform (IG7). House hunting (IG5) and the tendency to stay longer with parents (IG2) serve as two examples. Many interviewees gave familiar names to owls and described them as having emotions similar to humans: 'The owls watched the dog get closer and instinctively pulled their right foot up inside the plumage into a strike position. They watched the dog with what I would consider amusement. The dog looked up, saw the owl, completely freaked, leaped, and ended up in the black mangrove mud. The owls just looked at the whole exercise as if it was humorous' (IG7). Regardless of which terms one prefers to describe observed behaviours, the point is that making efforts to understand nonhuman experiences can help inform human actions that not only reduce suffering but promote thriving.

4.2.2 | Considering environmental management from the perspectives of nonhuman stakeholders

Interviewees who spent time observing powerful owls began to understand the birds' preferences, including their favourite trees and branches. One observer noted: 'Since I started following the powerful owl, I've noticed just how many creeks there are that I pass over in the car that I hadn't noticed before. I've been birding for 40 years,

and I gained enough knowledge to start looking at the entire landscape differently' (IG9). Owls prefer thick, horizontal branches for bonding and dense vegetation for escaping mobbing birds (IG1/3). They follow safe flight paths beneath cathedral-shaped tree canopies (IG8) and use roosting spots near cool, protected rock faces (IG3). Observers have learned to find owls based on temperature, humidity, time of day and year, and the behaviour of other animals: 'See how the owl is up the top of where the air is pushing up the rock face? When it starts to get hot like this, you'll only ever find them in this position' (IG3).

Interviewees also reported the novel use of urban features by powerful owls, including street signs, cables (IG3), letterboxes (IG2) and antennas (IG8). They noted that powerful owls adapt to human-made environments and develop unique hunting techniques using structures, such as power lines and houses (IG2/5/7/9). These techniques vary between individuals and groups. One pair of owls, for example, used teamwork to catch possums: 'You'll get one on this side and one on that side, and they'll just yell at the possum. And the possum freaks out and usually they'll chase it to the other owl' (IG4).

Interviewees have documented events that challenge existing understandings of powerful owl behaviours. For example, one interviewee refuted the beliefs that only males display prey during the day or that owls do not retrieve dropped prey (IG9). Interviewees also reported instances of teaching and learning among powerful owls (IG4), such as parents withholding food to encourage their young to leave the nest site (IG5). Several mentioned that owls avoid hunting in trees or backyards where they roost and nest (IG1/3/4). One observer suggested that powerful owls preserve wildlife to help their young learn to hunt: 'They farm their prey. It's almost like it's their pantry' (IG4). Some owls let brush turkeys (*Alectura lathami*) live nearby (IG8), allowing young owls to practise hunting by waiting on top of nest mounds until the turkey chicks come out (IG4). Brush turkeys also benefit powerful owls by removing undergrowth vegetation, making it easier for owls to fly (IG8) and catch prey: 'People don't realise how much the owls depend on brush turkeys; so, I don't chase the brush turkeys away because it would disturb the whole balance' (IG4). These anecdotes prompt consideration of how human interventions influence powerful owls and their relationships with other species, highlighting the importance of considering land management from the perspectives of owls to inform human behaviours in shared habitats.

4.2.3 | Recognising and respecting owl preferences

The experience of interviewees demonstrates that by observing and studying powerful owls, one can interpret their preferences through signals, such as facial expressions, body postures, vocalisations and play patterns. Young powerful owl play includes tug-of-war, feather pulling and scaring from behind (IG4). These behaviours reveal how owls adapt to their environment, interact with other species, express their needs, pursue their preferences and enjoy their lives. For example, owls take turns throwing and catching objects on streetlights (IG3). Owls show individual preferences that vary depending on exposure to human contact. Interviewees described some owls as shy (IG8) and others as curious (IG3/4/8), sanguine (IG3) or relaxed (IG10). One can notice these differences by paying attention to body language: 'Dad's very aloof … Mum's always very alert, eyes wide, checking you out—we tend to keep away from her as much as possible. Dad will look at you and turn around like "whatever". The chick is much more interested. He'll be aware that you're there. We've seen him hanging off vines upside down pulling things off. It looked like directed play in terms of the skills he might need to catch prey. The first time we saw him playing on the ground, he was playing with a leaf, just attacking a leaf and tearing it apart' (IG9).

Interviewees discussed how humans and owls can adjust their behaviours to create mutual compatibility. They provided examples of efforts to build trust through respectful interactions that consider powerful owl preferences. Disturbance can be minimised by keeping distance (IG1/2/5/6/8/10), avoiding eye contact (IG3/10) and using less invasive forms of recording, such as photography without flash or with a red rather than white flash (IG1/2/6/7/10). Learning to interpret the many ways powerful owls communicate and express their preferences is also essential (Figure 3). For instance, some owls show curiosity by persistently observing humans (IG3/4/8); wariness by shuffling, blinking, locking eyes with intruding humans, excreting to get rid of weight, suddenly leaving roosts or swooping (IG3); and comfort by looking away, grooming themselves (IG4) or falling asleep in the presence of humans (IG5/9). Many interviewees aim to reduce the number of visitors, the duration of visits and the frequency of encounters. The information from interviewees shows how learning to recognise the behaviours and preferences of nonhuman stakeholders can foster positive coexistence.

4.3 | Outcomes of positive coexistence

4.3.1 | Connecting to multispecies communities

Our interviews highlighted several positive aspects of living alongside owls. Several interviewees enjoyed long-term learning about owls and their ability to surprise (IG6/8/9). They described the thrill and satisfaction of finding owls and nests (IG6/8/9), sometimes partnering with dogs to locate owls (IG7). Some interviewees described awe at owls' beauty, might (IG5/6/9) and elusiveness (IG1/4). Most of the interviewees reported benefits for their mental or physical health, even where direct encounters were not feasible. For instance, audio and video are useful ways that interviewees tune into the lives of owls if there are concerns over disturbance, or where access is challenging due to terrain, distance, vegetation or dangers, such as ticks and snakes (IG1/2/6). Some interviewees became fascinated with owls after chance encounters (IG3/10), underscoring the importance of seeing more owls in cities.

Several interviewees noted that the increase in preferences for larger houses with smaller backyards disconnects residents from wildlife (IG2/4/10): 'I've watched where I live which is right in the

FIGURE 3 Various expressions of powerful owls. The interpretation of owl behaviours is not straightforward but is important for informing human actions in owl habitats (images by Nick Hamilton).

zone of "knock down these 1950s brick houses and replace them with the 1m-setback-black-roofed-grey-brutalist-structures". The residents are never going to know urban wildlife' (IG7). For several interviewees, seeing owls is a positive social activity: 'Having the community watching the nest has done quite a lot for people's awareness of the fact that there are owls here and how important some of those trees are. It would be great if owls just became part of the norm, and you'd just point them out like tawny frogmouths "and there's an owl". Sometimes there would be ten or more people watching the owls and it was like a little community. You got to know people, you got to know their names' (IG9).

4.3.2 | Developing trust in routine encounters

Interviewees reported that familiarity and trust can emerge through repeated encounters, predictable movements and even talking to owls. Similarly, the observations of the interviewees suggest that owls can recognise humans and learn patterns of human behaviour. Many believed owls respond differently to visitors they know (IG2/4/8), sometimes following humans as they walk, staying near houses or roosting just metres away: 'Some of the owls will greet us. They will trill when we arrive' (IG9). 'The response of the bird is dramatically different when they know the

person. It's not about the same clothes or saying the same thing every time you come in, it's definitely recognition' (IG3). 'At night you can't see them, and they'll fly a couple of feet over your head, right up to the veranda' (IG1). 'Often I'd I go "hello", "hello". 30 s later, sometimes I'd feel the swish of the wind. The owl would come down and fly past me. Then sometimes it would meet me down at the meeting spot or follow me. The first time it happened I was going, "What do I do now?" I thought, "I just sit down. I'm going to enjoy the night and the sounds." So I sat there for about an hour and a half. And it was there, and called for food, it was watching things. And it would look over and put its head around so it's looking away from me, and it's having a snooze! How cool is this, like sitting on a rock with a pet powerful owl' (IG5). One interviewee installed a birdbath that provides respite in dry periods while his backyard supports a community of owls, parrots, turkeys, magpies, possums, bandicoots and beetles. 'Most evenings my wife and I would have a fire, and when the owlets first came, they were fascinated about the fire, and were sitting above us, watching the fire. We'd be talking back to them. I noticed also that they'd be attracted to catching beetles near the fire. But I think they just enjoyed our company. In the mornings—we had a balcony out front—they would come and roost outside our bedroom window. I think it was just the whole environment that we created and the fact that they felt safe' (IG4). These relationships highlight the potential for positive coexistence, offering aspirational goals for design and management.

4.3.3 | Providing support through research, advocacy and intervention

Interviewees suggested a number of law enforcement strategies to support coexistence, such as acquiring properties from developers to create habitats, using fines for illegal tree felling to fund regeneration projects and designating critical habitats as protected areas (IG2/4). Some emphasised the need to establish vegetation corridors informed by data on powerful owl dispersal as gathered through genetic analysis of feathers (IG2/8). Further research on the movements and fates of young owls dispersing from their natal territories would also strengthen conservation efforts (IG3/9). Such insights could guide urban development to reduce harm to wildlife. For instance, one interviewee cited a positive example of a major urban development, including plans to create vegetation patches no more than 1 km apart to support animal movement (IG3).

A deeper understanding of owl behaviours would also improve land management practices, such as designing human-made nesting hollows and roosts. Interviewees pointed to behaviours needing further research, including the use of multiple nest entrances to allow each chick to perch and receive food independently (IG2/3); the sharing of trees with pardalotes, cockatoos, rosellas, butcher birds, possums and other species (IG1/3/4); the availability of nearby roosts from which the male can guard the hollow (IG1/3/4); and other nest characteristics, such as microbiomes and hygiene (IG3/4/10). One interviewee noted, 'There's probably a load of stuff owls perceive that we don't. I think the reason nest boxes aren't working is because they're too dead. There is an amazing dynamic recycling environment that includes fungus, microbes, and beetles in a tree hollow that we don't replicate in a nest box. We can't replicate nesting sites until we understand how tree hollows work' (IG3). Rapid landscape changes since colonisation have destroyed many of the trees owls prefer. As a result, the shapes of nests and roosts in remaining trees, which designers use as models for artificial hollows (Parker, Roudavski, Jones, et al., 2022), are likely suboptimal; owls rely on these structures because they have no other options (IG3/4). For instance, owls often nest in old trees (Figure 4) left standing because their twisted shape, inaccessibility or locations make them unsuitable for timber or development (IG1/3/7).

Out of affection for owls, interviewees advocate on their behalf at council meetings, write to leaders, attend protests and participate in community organisations (IG2/4). Many work to halt development, secure funding or build public support for conservation projects by educating others about threats, such as roadkill, glass strikes, rodenticide poisoning, predation by cats and dogs, and the impacts of artificial lighting (IG2/3/4/7). Some interviewees proposed specific interventions to meet owl needs during breeding and fledging. For example, parks could include paths that direct humans away from core habitat areas (IG2), fledging platforms near nest trees to support owls until surrounding vegetation matures and temporary barriers to limit human intrusion during the nesting season before owls disperse (IG3/5/8). As one interviewee put it, 'think of those exclusion zones as little oases for all sorts of fauna … You want it to be a little haven for wildlife that's a sanctuary where they can get away from the busy city' (IG3). These ideas reflect a shared understanding that, while improvements to urban coexistence are achievable, they require dedicated, collaborative efforts.

5 | DISCUSSION: A SYNTHESIS OF OPPORTUNITIES TO BENEFIT HUMAN–OWL COEXISTENCE

Our interviews demonstrated several challenges, opportunities and benefits of coexistence. Building on the interviews, we synthesise possibilities for urban design and management to foreground nonhuman stakeholders, curate positive interactions and encourage informed action. We propose actions to foster positive coexistence between humans and powerful owls, drawing on interviewees' insights and expanding upon established best practices in design and conservation. We inform this vision with concepts demonstrating the abilities of human and nonhuman animals to co-adapt their behaviours for life in shared areas (Carter & Linnell, 2023; Marzluff & Angell, 2005; van der Wal et al., 2022). Advancing research demonstrating that nonhuman stakeholders can lead design

FIGURE 4 Old *Angophora* tree used by owls. Such critical habitat structures may not always be optimal for owls but are often what remains because their shape or location was unsuitable for timber harvesting (image by the authors).

(Rutten et al., 2024), we provide actionable steps that aim to allow humans and owls to shape shared spaces together.

5.1 | Foreground nonhuman stakeholders

5.1.1 | Challenges for urban owls

Our interviews identified several human activities that negatively affect powerful owls, confirming the inadequacies of existing policies (Carter et al., 2024). Interviewees discussed challenges in balancing the needs of owls with human demands for development, controlled burns and tree management (Section 4.1.1). For example, the removal of non-indigenous trees deprives owls of regular roosts, reinforcing the need to reconsider both the necessity and pace of removals (O'Leary et al., 2021).

5.1.2 | Best practices in urban development

Guides exist for built-environment practitioners to mitigate harm to powerful owls (Powerful Owl Coalition, 2018). Emerging practices advocate integrating nonhuman animals as stakeholders in urban developments (Kirk et al., 2021), cultivating positive interactions among all urban dwellers (Garrard et al., 2018) and actively creating habitats in new construction and building retrofits (Birkeland, 2022). Thomson et al. (2022) included powerful owls as stakeholders in housing developments, but this remains a rare case.

5.1.3 | Opportunities to foreground owls in urban planning

Figure 5 illustrates some of the spatial opportunities by building on the existing mapping of land uses in relation to powerful owls (Carter et al., 2024), proposals to reconsider economic rights to property (Herrmann-Pillath, 2023) and bird-friendly design (Thomson et al., 2022).

It centres on the idea that equitable and just design of urban ecosystems is achievable by including nonhuman stakeholders in decision-making while monitoring the resulting well-being for all forms of life (Mancini et al., 2023; Parker, Soanes, & Roudavski, 2022; Pineda-Pinto et al., 2023). The centring of nonhuman stakeholders could encourage local communities to move from broad policies towards giving concrete rights to owls, which requires recognition of nonhuman lifeforms as political actors who can influence decisions (e.g. see Donaldson & Kymlicka, 2011; Nussbaum, 2023). One way to implement this is to appoint human representatives who can speak on behalf of nonhuman stakeholders (Brown, 2018). Such a representative could, for example, object to planning permits or advise on protection and mitigation measures.

Reconceptualising urban areas as more-than-human commons is another promising approach (Büscher & Fletcher, 2019;

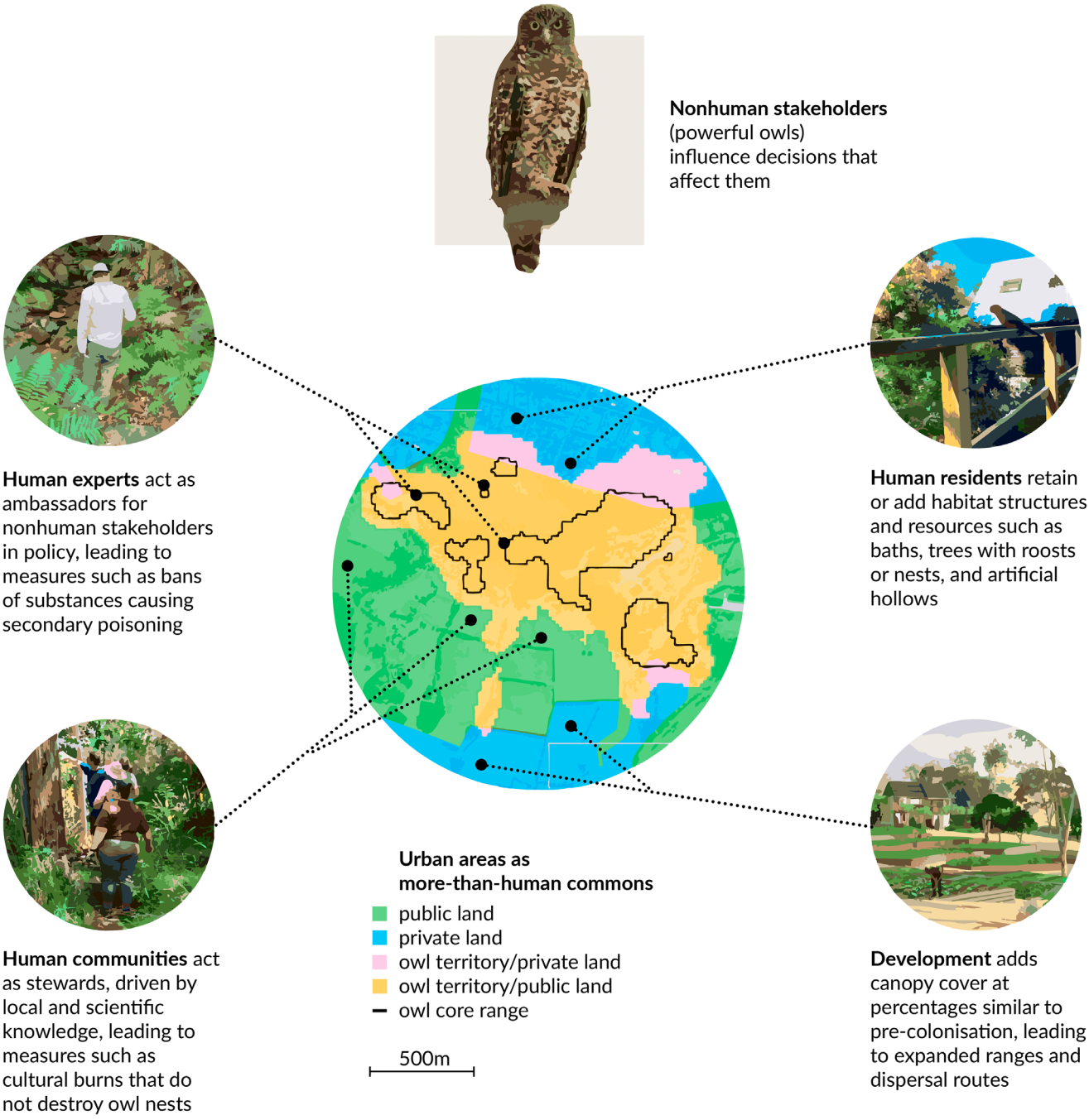

FIGURE 5 Foregrounding nonhuman stakeholders through design (image by the authors, featuring work from Nicholas Carter and colleagues and The Paddock, Castlemaine).

Haldrup et al., 2022; Herrmann-Pillath, 2023). In one conceptualisation, recognising nonhuman possession and ownership of property reframes the restrictive divisions between private versus public or human-imposed zoning (Herrmann-Pillath, 2023). The resulting governance could incentivise retaining habitat structures on private land, maintaining similar tree cover percentages to the woodlands that owls evolved with in new developments and accommodating powerful owls safely in urban infrastructure, such as transportation and electricity services (Sections 4.1.1 and 4.3.3). To further support urban coexistence, regulations should prohibit the use of poisons and assist pet owners to understand local wildlife (Sections 4.1.2 and 4.3.3).

5.2 | Curate positive interactions

5.2.1 | Challenges in human–owl interactions

The interviewees reported several cases of disturbance as a result of apathy, unawareness, hostility or intrusive attempts at observation.

Negative interactions with powerful owls indicate the necessity of integrating animals' input into practices of design and management (Section 4.1.2).

5.2.2 | Best practices in urban design

Efforts to respect powerful owls' need for seclusion during breeding exist but are not widespread. Examples of support include fledging platforms beside nest trees to support owls until surrounding vegetation matures (City of Ryde, 2021) and temporary barriers to reduce human intrusion during nesting in winter (Olsen, 2011). In other contexts, landscape elements can create distance between humans and animals to minimise stress, reduce fearful reactions, and prevent conflict between humans and wildlife by using vertical barriers that still maintain visual connection (Hwang & Jain, 2021).

5.2.3 | Opportunities to co-design urban areas for shared benefits

Figure 6 extends a real-world example in the City of Ryde (2021) by highlighting some of the current, emergent and longer term design interventions that enhance urban areas for birds (Holland et al., 2023; Pugnale et al., 2024), with minimal impact on human convenience.

Opportunities to support positive human–owl interactions include specific vegetation management strategies, such as maintaining undergrowth around nest trees. This undergrowth encourages humans to keep a respectful distance while providing essential landing areas, shelter and food for fledglings (Section 4.3.3). Tree pruning can create canopy gaps that facilitate owl flight paths while offering open views that humans prefer (Section 4.2.2). Educational tools, such as signs, can share insights into local owl behaviours and tolerance for human activity, fostering community solidarity and guiding human actions around proximity, timing and duration of contact (Section 4.2.3). These steps help humans understand owl needs and broader ecological interactions, promoting behaviours that build trust with owls and reduce stress (Sections 4.2.3 and 4.3.2).

Gathering and sharing stories of coexistence with powerful owls can further enhance these efforts, offering communities concrete examples of positive outcomes alongside a realistic view of potential harms and risks. For example, by understanding the relationships between brush turkeys, owls and their habitats, residents may become less inclined to remove brush turkey nests, recognising these as integral to a thriving ecosystem (Section 4.2.2). Interviewees also highlighted how certain housing and backyard features can attract owls and create engaging wildlife encounters (Section 4.3.2). Collecting, showcasing and disseminating these success stories not only provides practical, inspirational examples but also strengthens community support, guiding collective efforts to promote positive coexistence with urban wildlife (Section 4.3.1).

There are examples of more-than-human approaches that could shape existing developments. The Powerful Owl Park project (Development Victoria, 2024), mentioned in the Section 1, adopted the name of this iconic species but primarily serves here as an example of how planners and designers could achieve better outcomes by taking powerful owls seriously. As large predators, powerful owls can function as umbrella species, meaning that conservation and coexistence measures supporting them also benefit many other life forms, fostering a biodiverse community essential to their survival. The Powerful Owl Park project repurposed a former golf driving range into sports and recreation facilities for clubs displaced by a new road. Despite the architects promoting a human-centred design that includes tree plantings and green spaces for human enjoyment, the park largely overlooks the needs of its namesake. Designing for positive human–animal coexistence from the outset could have strengthened the project in several ways.

An imagined alternative could look something like this: artificial habitat structures rise among the newly planted trees, providing essential roosting and nesting opportunities while the slow process of natural hollow formation unfolds over centuries. More than just a single red-spotted gum tree stands tall on-site, as designers preserve additional mature trees to offer shelter and food for various species. Instead of sprawling across the landscape, the 176-space car park sits underground, allowing rich vegetation to flourish above. Microorganisms, insects, small birds and marsupials thrive among the plants, contributing to a complex and dynamic ecosystem. The sports and recreation facilities remain, but planners have positioned them away from wildlife spaces. Human visitors learn how to minimise disturbances, especially during breeding seasons, ensuring that owls and other species can persist on the site. Tree-lined walking and cycling paths weave towards the nearby river, forming corridors that support wildlife movement. Along these paths, well-placed signs and observation points encourage visitors to engage with urban biodiversity, fostering a deeper connection with the powerful owls that continue shaping this shared environment.

5.3 | Encourage informed action

5.3.1 | Challenges to owl conservation

Interviewees reported numerous challenges in sustaining conservation efforts. Long-term commitments to support powerful owl conservation remain inadequate, and knowledge accumulation and sharing face constraints (Section 4.1.3). Additionally, maintaining volunteer and enthusiast interest is difficult, particularly when conflicting opinions arise.

5.3.2 | Best practice in community initiatives

Committed volunteers already collect valuable data for organisations, such as the Powerful Owl Project. The use of devices, such as cameras or sensors, can offer opportunities to gather novel information on nesting behaviours (Parsons, 2023). To enhance these efforts, future measures should support citizens in collecting and

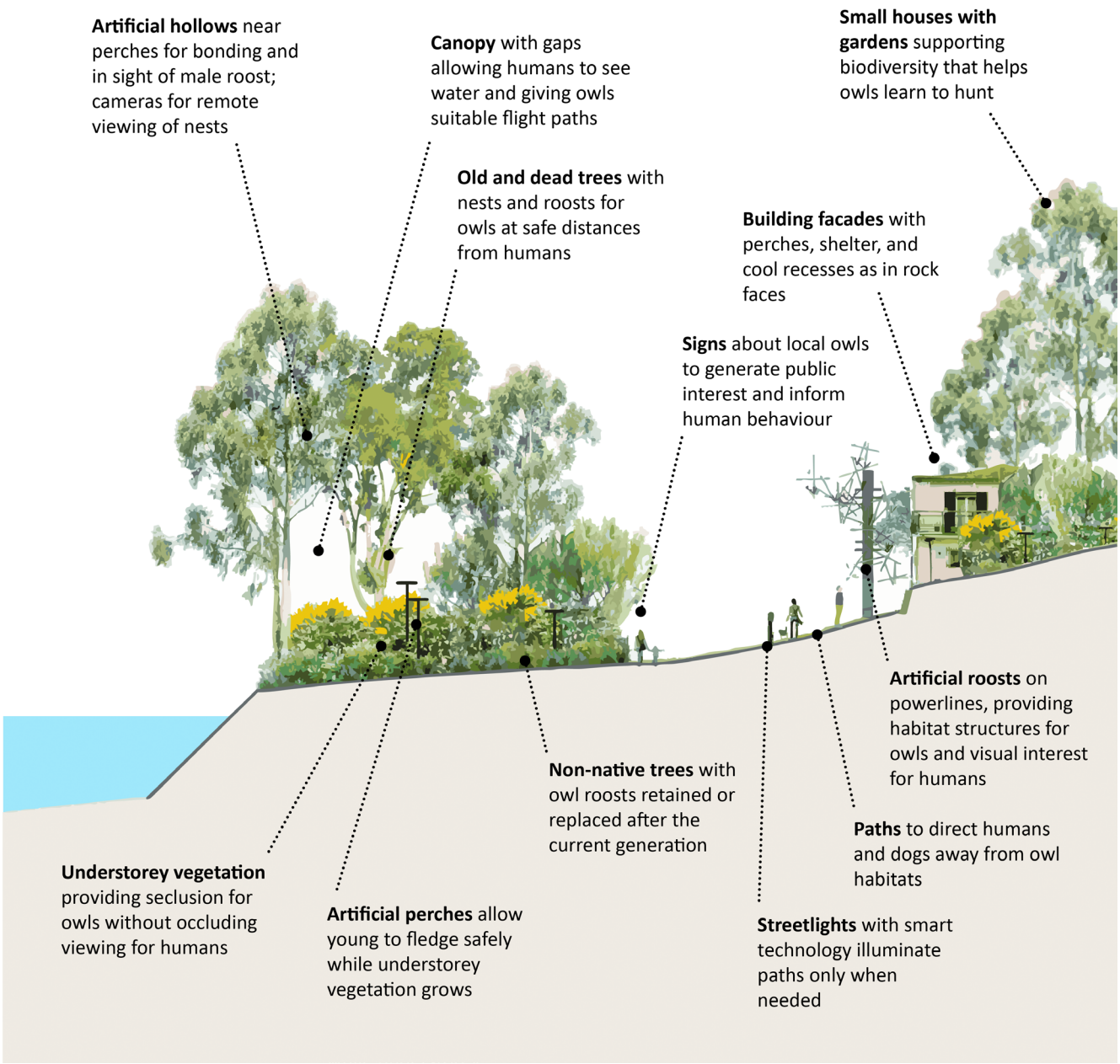

FIGURE 6 Curating positive interactions (image by the authors, featuring work from the City of Ryde combined with contributions by Alex Holland and colleagues).

sharing knowledge more easily, ensure projects remain exciting and persistent, make sure communities receive the information and demonstrate how knowledge leads to meaningful action. Based on participant feedback, this approach can encourage positive interactions with and support for powerful owls (Section 4.2.3).

5.3.3 | Opportunities for shared imagination

Building on the efforts of Big City Birds and our work with online platforms to make innovative design accessible (Parker et al., 2023), Figure 7 outlines elements of a knowledge- and practice-sharing network that links scientific research with long-term, in-depth observations by committed volunteers.

Citizen science initiatives can encourage actionable engagement, improve understanding of powerful owl behaviour, guide effective interventions, deter development that threatens habitats and shape human behaviour to align with preferences of individual owls (Section 4.3.3). For instance, a public database or field guide could enable citizens to document novel, disputed or location-specific cultural behaviours (e.g. see Greggor, 2024). The Big City Birds platform sets a precedent for engaging citizens in scientific research and mapping behaviours, such as cockatoos opening bins. An expanded version of such a database could collect data on how powerful owls

FIGURE 7 Better understanding and action through a collaborative system (image by the authors, featuring work from Lian Hingee, Big City Birds, Simon Zhu, Meredith Aveling and Steve Trikoulis).

adapt to urban environments, advancing research into undocumented behaviours (Section 4.2.1).

A platform combining scientific evidence, observations of cultural behaviours, design templates and educational resources could then ensure continuous management and provision of essential habitat features, such as hollows and trees, to meet current and future demand. Such tools would support fine-grained, individualised knowledge driven by empathy, reciprocal stewardship and mutual capacity-building, combined with innovative manufacturing, engineering and design solutions that utilise computation and emerging technologies to create custom habitats or inspire new ideas.

Our interviews confirm that citizens can contribute high-quality observations, presenting an opportunity to elevate citizen science by combining multiple forms of knowledge. This diverse knowledge base could evolve into a model of 'citizen design'—an action-oriented expansion of 'citizen science'—empowering a wide range of participants to access advanced technology via collaborative tools. The expansion of these platforms into mainstream use could benefit from the integration of learning about nonhuman urban dwellers into core education and accreditation standards across design disciplines. This approach could foster innovation to extend beyond the practical measures that are imaginable now.

Our research underscores the need for further study to validate and expand stories about powerful owls' behaviours, such as grief, as mentioned in popular science literature (Ackerman, 2023), and to address the lack of research on their emotions, cultures or cognitive capacities, as studied in other birds (Kaplan, 2015). Such research could refine urban planning and management by enhancing predictions about animals' responses to urban design (Stanton et al., 2023). Future study also holds potential for discovering new methods of engagement with diverse stakeholders (Marzluff, 2019) and represents a critical step towards inclusive decision-making that acknowledges animals as sentient beings capable of shaping cultures, spaces and management practices (Edelblutte et al., 2023).

For example, information about owls' roosting preferences could guide the management of large old trees and establish baselines for designing artificial perches that mimic natural tree branches where these trees cannot grow (Holland et al., 2023). Insights into the features of trees frequently used by owls, discussed by interviewees (Sections 4.2.2 and 4.3.3) and in prior studies (Bradsworth et al., 2021; McNabb et al., 2007), could also inform these designs. When integrated into knowledge-sharing platforms as discussed above, these resources could enable the customisation of artificial hollows based on nuanced local observations of owl behaviours and the habitat structures they typically use (Parker, Roudavski, Isaac, & Bradsworth, 2022). Addressing challenges reported by interviewees, these tools could connect diverse stakeholders, facilitate knowledge exchange, offer timely guidance, translate research findings into practice and lead to habitat designs that help powerful owls adapt to and use new urban structures.

6 | CONCLUSIONS

Our investigation into coexistence between humans and powerful owls in south-eastern Australia has presented examples that can inspire future design and management of cities. Through in-context interviews, we have gathered insights from dedicated individuals who, over many years, have closely engaged with powerful owls as ethologists, participant observers, activists, conservation scientists and conscientious neighbours. Their expertise has revealed the following findings:

- Cities present challenges for human–owl coexistence, highlighting the need to account for nonhuman stakeholders in decision-making, overcome interspecies conflict and support knowledge sharing.
- Humans can learn to coexist with owls by empathising with nonhuman experiences of anthropogenic environments, considering land management from nonhuman perspectives and recognising nonhuman preferences.
- Coexistence can be a mutually rewarding experience when humans develop connections to multispecies communities, experience positive interactions with wildlife and provide support through research, advocacy and urban interventions.

Considering the urgent need to create more biodiverse, thriving and fair urban ecosystems, the findings of this study are significant. Typically, urban development and everyday practices pay little attention to nonhuman inhabitants, often leading to adverse impacts on wildlife (Taylor-Brown et al., 2019). Improvements to current urban development practices are readily attainable, but substantial progress depends on identifying and promoting human behaviours that are more conducive to positive coexistence (Veríssimo et al., 2024). Our study addresses this challenge by presenting a hopeful vision of urban living that emphasises shared benefits, characterised by mutual respect, understanding and support. We offer strategies to integrate the interests of nonhuman stakeholders in design, actionable steps to improve human–wildlife relations and paths to translate knowledge into action. In doing so, our study expands the dialogue on multispecies approaches to design (Roudavski, 2020), extends guidelines aiming to help urban owls (Powerful Owl Coalition, 2018) and documents cases of convivial conservation (Büscher & Fletcher, 2019).

By offering examples that indicate how positive coexistence can become more feasible and desirable, this article provides insights for brief writing, regulation and education in urban planning, design and management. Future research should focus on understanding the nuanced behaviours of powerful owls in urban settings to refine these approaches. Efforts to engage communities through citizen science and educational initiatives can further bridge the gap between human and nonhuman needs. Ultimately, fostering a deeper connection with nonhuman stakeholders enriches urban life, promotes biodiversity and creates resilient ecosystems that support both humans and wildlife. Embracing these principles, this article works towards more sustainable and just urban environments in which both humans and powerful owls have better opportunities to thrive.

AUTHOR CONTRIBUTIONS

Stanislav Roudavski developed and led the overarching approach. Dan Parker, Kylie Soanes and Stanislav Roudavski conceived the ideas and designed the methodology in this article. Dan Parker collected and analysed the data. Dan Parker, Kylie Soanes and Stanislav Roudavski led the writing of the manuscript. All authors contributed critically to the drafts and gave final approval for publication.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

All data for this study are within the article.

ORCID

Dan Parker https://orcid.org/0000-0001-5325-4176
Kylie Soanes https://orcid.org/0000-0002-2266-9392
Stanislav Roudavski https://orcid.org/0000-0003-0124-4907

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Data S1. Interview topics and questions.

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